

*AMPLIPEDICOLA PECTINATUS* GEN. ET SP. N. (COPEPODA,  
HARPACTICOIDA, TISBIDAE), A PARASITE OF OCTOPUSES IN  
THE BERING SEA

BY

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ABSTRACT

A new species of parasitic copepod, *Amplipedicola pectinatus* gen. n. et sp. n. (Tisbidae, Cholidiinae) is described. The parasite was detected on the gills of octopuses in the Bering Sea at a depth of 129-500 m. *Amplipedicola* gen. n. differs from closely related genera by the absence of legs 2-4 and of the exopodite of the antenna, as well as by the unusually long, uniramous legs 1, extending away from the sides of the body.

RÉSUMÉ

Une nouvelle espèce de copépode parasite *Amplipedicola pectinatus* gen. n. et sp. n. (Tisbidae, Cholidiinae) est décrite. Le parasite a été trouvé sur les branchies de pieuvres dans la mer de Béring, à une profondeur de 129-500 m. *Amplipedicola* gen. n. diffère des genres les plus proches par l'absence des pattes 2-4 et de l'exopodite de l'antenne, ainsi que par la première paire de pattes uniramée, exceptionnellement longue et s'étendant de chaque côté du corps.

INTRODUCTION

Twelve species from eight genera of tisbid copepods (Copepoda, Harpacticoida, Tisbidae) are associated with octopuses (Humes & Voight, 1997; López-González et al., 2000). Two genera, *Yunona* Avdeev, 1983 and *Octopinella* Avdeev, 1986, belonging to the subfamily Tisbinae (cf. Avdeev, 1983, 1986), include both free-living species and species that are symbionts of marine invertebrates. The remaining genera belong to the subfamily Cholidiinae, created by Boxshall (1979): *Cholidya* Farran, 1914, *Cholidyella* Avdeev, 1982, *Brescianiana* Avdeev,

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1982, *Tripartisoma* Avdeev, 1983, and the most recently described genera *Avdeevia* Bresciani & Lützen, 1994 and *Genesis* López-González, Bresciani & Huys, 2000. All of these include species parasitizing octopuses. This paper deals with a new genus from the subfamily Cholidiinae.

#### MATERIAL AND METHODS

The parasitic copepod described in the present paper was collected on the gills of octopuses by Mr. S. P. Matveichuk, Pacific Research Fisheries Centre, Vladivostok. The copepod parasites removed from the host's gills were preserved in 70% ethanol. They were later cleared in lactic acid for about 2 hours before being dissected in a drop of lactic acid. All drawings were made with the aid of a camera lucida. Measurements of the body and of body parts were taken after the specimen was cleared in lactic acid.

#### SYSTEMATIC PART

##### TISBIDAE Stebbing, 1910

##### CHOLIDIYINAE Boxshall, 1979

##### ***Amplipedicola* gen. n.**

Diagnosis. — Female. Body modified and divided into 2-segmented prosome (cephalosome and metasome) and 1-segmented urosome. Metasome includes somite bearing leg 1. Deep lateral indentation between cephalosome and metasome. Caudal ramus with 3 setae. Rostrum ventrally undeveloped. Antennule 5-segmented. Antenna without exopod; endopod with 3 pectinate claws. Mandible with praecoxa spiniform in distal part, palp uniramous and 1-segmented. Maxillule absent. Maxilla 2-segmented, claw-like, without seta on first segment. Maxilliped 4-segmented, last segment with 5-6 pectines terminally. Leg 1 uniramous, with coxa and basis elongate, endopod 3-segmented. Legs 2-4 absent. Leg 5 is 1-segmented, placed ventrolaterally, with 2 setae.

Male. Body unsegmented, with cephalosome broader than metasome. Caudal ramus with 4 setae. Rostrum ventrally rounded. Antennule geniculate, 6-segmented. Last segment of maxilliped with 3 pectines terminally. Leg 5 represented by 1 seta. Other details as in female.

Sexual dimorphism in body shape, caudal rami, rostrum, antennule, antenna, maxilliped, and legs 1 and 5.

Parasitic on gills of octopuses.

Type and only known species. — *Amplipedicola pectinatus* sp. n.

Etymology. — The generic name is derived from the Latin “amplus” (= large) and “pedes” (= feet) alluding to the unusually long legs 1 of the new genus. The gender is masculine.

### **Amplipedicola pectinatus** sp. n. (figs. 1, 2)

Material examined. — Eleven ♀♀ and 1 ♂ from the gills of 3 *Benthocopus* sp. (cf. *profundorum* Robson, 1932), caught in the Bering Sea (61°15'N 175°34'E), depth 500 m, 7 September 1991; 10 ♀♀ from the gills of 1 *Octopus dofleini* (Wülker, 1910) in the Bering Sea (55°42'N 167°01'E), depth 129 m, 4 June 1991. Holotype (♀, AGK 99001) and paratypes (20 ♀♀ and 1 ♂, APK 99002) deposited in the parasitological collection of the Pacific Research Fisheries Centre, Vladivostok.

Female. — Body (fig. 1A, B) 141 (122-144)  $\mu\text{m}$  long, excluding setae on caudal rami. Greatest width of cephalosome 81 (72-84)  $\mu\text{m}$ , based on 10 specimens in lactic acid. Prosome oval, expanded dorsally. Ratio of length cephalosome to that of metasome 1.09:1, both about equal in width. Urosome (37  $\times$  45  $\mu\text{m}$ ) tapering posteriorly. Ratio of length prosome to that of urosome 2.87:1. Cephalosome in dorsal view showing internal sclerotizations (fig. 1A). Minute spinules cover all body surface. Unarmed genital field and copulatory pore as shown in fig. 1D. Egg sac (fig. 1B) measuring 82  $\times$  77  $\mu\text{m}$ , dorsoventrally flattened, slightly concave on its dorsal surface and convex on its ventral face, containing 12-14 eggs, each egg approximately 26  $\mu\text{m}$  in diameter. Caudal ramus (fig. 1C) slightly longer than wide (16  $\times$  12  $\mu\text{m}$ ), carrying 2 terminal setae (one modified) and 1 dorsal seta. All setae naked.

Rostrum (fig. 1A, B, E) produced anteriorly, but posteroventrally not well defined. Antennule (fig. 1E) 5-segmented, 45  $\mu\text{m}$  long (measured along posterior margin), with formula 1, 7, 3, 3 + 1 aesthetasc, and 6. All setae naked. Antenna (fig. 1F) with coxa and basis fused; exopod absent, endopod 2-segmented, first segment unarmed, second segment with 3 claws that are pectinate distally. Claws different in length, outermost longest and innermost shortest. All claws with 5 pectines. Labrum shield-shaped. Praecoxa of mandible (fig. 2A) broad in basal part and bifurcate, spiniform in distal part. Mandibular palp 1-segmented, with 1 seta and a group of minute spines on outer distal surface. Maxilla (fig. 2B) 2-segmented, first segment unarmed, with posterior edge strongly sclerotized; second segment claw-shaped. Maxilliped (fig. 2C) 4-segmented, last segment with 5-6 pectines terminally.

Leg 1 (fig. 1A, B) uniramous, 97  $\mu\text{m}$  long, both legs of the pair extending out from body sides. Intercoxal plate absent. Coxa and basis elongate, about equal in length. Coxa bearing 1 distal outer seta and 3 groups of minute spines proximally on ventral surface; basis unarmed. Endopod 3-segmented, first 2 segments short and unarmed, third segment longer than first and second combined, terminally armed with 2 short claws and lamelliform element, all with 5 pectines distally.

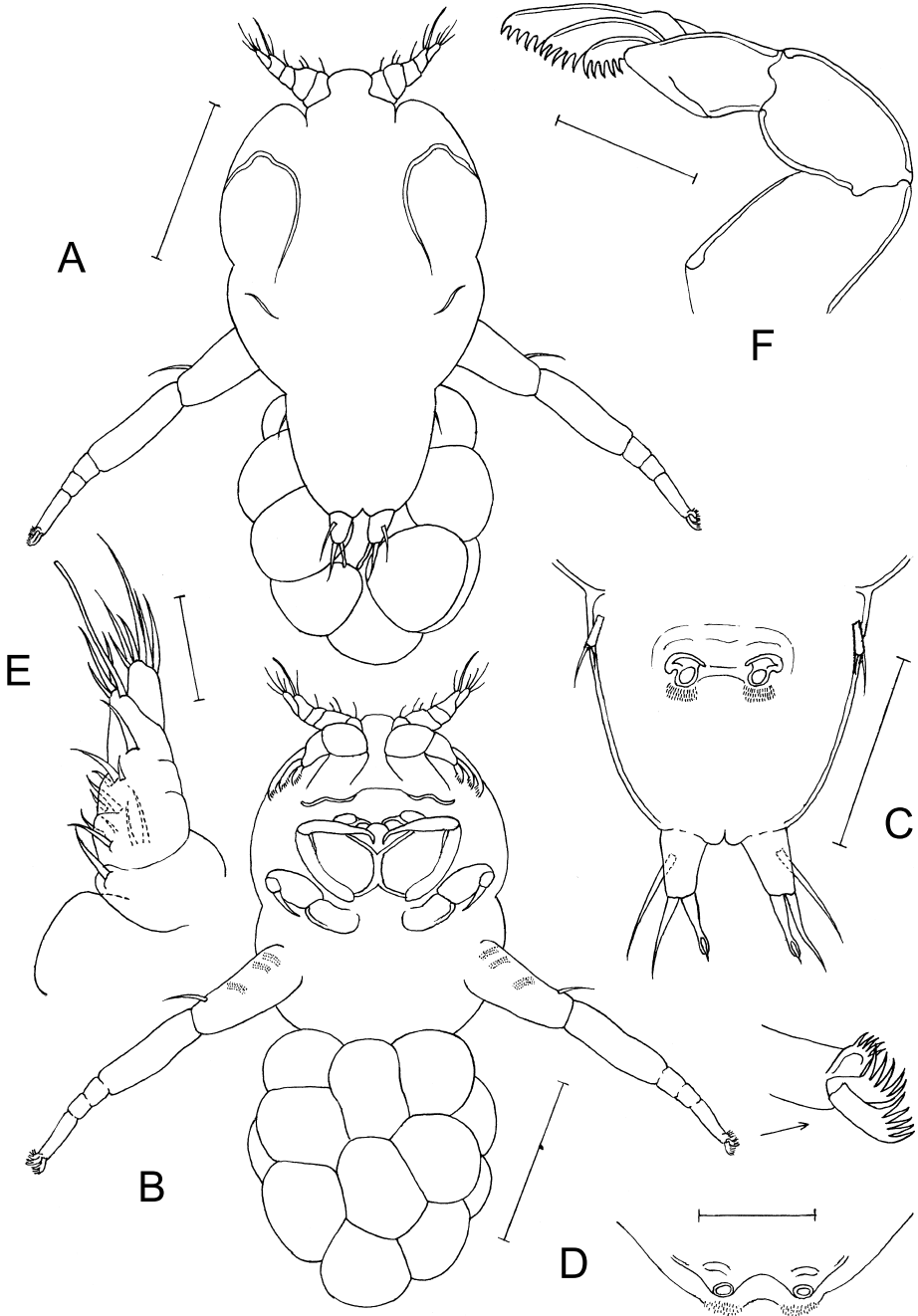


Fig. 1. *Amplipedicola pectinatus* gen. n., sp. n., female. A, body, dorsal; B, body, ventral; C, urosome and caudal rami, ventral; D, genital field, anteroventrally; E, antennule and rostral area, ventral; F, antenna, ventral. Scale bars: 0.05 mm in A, B, C; 0.02 mm in D, E, F.

Legs 2-4 absent. Leg 5 (fig. 2D) represented by small segment ( $10 \times 3 \mu\text{m}$ ) bearing 2 terminal setae 13 and  $7 \mu\text{m}$  long. Position of 5th pair of legs shown in fig. 1C.

Male. — Body elongate, length  $276 \mu\text{m}$  and greatest width  $135 \mu\text{m}$ , unsegmented (fig. 2E), but demarcation between cephalosome and metasome indicated by feebly expressed swellings of epimeral areas. Cephalosome in dorsal view showing internal sclerotizations. Urosome elongated. Caudal ramus (fig. 2G)  $27 \times 18 \mu\text{m}$ , bearing 3 terminal setae and 1 dorsal seta, all setae naked.

Rostrum expanded laterally, covering first segment and basal part of second segment of antennule (figs. 2E), anterolateral edge strongly sclerotized; ventrally visible as a plate, rounded posteriorly, between bases of antennules (fig. 2H). Antennule (fig. 2H) geniculate, 6-segmented,  $58 \mu\text{m}$  long (measured along posterior margin), with formula: 1, 2, 1, 2 + 1 aesthetasc ( $58 \mu\text{m}$  long), 1 + 1 spine, and 2. All setae naked. Antenna (fig. 2I) as in female, but claws terminally with 3-4 pectines. Mandible, maxilla as in female. Maxilliped (fig. 2J) as in female, but last segment with 3 pectines.

Leg 1 (fig. 2E)  $189 \mu\text{m}$  long, resembling that of female, but limb carrying 2 short, distally pectinate claws and 1 normal claw (fig. 2K). Leg 5 (fig. 2F) represented by 1 seta, with group of minute spines at base.

Colour of living specimens unknown.

Etymology. — The specific name, derived from the Latin “pectinatus”, “with combs”, alludes to the claws of the antenna, maxilliped, and leg 1, that are all pectinate distally. The name is an adjective agreeing in gender with the (masculine) generic name.

Remarks. — The most conspicuous feature of the present genus is the extreme disproportion in size of leg 1 compared to the body of both sexes, which indicates the important role of this appendage in attaching the parasite to the gills of the host. There are, however, important differences between *Amplipedicola* and the other genera of the Cholidiinae. Among all the known genera of Cholidiinae, only in *Cholidya*, as in *Amplipedicola*, somite bearing leg 1 is included in the metasome (Humes & Voight, 1997), while in *Cholidyella*, *Tripartisoma*, and *Genesis* it is included in the cephalosome; *Brescianiana* has a strongly inflated body shape, lacking any defined segmentation (Avdeev, 1982); *Avdeevia* is the most modified genus, with the body shape irregularly bean-shaped and the cephalothorax being clearly differentiated from the undivided trunk (Bresciani & Lützen, 1994). In *Amplipedicola* (only the female) the antennule is 5-segmented, whereas in *Cholidyella*, *Brescianiana*, *Tripartisoma*, and *Avdeevia* it is 7-segmented, in *Cholidya* 6-segmented, and in *Genesis* only 4-segmented. In *Amplipedicola* the coxa and basis of the antenna are fused and the exopod is absent, but in the other genera of Cholidiinae

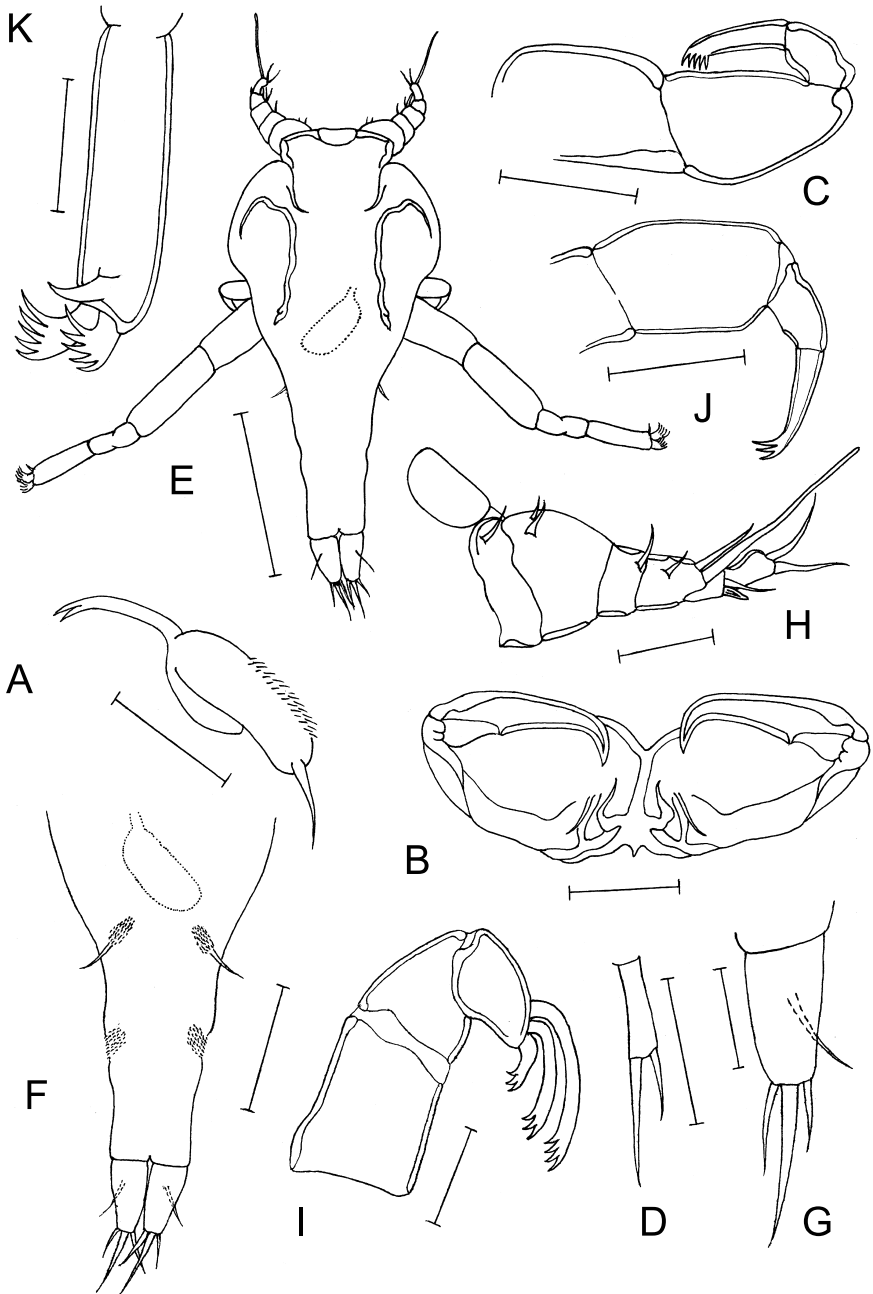


Fig. 2. *Amplipedicola pectinatus* gen. n., sp. n., A-D, female: A, mandible, ventral; B, maxilla, ventral; C, maxilliped, ventral; D, leg 5, ventral. E-K, male: E, body, dorsal; F, urosomal area and caudal rami, ventral; G, caudal rami, ventral; H, antennule and rostrum, ventral; I, antenna, ventral; J, maxilliped, ventral; K, distal segment of leg 1, ventral. Scale bars: 0.02 mm in A, B, C, G, H, I, J, K; 0.1 mm in E; 0.05 mm in F; 0.015 mm in D.

the coxa and basis of the antenna are separate and the exopod is present. In *Amplipedicola* the palp of the mandible is 1-segmented, while in *Cholidya*, *Cholidyella*, and *Brescianiana* it is 3-segmented, in *Avdeevia* and *Genesis* 2-segmented, and in *Tripartisoma* the palp of the mandible is biramous with each ramus 1-segmented. In *Amplipedicola* leg 1 is uniramous and legs 2-4 are absent, but in *Cholidya*, *Cholidyella*, *Brescianiana*, *Tripartisoma*, and *Genesis* leg 1 is biramous and legs 2-4 are present; in *Avdeevia* only the first two pairs of legs are present. In *Amplipedicola* (only the female) the caudal ramus has 3 short setae (one modified), while in *Cholidya*, *Cholidyella*, *Tripartisoma*, and *Brescianiana* it has 5 short setae and 1 enlarged terminal seta, in *Genesis* it has 4 short setae and in *Avdeevia* the caudal rami are completely lost (Bresciani & Lützen, 1994).

Among the genera of the Cholidiinae, both sexes are known only in *Cholidya* (*C. polypi* Farran, 1914) and in three species of *Cholidyella* (*C. incisa* Avdeev, 1982; *C. breviseta* Avdeev, 1986; and *C. nesis* Avdeev, 1986). The male of *Amplipedicola* differs from males of both these genera as follows: the caudal ramus has 4 setae (6 setae), the antennule is 6-segmented (7- and 10-segmented, respectively), the exopod of the antenna is absent (present), and only the first and fifth pairs of legs are retained (six pairs of legs).

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