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A redescription of *Cumoniscus* Bonnier, 1903 (Crustacea: Tantulocarida) from a cumacean host in the Bay of Biscay

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Abstract

Cumoniscus kruppi Bonnier, the only tantulocarid known from a cumacean host, is redescribed from a tantulus larva collected from the Bay of Biscay. The host is a male leuconid cumacean. This genus is placed in the family Deoterthridae, and can be distinguished from other genera by the pore pattern on the cephalic shield, the reduced setae on the sixth legs and the presence of tiny curved spinules on the endopod of thoracopods 2 to 5.

Introduction

In 1903 Jules Bonnier presented a short note describing a new parasitic crustacean found on an unidentified cumacean host collected by F.A. Krupp during a cruise of his yacht Puritan in 1902 in the vicinity of the Isle of Capri in the Mediterranean. The parasite was classified as an epicaridean isopod and named *Cumoniscus kruppi* by Bonnier. The brief original description of *C. kruppi* referred to a sac-like body attached to the host by a small adhesive disc and Bonnier's figure also showed a slender neck region. On the basis of this description, Boxshall & Lincoln (1987) placed *Cumoniscus* in the Tantulocarida, but in the *incertae sedis* category, because the lack of information on other life-cycle stages prevented classification to family level.

During the course of a study of part of the epibenthic community from the Bay of Biscay, one of us (J-PC) discovered a tantulus larva attached to the pleopod of a small male cumacean. This larva was in poor condition, but sufficient detail could be observed to permit its description. It differs from known tantulocarids in several important features and is here redescribed and attributed to the genus *Cumoniscus*.

Materials and methods

Material

A single tantulus larva was attached to the inner ramus of the second pleopod of a male leuconid cumacean collected in an epibenthic haul taken at a depth of 306–307 m in the Bay of Biscay off Arcachon. The start and end positions of the haul were 44°33.70′ N, 2°07.25′ W and 44°33.75′ N, 2°07.10′ W, respectively.

Methods

The larva was examined as a temporary mount in lactophenol. All observations were made under

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oil immersion using a 100× objective on a Leitz Diaplan microscope with differential interference contrast. Drawings were made with the aid of a drawing tube. Cephalic pore nomenclature system follows Huys & Boxshall (in press).

Identity of host

The holotype female of *Cumoniscus kruppi* was collected by sledge at a depth of 1,100 m (Stn 39) off Capri, at a distance of ±9 km from Galli di Positano (Lo Bianco, 1903). A depth of 1,000 m was given by Bonnier in his account of the discovery. The host cumacean was identified as a member of the family Leuconidae but could not be placed in an existing genus. Lo Bianco (1903) identified two potential leuconid hosts from Stn 39, one of which, *Leucon* (*Leucon*) *nasica nasica* (Krøyer), was rare (one specimen) and the other, *Leucon* (*Epileucon*) *longirostris* G.O. Sars, was abundant. Calman (1906) considered Lo Bianco's record of *L.* (*L.*) *nasica nasica* doubtful, which leaves *L.* (*E.*) *longirostris* as the likely host. However, Bonnier's (1903: taf. 7, 9) and Lo Bianco's (1903: taf. 7–11) illustrations show the inner ramus of the cumacean's uropod as 3-segmented. This character is not found in any known leuconid genus. The male host of *C. kruppi* from the Bay of Biscay is also a leuconid characterised by a 3-segmented inner ramus on the uropod. It is possible that in these two records the host cumacean represents the same new genus of Leuconidae.

Cumoniscus Bonnier, 1903

Diagnosis

Tantulocarida. Tantulus larva comprising cephalon, thorax of 6 pedigerous somites plus one limbless somite, and undivided abdomen. Cephalic shield with pore formula: A_{I-V}, D_{I-IV}, L_{I-IV}, V_I. Ornamented with longitudinal and oblique surface lamellae. Thoracopod 1 unknown. Thoracopods 2 to 5 each with unsegmented protopod bearing well-developed medial endite. Exopods 2-segmented with 5 setae. Endopods one-segmented with 2 setae on outer margin, 2 small curved spinules on inner margin and bifurcate process subapically. Thoracopod 6 without distinct rami, with coupling spines on medial margin and 2 short setae apically. Abdomen with striations. Caudal rami distinct, armed with one short and 2 long setae. Parthenogenetic female with slender neck and sac-like trunk.

Host: Cumacea (Leuconidae).

Type: *Cumoniscus kruppi* Bonnier 1903, by monotypy.

Cumoniscus kruppi Bonnier, 1903

Description of Tantulus (Fig. 1)

Body length approximately 100 μm. Body comprising cephalon covered by dorsal shield, 6 pedigerous thoracic somites, one limbless thoracic somite and a one-segmented abdomen. Cephalon broadly triangular in dorsal view (Fig. 1A), tapering anteriorly towards frontal disc; postero-lateral angles simple, without processes. Cephalic shield just slightly longer than broad (35 × 34 μm). Integument of shield ornamented with single median and pair of dorsal longitudinal epicuticular lamellae; 2 pairs of short oblique lamellae (Fig. 1B) present midway along ventro-lateral margin of shield. Rostrum absent. Oral disc about 13 μm in diameter (Fig. 1A–B). Cephalic shield with 14 pairs of pores: pore formula A_{I-V}, D_{I-IV}, L_{I-IV}, V_I. Anterior group of pores located near frontal margin, with pore A_{IV} displaced anterior to slit-like pore A_I. Cephalic appendages absent. Cephalic stylet missing from disarticulated tantalus.

Free thoracic tergites and thoracopod 1 not observed. Thoracopods 2 to 4 similar (Fig. 1D), biramous, with one-segmented protopod bearing elongate medial endite. Armature of endite under light microscope visible as single spinous element (coupling spine). Surface of protopod ornamented with scattered spinules. Endopod one-segmented, longer than protopod; outer margin with 2 short setae closely set in socket; proximal seta stouter and longer than distal, neither extending to tip of ramus; endopod bearing bifurcate element subapically; inner margin bearing 2 curved spinules. Exopod 2-segmented; proximal segment un-

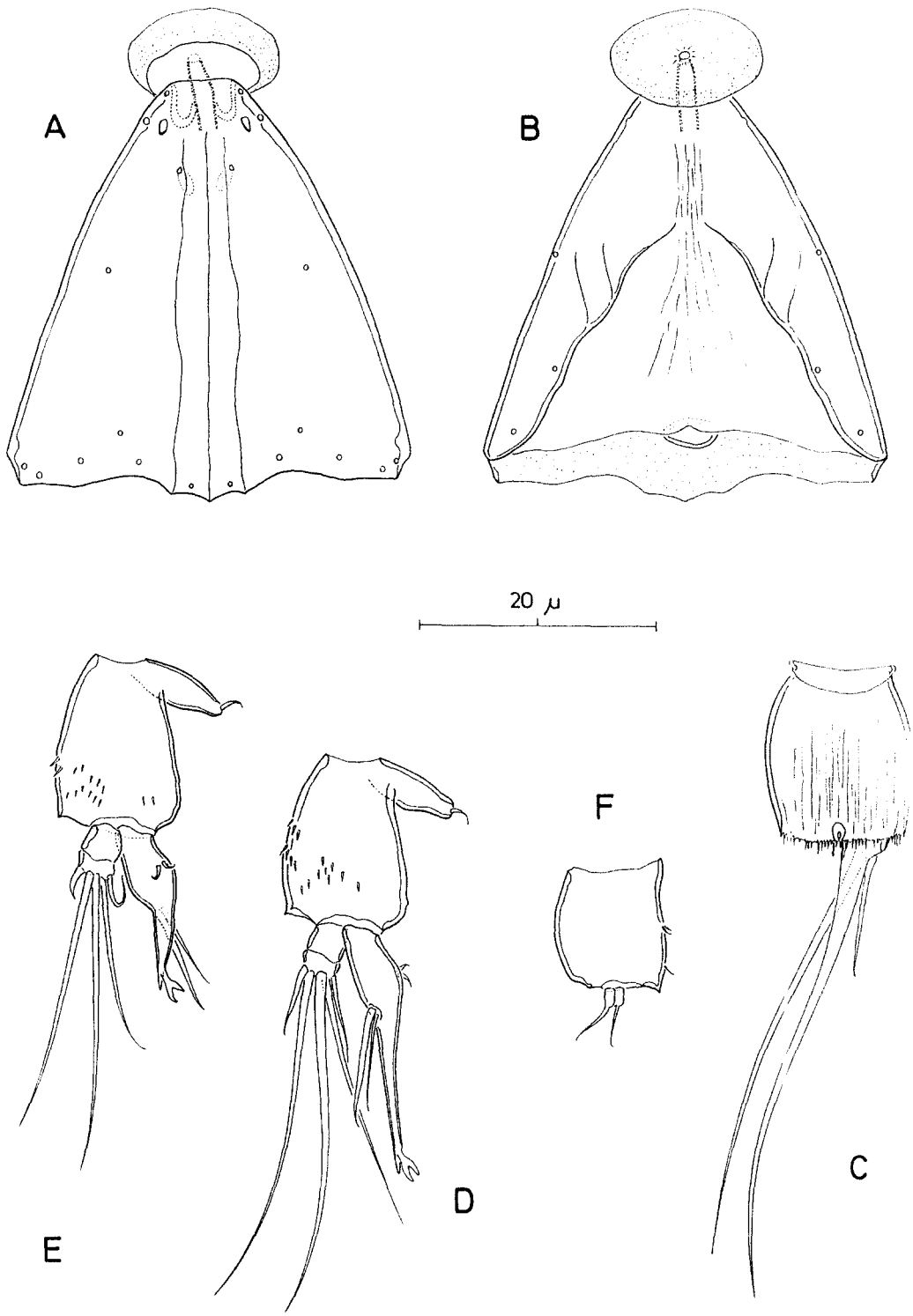

Fig. 1. Cumoniscus kruppi tantulus larva. A, Cephalic shield, dorsal; B, Cephalic shield, ventral; C, Abdomen, ventral; D, Thoracopod 2, anterior; E, Thoracopod 5, anterior; F, Thoracopod 6, posterior.

armed; distal segment bearing 3 long and 2 short naked setae around distal margin.

Thoracopod 5 (Fig. 1E) similar to thoracopods 2 to 4 in basic structure, armature and ornamentation but with endopodal segment relatively shorter. Thoracopod 6 (Fig. 1F) comprising single protopodal segment with 2 coupling spines midway along medial margin and single spinule near inner distal angle; distal margin bearing 2 short setae with bulbous bases.

Abdomen (Fig. 1C) one-segmented, 1.2 times longer than wide (14×12 μm). Ventral surface longitudinally striated; postero-ventral margin ornamented with combs of spinules. Caudal rami distinct, armed with one short and 2 long setae (Fig. 1C); longest seta inserting apically, shortest laterally, near base of ramus.

Discussion

The tantulus larva described above is only the second tantulocarid specimen ever found on a cumacean. The first, an adult parthenogenetic female, provided no information on phylogenetic relationships and had to be treated as *incertae sedis* (Boxshall & Lincoln, 1987). The tantulus described above is identified as *Cumoniscus kruppi* solely on the basis of its host – a leuconid cumacean. This effectively brings *Cumoniscus* into the modern tantulocarid literature and avoids the unnecessary establishment of new taxa. The decision to identify this tantulus as conspecific with the type-specimen is arbitrary and may require re-evaluation in future should more tantulocarids be collected from cumacean hosts in the vicinity of the type-locality.

Cumoniscus is still imperfectly known, since the first thoracopod could not be found on the poorly preserved specimen described here. The male of this genus is also unknown. However, on the basis of the morphological information available *Cumoniscus* can be readily excluded from the family Microdajidae, which is characterised by the reduced rami of the larval thoracopods, and the family Basipodellidae, which is characterised by the apparently multisegmented larval abdomen. The family Doryphallophoridae is best diagnosed on the basis of its male characters, but the presence of a well-developed rostrum on the larval head of the only genus, *Doryphallophora* Huys, is a unique feature. The absence of a rostrum serves to exclude *Cumoniscus* from the Doryphallophoridae. Only two families remain, the Deoterthridae and Onceroxenidae, distinguished primarily by the apparent segmentation of the abdomen. We place *Cumoniscus* in the Deoterthridae on the basis of the one-segmented nature of the larval abdomen, the presence of well-developed rami on the larval thoracopods and the absence of a rostrum. Most deoterthrids occur on copepod and ostracod hosts. The only other deoterthrid genus reported from a peracarid host is *Amphitantulus* Boxshall & Vader, which is parasitic on the amphipod *Harpinia antennaria* Meinert in the North Sea (Boxshall & Vader, in press).

Cumoniscus can be distinguished from other genera in the Deoterthridae on the basis of a number of unique characters. The arrangement of the pores of the anterior group on the cephalic shield is unusual in the location of pore A_{IV} anterior to the slit-like pore A_I. The latter was presumably sensillate in life but no sensilla at all remain on the cleared specimen. The presence of pore A_V is a relatively uncommon character for the family. *Cumoniscus* also differs in the possession of a pair of tiny curved spinules on the inner margin of the endopods of thoracopods 2 to 5. These spinules may function as coupling spines, but this cannot be confirmed using light microscopy. Finally, the very reduced size of the setae on the apex of the sixth thoracopods is another distinguishing feature.

Few crustacean parasites have been reported from cumacean hosts. Hansen (1916) described an epicaridean isopod, *Cumoechus insignis*, from the brood-pouch of cumaceans belonging to the genera *Diastylis* Say and *Hemilamprops* G.O. Sars. Within the copepod family Nicothoidae (order Siphonostomatoida) representatives of two genera occur on cumaceans (Hansen, 1897): all five described species of *Homoeoscelis* Hansen and eight of the more than 70 known species of

Sphaeronella Salensky infest cumaceans (Boxshall & Lincoln, 1983). These copepods occupy relatively sheltered sites on the host, either in the branchial chamber (*Homoeoscelis* species) or in the brood pouch (*Sphaeronella* species). In contrast, tantulocarids can be found in exposed sites, such as the fifth pleonite (Bonnier, 1903) and the second pleopod (present account). This indicates that the minute adhesive oral disc provides sufficiently secure attachment to the host to prevent the tantulocarid from being dislodged either by the grooming behaviour of the host or by contact with the sediment as the host moves over and through the bottom.

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