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Arcticotantulus pertzovi gen. et sp. n. (Tantulocarida,
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Short communication

***Arcticotantulus pertzovi* gen. et sp. n. (Tantulocarida, Crustacea) – a new tantulocaridan from the pseudobathyal region of the White Sea**

Pavel N. Kornev, Alexei V. Tchesunov & Pavel V. Rybnikov

SARSIA



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A new genus and species of Tantulocarida, *Arcticotantulus pertzovi* gen. et sp. n., was found on harpacticoid copepod *Pseudobradia* sp. of the family Ectinosomatidae, collected from silty sediment in the Kandalaksha Bay in the White Sea. There were tantulii, parthenogenetic females and early stage males. This new genus can be easily distinguished from the other genera of Basipodellidae by the reduced setal count on exopods of thoracopods 1–5 and by the separate praecoxal segments of thoracopods 1–5. This is the first record of subclass Tantulocarida in the White Sea and adjacent waters.

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Keywords: Tantulocarida; *Arcticotantulus* gen. nov.; parasite; Harpacticoida; White Sea.

INTRODUCTION

The White Sea, according to its geographical locality, is separated from the central part of the Arctic Ocean by a shallow, warm water, coastal region of the Barents Sea. The central region of the White Sea, with a depth to 330 m and smaller local depressions, has typical arctic conditions with negative temperatures and is referred to as pseudobathyal. The shallow water margin has not isolated this region from the introduction of an arctic faunal component, such as bivalve molluscs *Portlandia arctica* (Gray), *Tridonta borealis* (Schumacher) and coral *Gersemia fruticosa* (Sars). Another component of fauna consists of relicts of the brackish water seas of the post-glacial epoch.

Benthic copepods of the pseudobathyal zone of the White Sea have never been studied. Current research of harpacticoids has revealed more than 20 species, belonging to Ectinosomatidae, Diosaccidae, Argesthiidae, Paranannopidae, Cletodidae and Ancorabolidae. Some of them (Paranannopidae) evidently represent an arctic component of the fauna (Gee & Huys 1994; Willen 1999). Among this variety of harpacticoids, only some specimens of a *Pseudobradia* sp. were infected by tantulocaridan parasites. Tantulocarida has previously never been recorded from the White Sea or adjacent waters or from the Arctic Ocean, but has been

found in many places in the North Sea and the Norwegian Sea. In view of the special properties of the pseudobathyal, Tantulocarida of this region may represent a typical part of an as yet unknown fauna of the Arctic Ocean basin.

MATERIAL AND METHODS

Samples were taken using a hyperbenthic sled: (1) 6 August 2002, at the Velikaya Salma Strait, the Kandalaksha Bay, the White Sea, at depth 90 m; (2) 13 August 2002, near the Krestovi Isles, the Velikaya Salma Strait, the Kandalaksha Bay, the White Sea, at depth 60 m. Sediment was sieved through a 50 µm mesh and fixed in 4% formalin. Selected copepods with parasites were transferred to a mixture of alcohol (70%) and glycerol (30%) and examined as temporary preparations in glycerol. The holotype (tantulus) was carefully detached from the host and placed on a slide in glycerol. All drawings were made under oil immersion using a Biolam microscope (1500× magnification). The tantulus paratype, attached at the base of the maxilla of its host *Pseudobradia* sp., was post-fixed in 2% osmium tetroxide, dehydrated through a graded ethanol series, critical point dried, mounted on a stub, sputter-coated with gold and examined using a scanning electron microscope (Hitachi S-405A).





TAXONOMY

Arcticotantulus gen. n.

Diagnosis

Family Basipodellidae. Tantulus larva comprising cephalon, thorax of six pedigerous and one limbless somite and unsegmented abdomen. Cephalic shield tapering to anterior end, oral disc small. Ornamentation represented by longitudinal and transverse surface lamellae and by pores (cephalic pore formula as follows: $A_{III}, D_{I,IV}, L_I$). Thoracopods 1–5 with protopod with clearly defined proximal part armed by proximal endite, two-segmented exopod and unsegmented endopod, prolonged into a bifid process. Legs 1 and 2 with unarmed endopod, exopod bearing two setae. Legs 3–5 with two setae on endopod, exopod bearing three setae. Thoracopod 6 with unsegmented exopod, armed by two setae. Abdomen ornamented by transverse lamellae. Caudal rami short, with three setae. Male trunk sac develops with the major swelling after the sixth tergite, minor swelling poorly developed, but first tergite is clearly remote from the posterior edge of cephalic shield. The hosts of a genus are harpacticoid copepods.

Type species: *Arcticotantulus pertzovi* sp. nov. No other species.

Etymology

The generic name is composed from *arctic*, referring to the habitat location almost certainly on polar cycle and *tantulus*, which forms part of the name of the subclass Tantulocarida.

DESCRIPTION

Material examined

Holotype tantulus larva on a single slide (collected 13 August 2002); paratypes: one tantulus larva on host, prepared for scanning electron microscopy (collected 13 August 2002), one early stage male on host on a single slide (collected 13 August 2002). Other material: two tantulus larvae on hosts, each on a single slide (collected 13 August 2002); two early stage parthenogenetic female, on hosts, each on a single slide, one early stage male on host on a single slide (collected 6 August 2002). All material deposited in the collection of the P.P. Shirshov Institute of Oceanology, Moscow.

Tantulus larva (Figs 1A, 2A–F, 3A,B). Total body length of holotype, measured from tip of cephalon to end of caudal rami 100 μm . Body (Figs 1A, 3A,B)

comprising cephalon, seven free thoracic somites and unsegmented abdomen. Cephalon triangular, posterolateral angles of cephalic shield slightly prominent, rostrum absent. Oral disc small, 7 μm in diameter. Proximal (located in the cephalon) part of funnel-shaped organ observed through integument, slightly curved. Cephalic stylet dilative in proximal part, with total length 30 μm . Ornamentation of cephalic shield represented by surface lamellae, simple pores and a pair of sensillate pores at lateral sides of distal margin. Major surface lamellae tile distal part of cephalic shield; central part of cephalic shield covered by a few longitudinal surface lamellae, on proximal part lamellae absent. Whole cephalic shield densely ornamented by minor surface lamellae. Cephalic pore formula as follows: $A_{III}, D_{I,IV}, L_I$, median and ventral pores not observed.

Seven free thoracic somites with well-developed tergites, with smooth integument.

Thoracopods 1 and 5 (Fig. 2A–F) similar in structure. Protopod broad, with defined proximal part, armed by proximal endite. Exopod clearly two-segmented, second segment bearing two setae in thoracopods 1 and 2 or three setae in thoracopods 3–5. Endopod distally prolonged into slightly curved bifid process, without setae in thoracopods 1 and 2 and with two setae in thoracopods 3–5. Inner seta of endopod in thoracopods 3 and 4 with proximal process. Thoracopod 6 with undivided protopod, endopod absent, exopod unsegmented, bearing two setae.

Seventh thoracic somite small, without appendages or ornamentation.

Abdomen unsegmented, ornamented by six transverse surface lamellae. Three, four and five lamellae are subdivided on dorsal side. Distal edge of abdomen armed by several denticles on dorsal side.

Caudal rami small, conical, with one subterminal and two terminal setae.

Early stage male (Figs 1B, 4A). Only tantulus with expanded trunk sac, but without clearly differentiated male body observed.

Total body length of metamorphosed tantulus 140 μm . Cephalon, seventh thoracic somite, abdomen and thoracopods remain unchanged from preceding tantulus larva. First tergite is well remote from posterior edge of cephalon. Major swelling of trunk sac located posterior to tergite 6.

Early stage parthenogenetic female (Fig. 4B). Total body length from tip of cephalon to end of trunk sac 70 μm . Body comprising cephalon and trunk sac only. Cephalon remaining unchanged from preceding tantulus larva. Female at this stage lacking visible oocytes in the trunk sac.

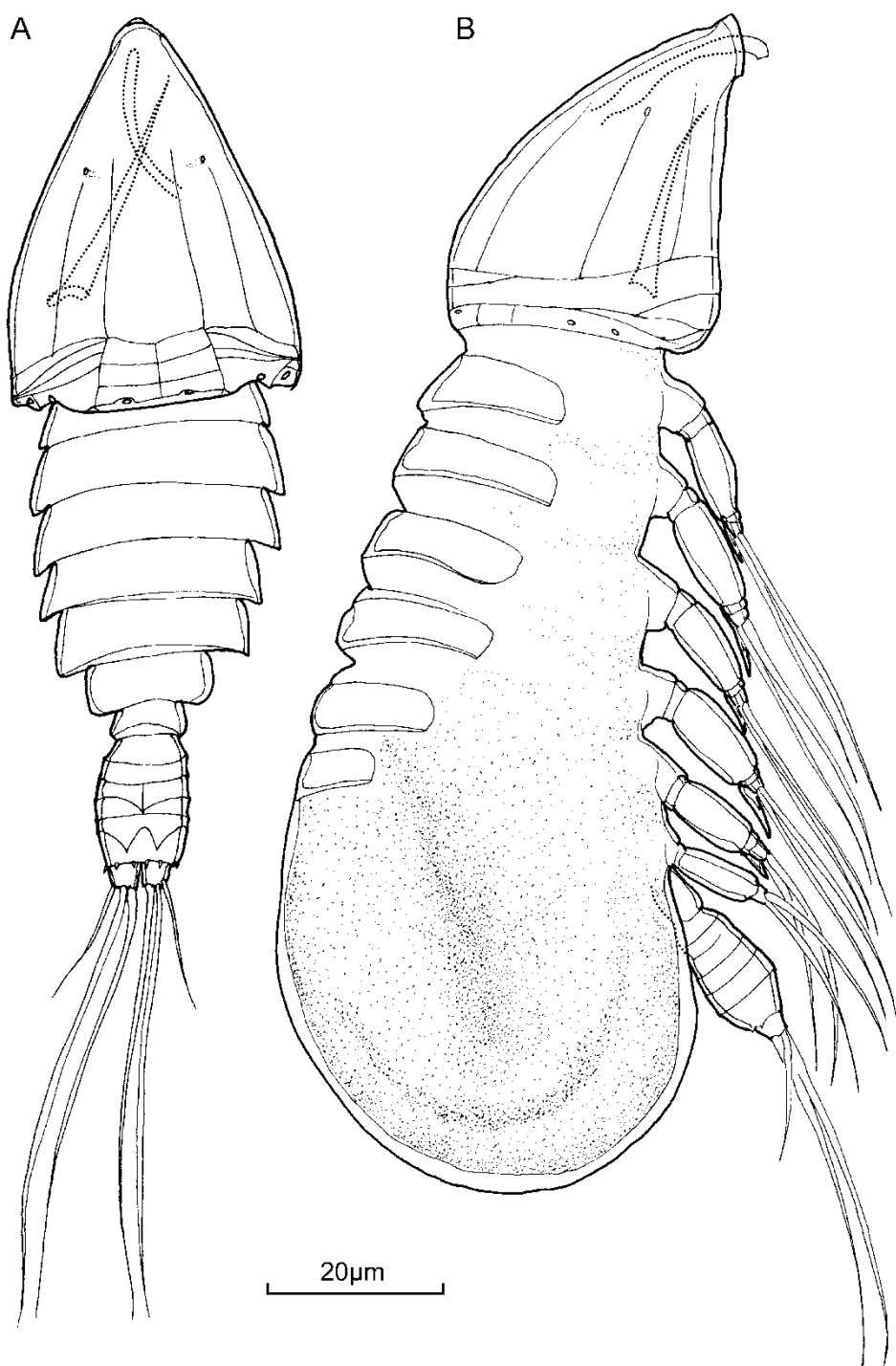


Fig. 1. *Arcticotantulus pertzovii* gen. et sp. nov. A. Tantulus larva, holotype, dorsal view. B. Early stage male, paratype, lateral view.

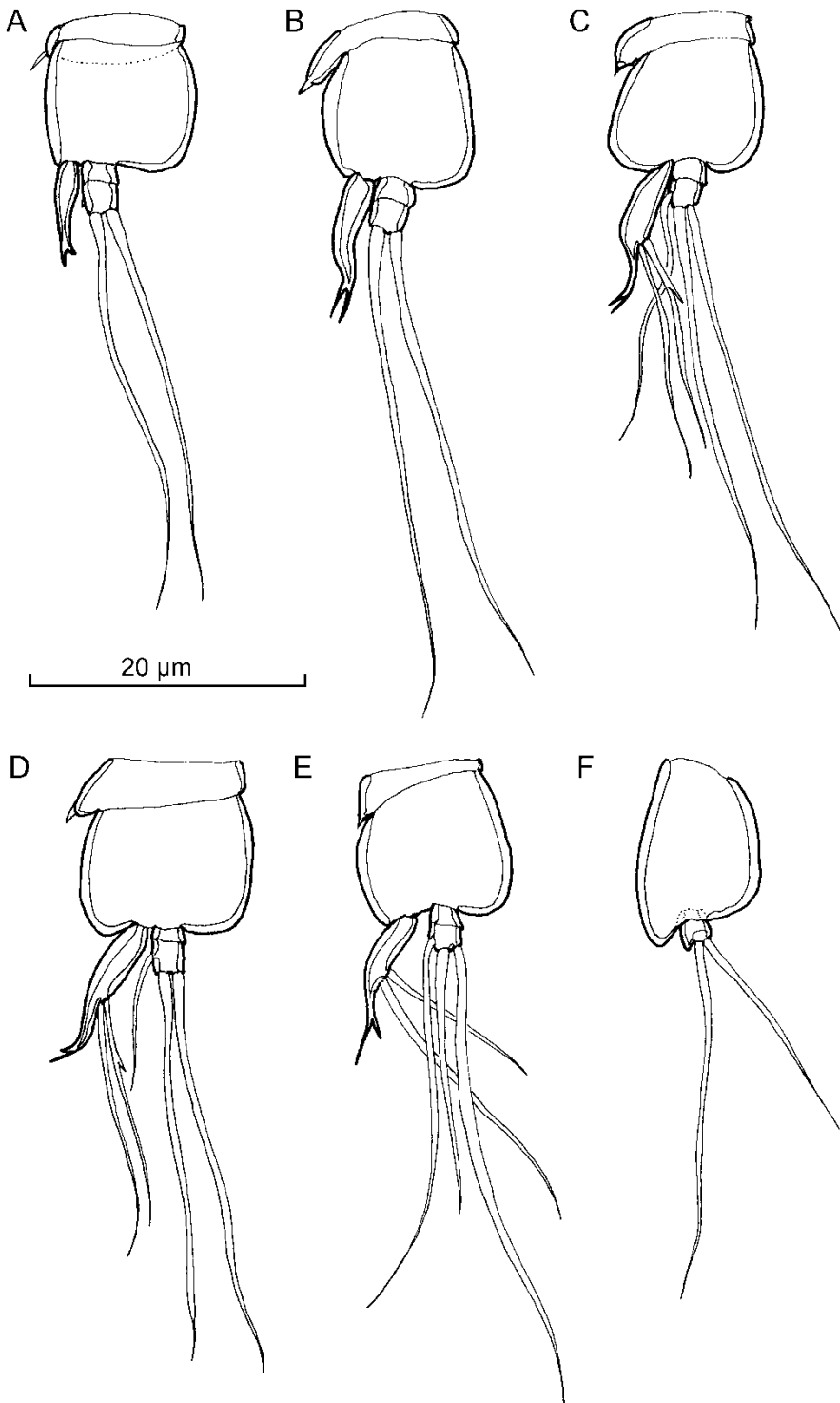


Fig. 2. *Arcticotantulus pertzovii* gen. et sp. nov., thoracopods of the tantulus larva (holotype). A. Thoracopod 1, B. Thoracopod 2, C. Thoracopod 3, D. Thoracopod 4, E. Thoracopod 5, F. Thoracopod 6.

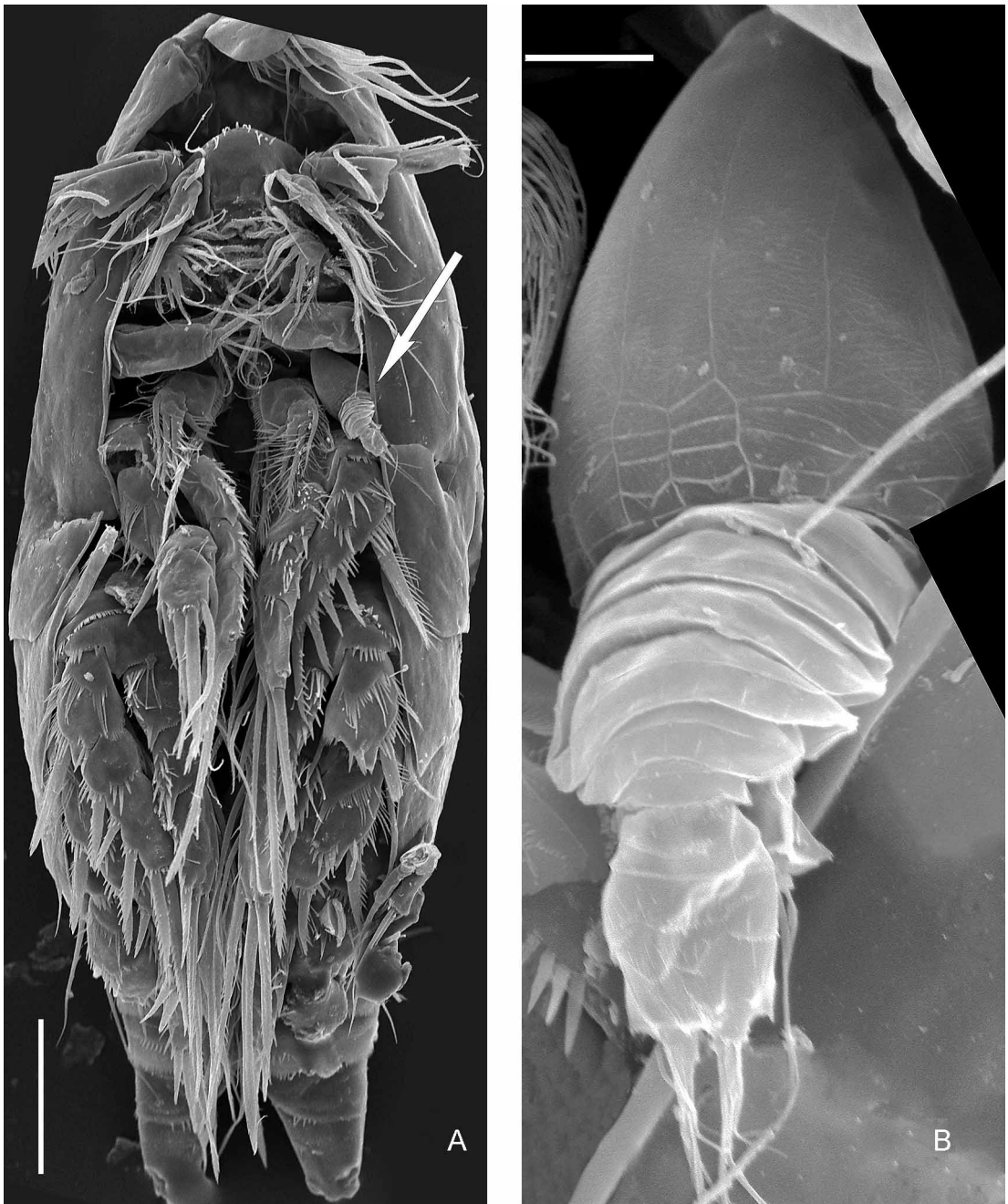


Fig. 3. *Arcticotantulus pertzovii* gen. et sp. nov. scanning electron micrographs. Tantulus larva (paratype), attached at maxilliped base of host *Pseudobradya* sp. A. General view of the host with attached parasite. B. Dorsal view of the parasite. Scale bar: 80 μ m for A; 8 μ m for B.

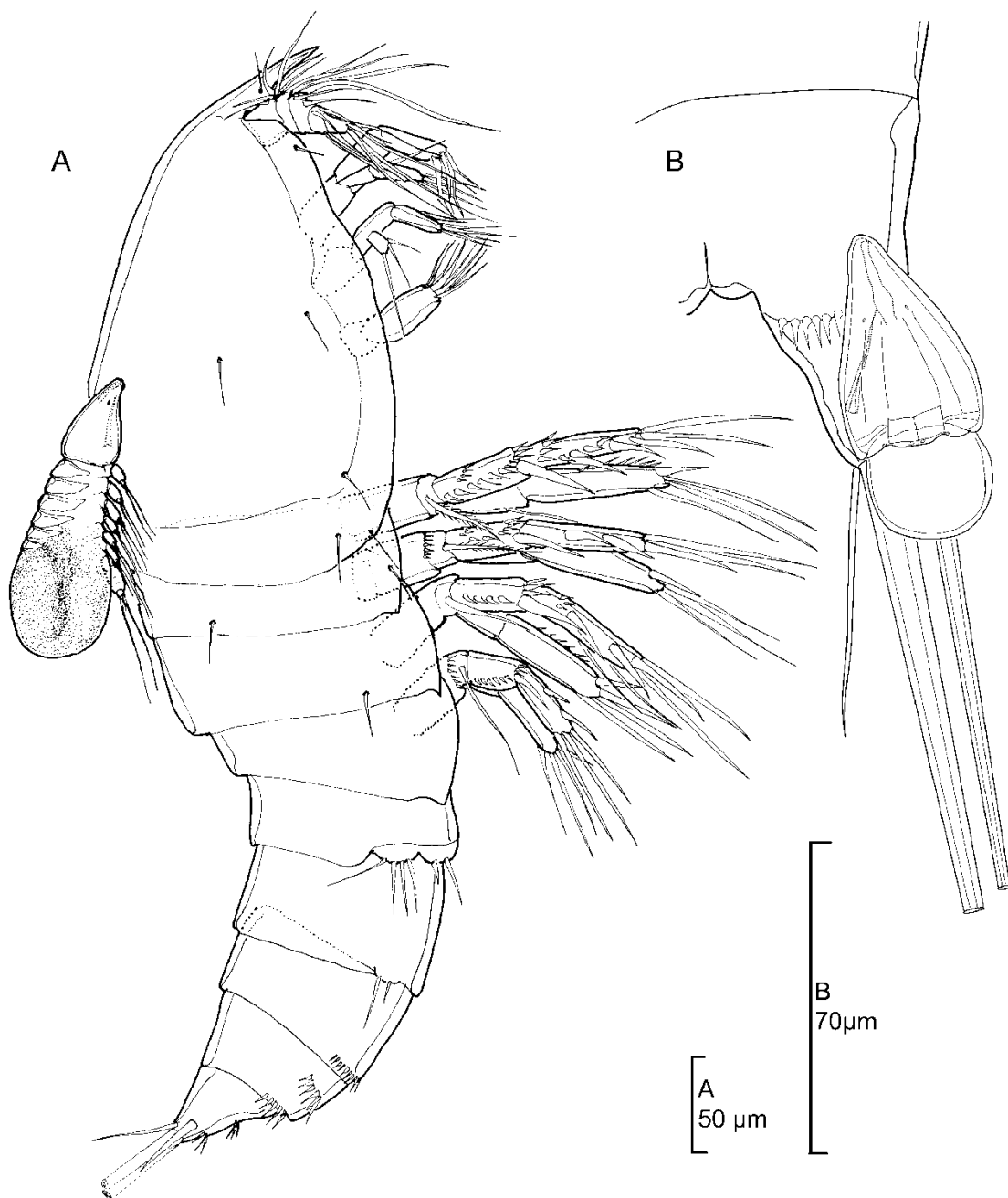


Fig. 4. *Arcticotantulus pertzovii* gen. et sp. nov. A. Early stage male (paratype) on host *Pseudobradya* sp., lateral view. B. Parthenogenetic female, attached at anal segment of host *Pseudobradya* sp., dorsal view.

Etymology

This species is named in honour of N. A. Pertzov, Director of the White Sea Marine Station of the Moscow State University 1951–1987.

DISCUSSION

Arranging the tantulocaridan genera into five known families is based on the position of the male trunk sac and also on the segmentation of the rami of thoracopods

and the cephalic pore formula. The trunk sac in *Arcticotantulus* shows an intermediate position between the basipodellid type and the deotherthrid type because of very small anterior swelling. A similar position of the male trunk sac is observed in *Rimitantulus hirsutus* Huys & Conroy-Dalton, which was placed in Basipodellidae (Huys & Conroy-Dalton 1997).

A peculiar morphological trait of *Arcticotantulus* gen. nov. is the differentiated proximal (praecoxal) portion of the protopod in each of thoracopods 1–5. The typical condition for Tantulocarida is to have an inner praecoxal endite, differentiated from the rest of the protopod by an inner furrow. In this new genus, the praecoxal segment is clearly defined and observed both in frontal and lateral (Fig. 1B) aspects. This feature has been demonstrated only for thoracopod 1 of *Coralliotantulus* Huys and *Boreotantulus* Huys & Boxshall (Huys & Boxshall 1988; Huys 1990). Among Basipodellidae, *Arcticotantulus* gen. nov. displays the most reduced number of setae of the exopod on thoracopods 1–5: only two setae in thoracopods 1–2 and three setae in thoracopods 3–5. Other Basipodellidae possess at least four elements on posterior thoracopods (*Nippontantulus* Huys, Ohtsuka & Boxshall) or five elements in *Rimitantulus* Huys & Conroy-Dalton. The cephalic pore ornamentation of *Arcticotantulus* gen. nov. also demonstrates great reduction, other than the full number of pores, A_{I-IV}, D_{I-IV}, L_{I-IV}, peculiar to Basipodellidae.

Tantulocarida have been reported from a wide range of hosts, but they have never been recorded on

representatives of the family Ectinosomatidae. *Arcticotantulus pertzovi* sp. nov. was found only on *Pseudobradya* sp. belonging to this family. In the samples with *Pseudobradya* sp. was a variety of other harpacticoids from the families Diosaccidae (*Stenhelia* spp., *Haloschizopera* sp.), Argestidae (*Eurycleotodes serratus* Sars, 1920, *Argestigens* sp.), Canthocamptidae (*Heteropsyllus* sp.), Ancorabolidae (*Arthropsyllus serratus* Sars, 1909, *Laophontodes gracilipes* Lang, 1936), but all these copepods had not been infested by tantulocaridean parasites. It may be said that *Arcticotantulus pertzovi* sp. nov. demonstrates high host specificity, rather than some other Basipodellidae, *Nippontantulus heteroxenus* Huys, Ohtsuka & Boxshall and *Hypertantulus siphonicola* Ohtsuka & Boxshall (Huys & al. 1994; Ohtsuka & Boxshall 1998).

A peculiar characteristic of interactions between Tantulocarida and their hosts is the frequent occurrence of parasites on immature stages of hosts (Huys 1991). Among eight examined specimens, only three tantulus larvae were found on adult copepods. All developmental stages of examined tantulocarida were found on copepodids: parthenogenetic females on CIII and CV, early stage males on CIV. One of the tantulus larvae was found on CV. On the early stages of copepods (CI and CII) no one parasite was found. The attachment sites of the tantuli are the cephalothorax (single specimen), trunc somites (three specimens), appendages of copepods (three specimens), caudal rami (single specimen).

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