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New data on the occurrence of Acanthocephala in Antarctic Amphipoda

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Abstract

In total, 6401 amphipods, including 5707 *Cheirimedon femoratus*, caught at the Galindez Island (Argentine Islands, Western Antarctica) were examined for the presence of cystacanths and advanced acanthellae of Acanthocephala. Two parasite species, *Corynosoma pseudohamanni* Zdzitowiecki, 1984 and *Metacanthocephalus johnstoni* Zdzitowiecki, 1983, were found in the haemocoeloma of *C. femoratus*. Total prevalence was 1.19%, that of *C. pseudohamanni* 0.68% and of *M. johnstoni* 0.51%. Additionally, 8 of 1416 *C. femoratus* caught in the Admiralty Bay (South Shetland Islands) were found to be infected with *C. pseudohamanni* and free of *M. johnstoni*. The representative of the genus *Metacanthocephalus* was found in the intermediate host for the first time. *C. pseudohamanni* was more abundant at the Galindez Island (prevalence 0.68%) than in the Admiralty Bay (prevalence 0.42% in previous investigations and 0.56% in present ones). Amphipods harboured usually one or rarely two acanthocephalans of one species. Both parasites were more abundant in amphipods caught in the polluted water closely to the Vernadsky Station than in the Mick Channel, farther from the station (prevalence 0.77% vs. 0.51% for *C. pseudohamanni* and 0.64% vs. 0.26% for *M. johnstoni*).

Keywords

Acanthocephala, Amphipoda, intermediate hosts, Antarctica

Introduction

Up to now, Amphipoda were found to be intermediate hosts of Antarctic Acanthocephala at three localities in the Western Antarctica. Bone (1972), and Richardson in Hoogesteger and White (1981) reported the presence of undetermined Acanthocephala in *Bovallia gigantea* and *Pontogeneia* (= *Gondogeneia*) *antarctica* at the South Orkney Islands. Hoberg (1986) found *Corynosoma pseudohamanni* in amphipods identified to the genus *Pontogeneiella* at the Antarctic Peninsula. Feiler (1984) reported the occurrence of undetermined Acanthocephala in some of not listed nine species of amphipods at the King George Island. Zdzitowiecki (2001) and Zdzitowiecki and Presler (2001) found four species of Acanthocephala, *Aspersentis megarhynchus*, *Corynosoma bullosum*, *C. hamanni* and *C. pseudohamanni*, in eight species of Amphipoda, *B. gigantea*, *Prostebbingia brevicornis*, *Gondogeneia antarctica*, *Jassa ingens*, *Cheirimedon femoratus*, *Hippomedon kergueleni*, *Orchomenella rotundifrons* and *Waldeckia obesa*, in the Admiralty Bay at the King George Island. Prevalence of infection was given by Bone (op. cit.) as 2.67%, by Feiler (op. cit.) as 1.1% and by Zdzitowiecki and Presler (op. cit.) as 0.08–3.41% for different host species (the highest data for *A. megarhynchus* + *C. bullosum* in *B. gigantea*). The present paper is based on the collection of Amphipoda caught by the authors at the Galindez Island (Argentine Islands) at the Antarctic Peninsula, more southern than all places of previous collections. Additional new data from the Admiralty Bay are also given.

Materials and methods

Investigations were carried out during the Seventh Ukrainian Antarctic Expedition in February and March 2002 to the Vernadsky Station localized on the Galindez Island (Argentine Islands, Western Antarctica), 65°14´S, 64°15´W. Amphipoda have been collected using traps with meat from two localities – closely to the Vernadsky Station and in the Mick Channel, at the depth 0–12 m. In total, 6401 specimens belonging to 10 species were caught and examined (Table I). Names are given according to De Broyer and Jażdżewski (1993). Amphipoda

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Table I. A checklist of Amphipoda caught at the Galindez Island

Amphipod species	N	Infection
Bovallia gigantea Pfeffer, 1888	8	–
Eurymera monticulosa Pfefffer, 1888	1	–
Paramoera edouardi Schellenberg, 1929	5	–
Prostebbingia brevicornis (Chevreux, 1906)	4	–
Gondogeneia antarctica (Chevreux, 1906)	22	–
Paraceradocus miersi (Pfeffer, 1888)	1	–
Abyssorchomene plebs (Hurley, 1965)	632	–
Cheirimedon femoratus (Pfeffer, 1888)	5707	+
Hippomedon kergueleni (Miers, 1875)	15	–
Orchomenella ultima (Bellan-Santini, 1972)	6	–
Total	6401	

were fixed and stored in 70% ethanol. They were determined by Professor K. Jażdżewski and Mrs. E. Presler, M.Sc., from the University of Łódź. Additionally, 1416 specimens of one amphipod species, *Cheirimedon femoratus*, collected in the Admiralty Bay were received from Professor Jażdżewski. These amphipods were collected in 1977 at the depth 5–60 m, fixed in formaldehyde solution 4% and re-fixed in 70% ethanol. They were a part of the same collection which was elaborated by Zdzitowiecki and Presler (2001).

Amphipods were examined for the presence of cystacanths and advanced acanthellae using a stereomicroscope (magnitude × 6.3 or ×10). All mesosome and three anterior metasome segments were opened using small pincers and needles and acanthocephalans found in haemocoeloma were collected. They were dehydrated in graded ethanol (85%, 96%) and cleared in benzyl alcohol. They were determined as temporary total mounts in clearing solution using a light microscope. Voucher specimens were deposited in the Natural History Museum in London (BMNH).

Dimensions are given in micrometers, unless stated otherwise.

Results

In total, 68 amphipods of one species, *Cheirimedon femoratus*, collected at the Galindez Island were found to be infected with 72 acanthocephalans of two species (total prevalence 1.19%). Eight specimens of the same species collected in the Admiralty Bay were found to be infected with eight acanthocephalans of one species (prevalence 0.56%). Other amphipods were not infected (Table I).

Parasites occurred in haemocoeloma in two posterior segments of mesosoma and one anterior segment of metasoma of hosts. All parasite specimens were either in cystacanth stage or developed almost to this stage. Indices of infection of *C. femoratus* in each locality are shown on the Table II.

Order Polymorphida

***Corynosoma pseudohamanni* Zdzitowiecki, 1984** (Fig.1a-g)

Intermediate host: *Cheirimedon femoratus*.

Locality: At Galindez Island (Argentine Islands) (prevalence 0.68%) and Admiralty Bay (South Shetland Islands) (prevalence 0.56%).

Intensity: Normally one parasite, in three cases two parasites.

Material: 50 specimens.

Voucher specimens: BMNH 2010.3.30.1-4.

Morphology (based on 20 specimens): Trunk contracted, with both extremities introverted, 1.313–1.896 × 0.660–0.928 mm in lateral position. Hind-trunk shorter than fore-trunk. Whole length of ventral side covered with spines. Proboscis sac curved, its maximum length 1141. Proboscis partly or entirely introverted, 742–957 in length. Its prebasal width reaches 286. Hooks arranged in circa 20 rows. Total number of hooks in row impossible for counting, number of basal hooks in row

Table II. Infection with Acanthocephala of the amphipod *Cheirimedon femoratus*

Locality	N	*Corynosoma pseudohamanni*		*Metacanthocephalus johnstoni*	
		prevalence %	mean abundance	prevalence %	mean abundance
At Galindez Island	5707	0.68	0.0074	0.51	0.0052
At Vernadsky Station	3765	0.77	0.0082	0.64	0.0066
Mick Channel	1942	0.51	0.0057	0.26	0.0026
Admiralty Bay					
After Zdzitowiecki and Presler	1431	0.42	0.0042	–	–
Present data	**1416**	**0.56**	**0.0056**	–	–

normally two, but sometimes one or three in some rows. Measurable hooks of four specimens 63–67 in length. Genital organs poorly developed, hardly visible.

Remarks: Morphology of all specimens collected at Galindez Island is clearly identical with that of specimens previously and presently collected from the same intermediate host from Admiralty Bay (see Zdzitowiecki 2001).

Order Echinorhynchida

***Metacanthocephalus johnstoni* Zdzitowiecki, 1983** (Fig. 2a-e)

Intermediate host: *Cheirimedon femoratus.*

Locality: At Galindez Island (Argentine Islands).

Prevalence: 0.51%.

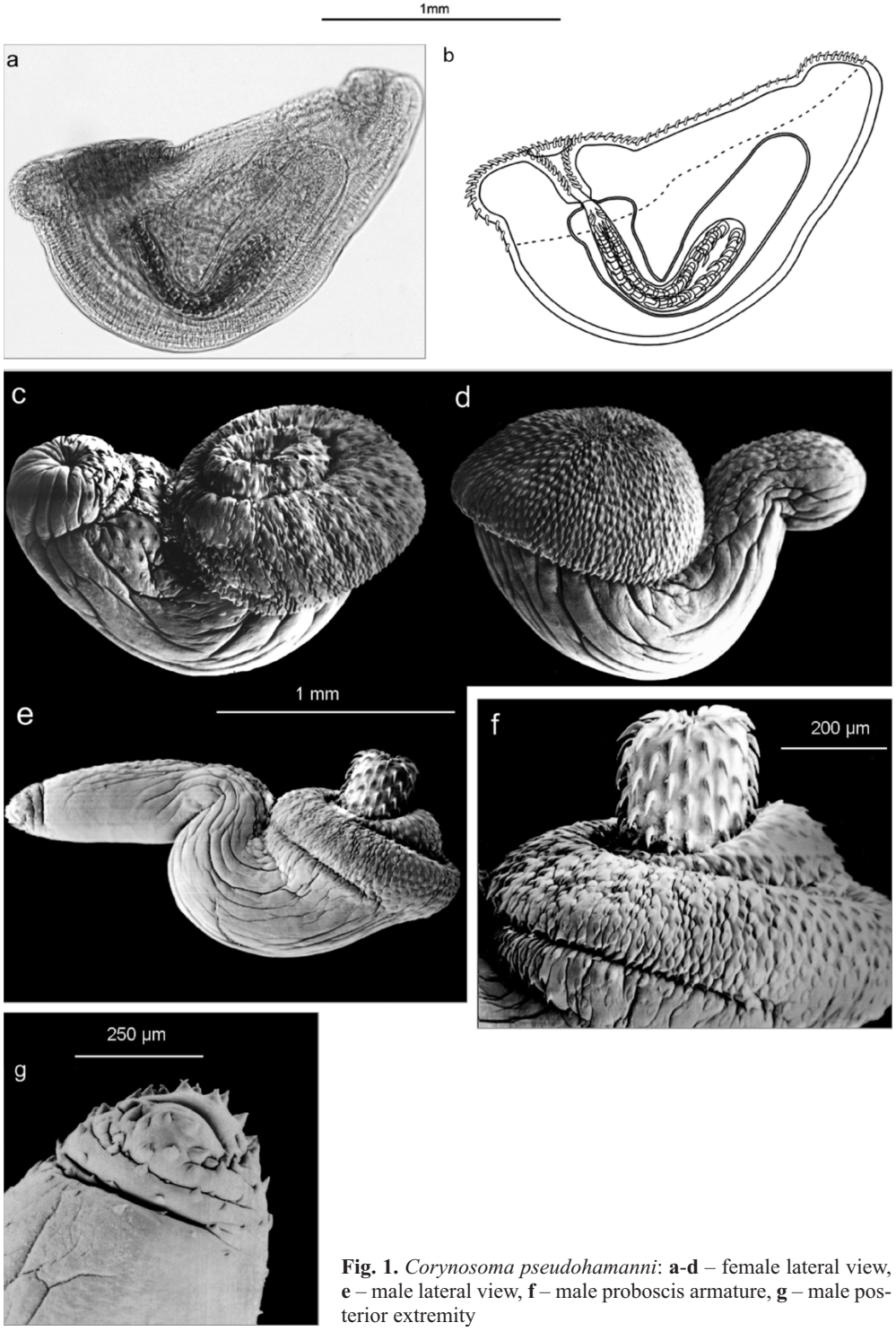

Fig. 1. *Corynosoma pseudohamanni*: **a-d** – female lateral view, **e** – male lateral view, **f** – male proboscis armature, **g** – male posterior extremity

Intensity: Normally one parasite, in one case two parasites.

Material: 30 specimens (17 males and 13 females).

Voucher specimens: BMNH 2010.3.30.5-8.

Morphology: Trunk normally (with two exceptions) strongly contracted. Trunk spines absent. Cylindrical proboscis could be entirely introverted or more or less extraverted. Hooks arranged in circa 14 rows. In ten cases hooks were counted as six or seven in row. Dorsal and ventral hooks of the same length. Maximum length of hook 105. Lemnisci normally contracted, 460–760 in length, in one case 1190 in length.

Male (based on 16 specimens): Trunk 1.545–2.624 × 0.438–0.746 mm, in one case 3.430 × 0.490 mm. Proboscis 378–542 × 150–209. Proboscis sac 509–882 × 116–184. Genital organs strongly developed. Testes arranged diagonal to tandem. Anterior testis 321–554 × 182–343. Posterior testis 283–452 × 181–373. Cement glands pyriform, eight in number, 38–68 × 40–72. Säfftigen's pouch club-shaped.

Female (based on eight specimens): Trunk 1.575–2.492 × 0.575–0.690 mm, in one case 3.134 × 0.504 mm. Proboscis 500–602 × 220 (width in one case). Proboscis sac 570–993 ×

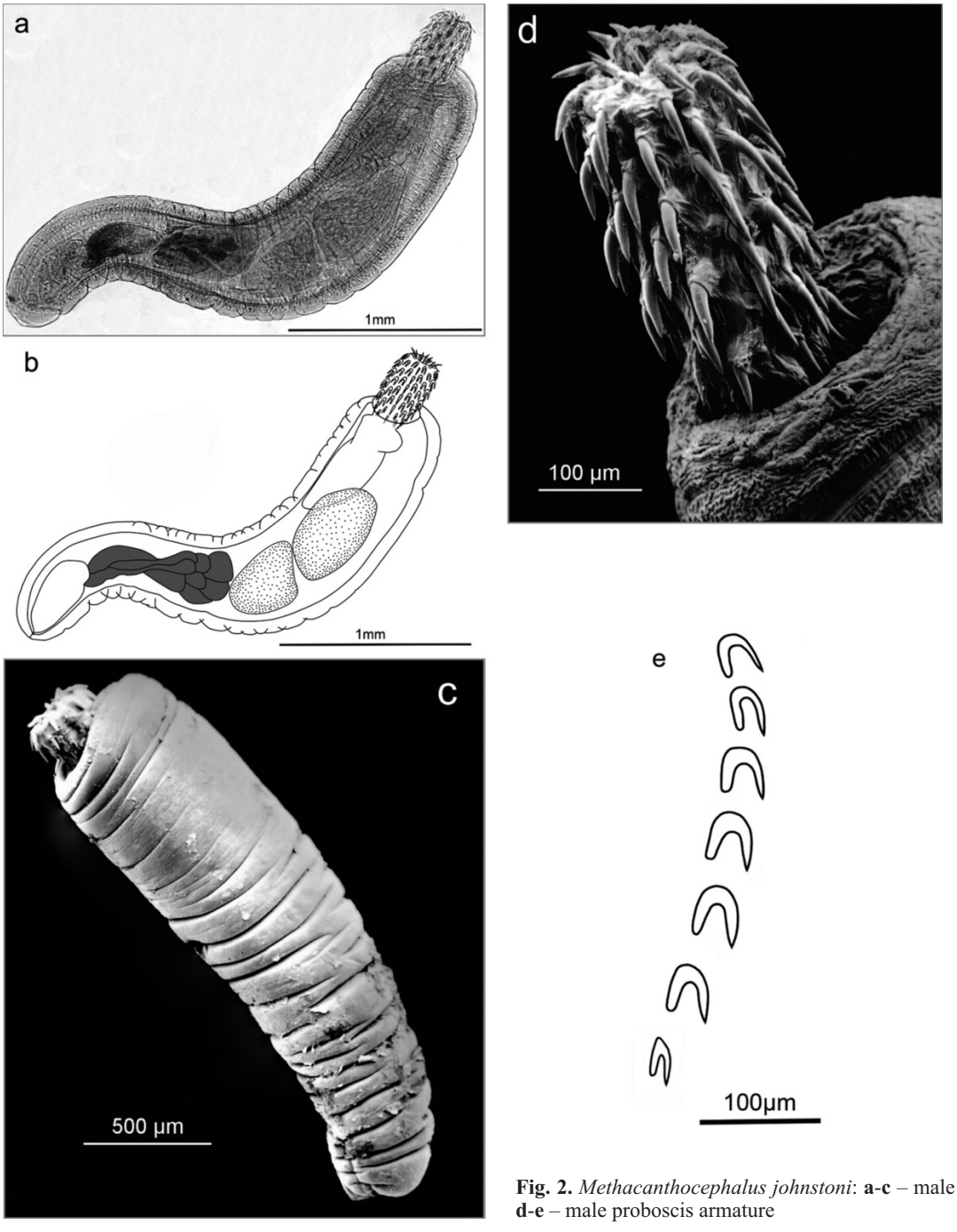

Fig. 2. *Methacanthocephalus johnstoni*: **a-c** – male lateral view, **d-e** – male proboscis armature

155–209. Ovarian balls free in pseudocoeloma, 42–82 in diameter.

Remarks: Proboscis length, hooks formula and number of cement glands fit well diagnose of *M. johnstoni* of Zdzitowiecki (1983). The representative of the genus *Metacanthocephalus* was presently found in the intermediate host for the first time.

Discussion

Of ten amphipod species presently examined, eight were represented in small numbers, 1–22 (Table I). Negative results of investigations of them could be associated with poor samples. It should be noted that three acanthocephalan species not found in amphipods at the Galindez Island, *A. megarhynchus* (syn. *A. austrinus*), *C. bullosum* and *C. hamanni*, were found in *B. gigantea*, *P. brevicornis*, *G. antarctica* and *H. kergueleni* (and three other species) in the Admiralty Bay (Zdzitowiecki and Presler 2001). These three acanthocephalans are abundant in fishes in the Admiralty Bay (Zdzitowiecki 1986a, Zdzitowiecki and Rokosz 1986) and considerably less numerous in fishes at the Galindez Island (Zdzitowiecki and Laskowski 2004, Laskowski and Zdzitowiecki 2005).

One amphipod species, *Abyssorchomene plebs*, examined in sufficient numbers in the Admiralty Bay (1204 specimens) and at the Galindez Island (632 specimens) was uninfected in both these areas. Amphipods belonging to *Orchomenella* (= *Abyssorchomene*) *plebs-rossi* complex were investigated in McMurdo Sound (Ross Sea, Eastern Antarctica) by Holloway and Bier (1967). They examined 812 specimens exposed for *C. hamanni* (probably = *C. pseudohamanni*) eggs and 592 specimens taken from the stomach of a fish. Results were negative. Probably *A. plebs* does not serve as the intermediate host of any acanthocephalan species.

Of two acanthocephalan species found in *C. femoratus*, an intermediate host at the Galindez Island, *C. pseudohamanni* is a parasite of seals and uses fish as paratenic hosts (Zdzitowiecki 1984). *M. johnstoni* uses fish as definitive hosts (Zdzitowiecki 1983). *C. femoratus* was the only amphipod species found to be infected with both acanthocephalan species at the Galindez Island. This amphipod was also found to be infected in the Admiralty Bay, but only with *C. pseudohamanni* (Zdzitowiecki and Presler 2001). The absence of *M. johnstoni* in all investigated amphipods in the Admiralty Bay is rather strange, because this parasite is abundant in fish in both these areas (Zdzitowiecki 1986b, Zdzitowiecki and Laskowski 2004, Laskowski and Zdzitowiecki 2005). The level of infection of amphipods with *C. pseudohamanni* is higher at the Galindez Island than in the Admiralty Bay, but the difference is not large (prevalence 0.68% against 0.42% for previously examined sample). The examination of additional samples of *C. femoratus* from the Admiralty Bay confirmed previous data – prevalence of *C. pseudohamanni* of 0.56% and a lack of *M. johnstoni* (Table II). Amphipods were collected at the Galindez Island in two localities. A little higher infection with both acanthocephalan species was found in polluted water closely to the Vernadsky Station than in Mick Channel farther from the station (Table II).

Of acanthocephalan species abundant in fish in the Admiralty Bay and occurring also in fish at the Galindez Island, only one, *Metacanthocephalus dalmori* Zdzitowiecki, 1983, was not reported from amphipods. Probably it uses other amphipods than *M. johnstoni* does, possibly species living deeper than *C. femoratus*.

In most of amphipod species one acanthocephalan species was recognized. Exceptions are for *B. gigantea* (*A. megarhynchus* and *C. bullosum*) (Zdzitowiecki and Presler 2001) and *C. femoratus* (*C. pseudohamanni* and *M. johnstoni*) (present data). *A. megarhynchus* and *C. bullosum* occur in more than one host species. The former was reported from five intermediate hosts, *B. gigantea*, *G. antarctica*, *J. ingens*, *H. kergueleni* and *O. rotundifrons*, the latter from two hosts, *B. gigantea* and *W. obesa* (Zdzitowiecki and Presler op. cit.).

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