

Leeches (Hirudinida: Piscicolidae) – parasites of Antarctic fish from Channichthyidae family

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ABSTRACT. There has hitherto been very few research projects focusing on ectoparasites of Antarctic fishes. The presently reported study provides data on the prevalence and the intensity of leeches (Hirudinida: Piscicolidae) infecting fishes. The materials were collected in December–February 1986/87 off the Elephant Island, South Georgia, Joinville Island, and South Shetlands. The following leech taxa were recorded in the Antarctic fishes of the family Channichthyidae: *Trulliobdella capitis* (Brinkmann, 1947); *Cryobdella antarctica* Epstein, 1970; *Nototeniobdella sawyeri* Utevsky, 1997; and *Cryobdella* sp. The above findings constitute new geographic records from off Elephant and Joinville Island and South Georgia.

Key words: leeches, Hirudinida, Antarctic fishes, *Channichthyidae*

Introduction

Ectoparasites of Antarctic fishes have been poorly known. The studies hitherto carried out were primarily taxonomic and zoogeographical ones [1–5]. Kock and Mőller [6] studied the parasitic copepod *Eubrachiella antarctica* (Quidor, 1906), based on small samples. Further research was carried out by Siegel [7] during the Second German Antarctic Expedition to the Atlantic sector of the Antarctic Ocean. He studied the prevalence and the infection intensity of ectoparasites of fishes representing two Antarctic families: the Channichthyidae and the Nototheniidae [*Chionodraco hamatus* (Lőnnberg, 1905), *Champsocephalus gunnari* (Lőnnberg, 1905), *Chaenocephalus aceratus* (Lőnnberg, 1905), and *Pseudochaenichthys georgianus* (Norman, 1937)]. Only a single leech species (*Trulliobdella capitis*) was recovered from *Ch. aceratus* [7]. Ectoparasites of Antarctic fishes were studied also by Sosiński and Janusz [8] and by Rokicki and Skóra [9]. The taxonomic position of some leech species was determined by Brinkmann [10]. Dollfus [1] studied the leeches collected by a French Antarctic expedition and described, i.e., *Trulliobdella capitis* (Brinkmann, 1947).

The presently reported study was aimed at analysing the prevalence and the infection intensity of leeches (Hirudinida: Piscicolidae) infecting Antarctic fishes off Elephant Island, South Georgia, Joinville Island, and South Shetlands.

Materials and methods

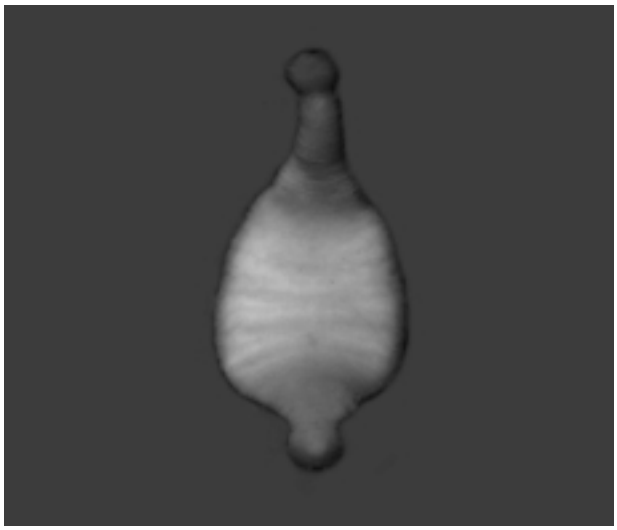
Materials for this study were collected on board RV PROFESSOR SIEDLECKI during the BIOMASS III Antarctic Expedition in December-February 1986/87. In December 1986, *Chaenodraco wilsoni* Regan, 1914 and *Ch. rastrospinosus* DeWitt et Hureau, 1979 were caught in fishing grounds off Joinville Island (62034'S 54055'W) and off Joinville Island and South Georgia (54039'S 38019'W), respectively.

In February 1987, *Ch. gunnari* was caught for off Elephant Island (61010'S 56006'W) and off South Georgia (54039'S 38019'W) and South

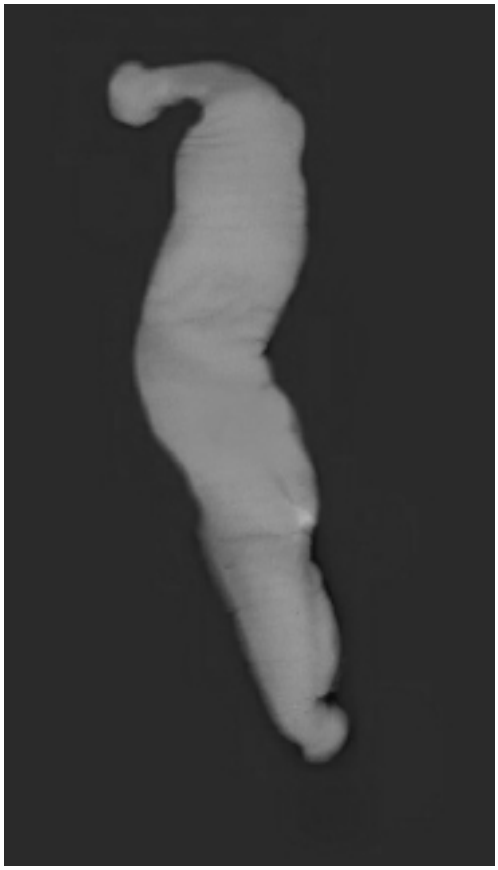
Shetlands (61053'S 58055'W).

The fish captured were examined by Zbigniew Formela of the Sea Fisheries Institute in Gdynia. The leeches collected were placed in 4% formalin. Prior to examination, the leeches were rinsed in distilled water and cleaned of mucus.

Results

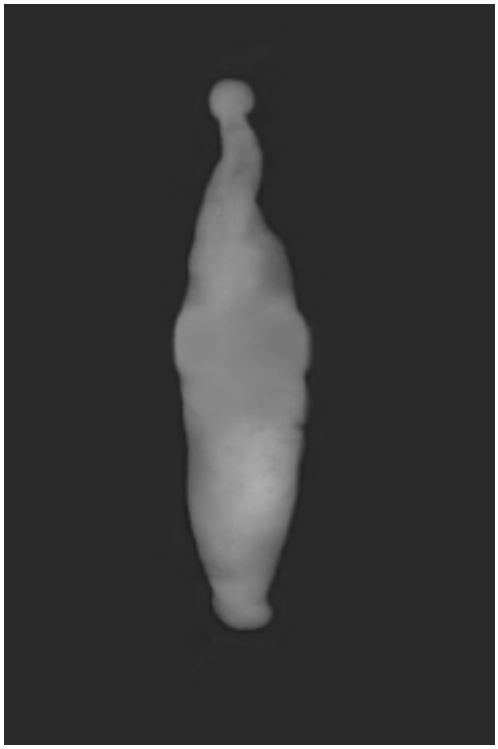


Phot. 1. *Trulliobdella capitis*, dorsal view (A. Bielecki}



Phot. 2. *Cryobdella antarctica*, dorsal view (A. Bielecki).

Phot. 3. *Notohteniobdella sawyeri*, dorsal and ventral view (A. Bielecki)



Phot. 4. *Cryobdella* sp. n., dorsal view (A. Bielecki)

The fishes studied were found to support the following three leech species: *Trulliobdella capitis* (Phot. 1), *Cryobdella antarctica* Epstein, 1970 (Phot. 2) and *Nototheniobdella sawyeri* Utevsky, 1993 (Phot. 3). Some *Cryobdella* individuals were

Table 1. Infection parameters of three species of leeches, found on three fish species in relation to the infection site

Parasite		*Chionodraco rastrospinosus*	*Champsocephalus gunnari*	*Chaenodraco wilsoni*
Trulliobdella capitis	Location	Skin of head and mouth	Skin of head and mouth	
	Prevalence/ mean intensity	0.45/3	0.09/6	
Cryobdella antarctica	Location	Skin of head, mouth and gill cavity	Skin of head, mouth and gill cavity	
	Prevalence /mean intensity	0.98/19	0.28/10	
Nototheniobdella sawyeri	Location		Gill cavity	
	Prevalence/ mean intensity		0.05/2	
Cryobdella sp. n.	Location	Mouth and gill cavity	Mouth and gill cavity	Mouth and gill cavity
	Prevalence/ mean intensity	1.07/16	0.05/5	9.91/16

difficult to be identified and most probably represented a new species (Phot. 4).

The highest prevalence (9.9%) of *Cryobdella* sp. was revealed in *Ch. wilsoni*. *Ch. gunnari* and *Ch. rastrospinosus* were found to support *T. capitis*, *C. antarctica,* and *Cryobdella* sp. *N. sawyeri* was found in *Ch. gunnari* only, while *Ch. wilsoni* supported only *Cryobdella* sp. (Table 1).

All the leeches were collected from the mouth cavity, gill cavity, head, and body.

Discussion

The presently recovered parasites show a relatively low degree of infection. Higher infection parameters, reported by Siegel [7], could have been caused by the fact that his study took place when the fish were aggregating prior to spawning, and the aggregation promoted parasite transmission. Pelagic fishes such as *Ch. gunnari* show infection parameters lower than those reported from demersal species [7]. As shown by the literature data, the infection intensity of *T. capitis*, *C. antarctica*, and *N. sawyeri* ranged from 1–36, 1–36, and 1–29 leeches, respectively [5]. In this study, *T. capitis*, *C. antarctica*, and *N. sawyeri* showed the presence of 3–6, 10–19, and 2 leeches, respectively. *N. sawyeri* had not been earlier recorded off Elephant Island, South Georgia, and Joinville Island [4, 5], while *Ch. gunnari* is a new host of the *Cryobdella* leech. The *Cryobdella* leeches have not been earlier reported from *Ch. wilsoni* in the area of study. The *Cryobdella* sp. individuals found were much larger than those of *C. antarctica*. The study confirmed the presence of the leech species found on known hosts, but also revealed new ones. *T. capitis* has been earlier reported from *Pseudochaenichthys georgianus*, *Ch. gunnari* [11, 1, 7, 5], *Ch. aceratus*, *Chionodraco* sp. [1, 7], *Chaenocephalus bouvetensis* [1, 7, 5], *Parachaenichthys georgianus*, *Neopagetopsis ionah*, *Channichthys rhinoceratus*, *Cryodraco antarcticus*, *Chionodraco kathleenae*, *Ch. hamatus*, *Ch. rastrospinosus*, *Ch. wilsoni*, and *N. rossi* [5]. This study confirmed the leech's presence in *Ch. rastrospinosus* and *Ch. gunnari*.

T. capitis range covers areas off Bouvet Islands, South Shetlands, South Orkneys, the Weddell Sea, and the Argentine Island, all in the Atlantic sector of Antarctic region, as well as off Wilkes Land in the Indian Ocean sector, and the Ross Sea in the Pacific sector [11–14]. *N. sawyeri* has been so far reported from *Ch. wilsoni*, [4], *Ch. hamatus, Ch. kathleenae*, *Ch. rastrospinosus*, *C. antarcticus*, *N. ionah* [4, 5], *P. georgianus*, and on the fishes of the family Harpagiferidae [5]. The *N. sawyeri* range covers areas off Palmer Coast, South Shetlands, Filchner Ice Shelf (Weddell Sea) in the Atlantic sector of the Antarctic region, off Clarie Coast in the Indian Ocean sector and off Scott Coast and Franklin Island (Ross Sea) in the Pacific sector [4].

C. antarctica has a broad host spectrum (11 species of 10 genera, 2 families, one superfamily), much broader than that of other species of the genus *Cryobdella* (e.g., *C. ljadovi* Epstein et Utevsky, 1994 is known from 2 host species of one genus). *C. antarctica* has been reported from *N. rossi*,

Lepidonotothen squamifrons, *Gobionotothen gibberifrons*, *Trematomus bernacchii*, *P. georgianus*, *Ch. aceratus, C. antarcticus*, *Ch. kathleenae*, *Ch. wilsoni*, *Ch. rastrospinosus*, and *Ch. gunnari* [5]. This study confirmed *Ch. rastrospinosus* and *Ch. gunnari* as the hosts. The *C. antarctica* range covers the Davis Sea in the Indian Ocean sector of the Antarctic region and the Scotia Sea in the Atlantic sector [3, 14]. In this study, specimens of *Cryobdella* sp. were collected from *Ch. gunnari*, *Ch. rastrospinosus,* and *Ch. wilsoni*.

Quantitative parasitological research is important, as it provides additional information on biology and ecology of the infested fish [15]. Parasites may be used as biological indicators supplying important clues on the host. Thus, numerous biological traits of the host may be elucidated, e.g., origin, evolution, affinities, and migrations. Frequency of occurrence of a parasite in various areas aids in identifying distinct fish populations [16].

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References

[1] Dollfus R.O. 1964. Sangsue tentaculifčre de la peau d'un Téléostéen du genre *Chaenichthys* Richardson, 1844. *Bulletin du Museum d'Histoire Naturelle*, *Paris* 36: 831–843.

[2] Kabata Z. 1965. Parasitic Copepoda of fishes. Report of B.A.N.Z. Antarctic Research Expedition 8: 1–16.

[3] Epstein V.M 1970. Fish leeches (Hirudinea, Piscicolidae) in the Antarctic seas from the collection of the Zoological Institute of the Academy of Sciences of the USSR. In: *Materials* of First All-Union Symposium Diseases and Parasites of Marine Animals. (Ed. V.A. Volyanitsky). Sevastopol, Kiev: 146–149 (in Russian).

[4] Utevsky A.U. 1993. A new marine leech *Nototheniobdella sawyeri* gen. et sp. n. from Antarctic seas (Hirudinea: Piscicolidae). *Zoosystematica Rossica* 2: 237–240.

[5] Utevsky A.U. 2007. Antarctic piscicolid leeches. Bonner Zoologische Monographien 54. [6] Kock K., Mőller H. 1977. On the occurrence of the parasitic Copepod *Eubrachiella antarctica* on some Antarctic fish. *Archiv fűr Fischereiwissenschaft* 27: 149–156.

[7] Siegel V. 1980. Parasite tags for some antarctic channichthyid fish. *Archiv fűr Fischereiwissenschaft* 31: 87–103.

[8] Sosiński J., Janusz J. 1986. Występowanie pasożyta *Eubrachiella gaini* Quidor, 1913 na rybach antarktycznych z rodziny *Chaenichthyidae*. *Acta Ichthyologica et Piscatoria* 16: 86–105.

[9] Rokicki J., Skóra K. 1986. Dynamika występowania *Eubrachiella antarctica* (Quidor, 1906) u *Notothenia gibberifrons* Lőnnberg, 1905. *Wiadomości Parazytologiczne* 32: 511-515.

[10] Brinkmann A. 1947. Two new antarctic leeches. Nature 160, 4074: 756.

[11] Brinkmann A. Jr., 1948. Some new and remarkable leeches from the Antarctic seas. Scientific Results of Norwegian Antarctic Expedition 1927–1928, I Kommisjon Hos Jacob Kybwad, Oslo 29: 1-20.

[12] Meyer M.C., Burreson E.M. 1983 Redescription of the piscicolid leech *Trulliobdella capitis* Brinkmann. *Proceedings of the Helminthogical Society of Washington* 50: 138-142.

[13] Meyer M.C., Burreson E.M. 1990. Some leeches (Hirudinea: Piscicolidae) of the southern oceans. *Antarctic Research Series* 52: 219-229.

[14] Sawyer R.T. 1986. Leech biology and behaviour. Feeding biology, ecology, and systematics. Oxford, UK.

[15] Margolis L. 1965. Parasites as an auxillary source of information about the biology of Pacific salmons (genus *Oncorhynchus*). *Journal of the Fisheries Research Board of Canada* 22: 1387-1395.

[16] Lubieniecki B. 1977. The plerocercus of *Grillotia erinaceus* as a biological tag for haddock *Melanogrammus aeglefinus* in the north Sea and north east Atlantic. *Journal of Fish Biology* 11: 555-565.

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