

## Naididae (Annelida, Oligochaeta) associated with bryophytes in Brotas, State of São Paulo, Brazil

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**ABSTRACT.** Mosses and liverworts can be colonized by various invertebrates, including fresh water oligochaete worms. However, little information is available on the habits and habitats of this oligochaetes in Brazil. Therefore, the present study was undertaken to examine the occurrence of naidids in mosses, as well as to broaden the knowledge about the habitats of these oligochaetes. Sampling of bryophytes adhered to rock substrates in the rapids of the Jacaré Pepira River (municipality of Brotas, São Paulo, Brazil) and to a vertical rock wall of a waterfall near the river revealed 191 Naididae individuals of the species *Nais communis* Pignet, 1906, *Pristinella jenkiniae* (Stephenson, 1931) and *Pristinella menoni* (Aiyer, 1929). We believe this to be the first record of naidids associated with mosses in Brazil.

**KEY WORDS.** Associated fauna, mosses, oligochaete worms, *Nais*, *Pristinella*.

**RESUMO.** Naididae (Annelida, Oligochaeta) associadas a briófitas em Brotas, Estado de São Paulo, Brasil.

Musgos e hepáticas podem ser colonizados por diversos invertebrados, incluindo os vermes Oligochaeta. Contudo, existe pouca informação na literatura brasileira sobre os hábitos e habitats destes oligoquetos. Portanto, o presente trabalho foi realizado para examinar a ocorrência de naídídeos em musgos, bem como aumentar o conhecimento dos habitats destes anelídeos. A coleta de briófitas aderidas a substratos rochosos nas corredeiras do Rio Jacaré Pepira (Brotas-SP) e à parede rochosa vertical de uma cachoeira localizada nas proximidades do referido rio revelou 191 indivíduos de três espécies de Naididae: *Nais communis* Pignet, 1906, *Pristinella jenkiniae* (Stephenson, 1931) e *Pristinella menoni* (Aiyer, 1929). Acredita-se que este seja o primeiro registro de Naididae vivendo em briófitas no Brasil.

**PALAVRAS-CHAVE.** Fauna associada, musgos, vermes oligoquetos, *Nais*, *Pristinella*.

Aquatic bryophytes are an inseparable and important part of lotic ecosystems (VLČKOVÁ *et al.* 2002). These plants can be colonized by a series of invertebrates (Suren 1993), among them several species of Naididae. These Oligochaeta worms, are predominantly free swimmers (Verdonschot *et al.* 1982), and can therefore exploit a wide range of habitats, including: sediments (STACEY & COATES 1996, ALVES & STRIXINO 2000), fine sediments of caves (WETZEL & TAYLOR 2001), macrophytes (NEIFF & CARINGNAN 1997), sponges (RIGHI 1984, CORBI *et al.* 2005) and even the dorsum of Odonata larvae (CORBI *et al.* 2004). SUREN (1993), VLČKOVÁ *et al.* (2002) and Habdija *et al.* (2004) studied extensively the macrofauna associated with mosses, however they did not give any details on oligochaetes, reaffirming the general lack of information on the association between these animals and other substrates in freshwater environments. The aim of this study was to examine the occurrence of naidids in mosses, as well as to broaden the knowledge about the habitats of these oligochaetes.

Samples were obtained from the municipality of Brotas (22°17'12"S and 48°07'35"W), in central São Paulo State, Brazil, at an elevation of 661 meters. Moss samples of the genus *Fissidens*

(Fissidentacea) and *Philonotis* (Bartramiaceae) were collected in winter and spring of 2003 from rocky substrates of the rapids of the Jacaré Pepira River (MR) and from the rock wall of a nearly waterfall (MW).

The mosses were carefully removed from the rocks using a metal blade and immediately placed in five-liter plastic jugs containing stream water. In the laboratory, they were carefully placed in plastic trays with a small amount of water over a light box, permitting visualization of the associated animals while still alive. These were collected and immediately fixed in 4% formalin.

The Oligochaeta worms were identified using the taxonomic keys of BRINKHURST & JAMIESON (1971), RIGHI (1984) and BRINKHURST & MARCHESI (1989). The species identified were preserved in labeled glass jars containing 70% alcohol and are deposited in annelid collection of the Department of Zoology at the Federal University of Juiz de Fora (UFJF).

A total of 191 individuals associated with the mosses were identified, all of them belonging to 3 species of the Naididae family: *Nais communis* Pignet, 1906, *Pristinella jenkiniae* (Stephenson, 1931) and *Pristinella menoni* (Aiyer, 1929). Among

the species identified, *P. jenkiniae* was dominant, being responsible for 96.8 % of all individuals, and was sampled in both habitats (Tab. I). The numerical dominance of this species indicates its ability to live in both inundated environments (mosses of streambeds) and habitats with little water (mosses living on rock walls). We believe this work to be the first register of naidids associated with mosses in Brazil.

Table I. Number of individuals of Naididae associated with bryophytes of the *Fissidens* (MR: mosses associated with river rapids) and *Philonotis* (MW: mosses associated with rocks of the waterfall) genera in the winter and spring of 2003.

Taxa	Winter, 2003		Spring, 2003		Total
	MR	MW	MR	MW	
Naididae					
<i>Nais communis</i>	1	4			5
<i>Pristinella jenkiniae</i>		25	72	88	185
<i>Pristinella menoni</i>		1			1
Number of individuals	1	30	72	88	191
Number of taxa	1	3	1	1	3

The presence of naidid species in this type of substrate may be related to factors that facilitate the development of such fauna, such as reduced current speed and the presence of shelter (Vlčková *et al.* 2002). For example Habdija *et al.* (2004) found a direct relationship between river current speed and the density of macro invertebrates associated with mosses. Another factor that is closely related to the abundance and diversity of freshwater invertebrates is the biomass of bryophytes, together with the periphyton and the amount of debris associated with them (EGGLISHAW 1969, SUREN 1993). For instance, LINHART *et al.* (2002) found that the presence of mosses increased the spatial diversity of the habitat, as well as the density of macro invertebrates that contributed substantially to stream metabolism.

Therefore considering that the occupation of freshwater habitats can be related to evolutionary advantages – such as feeding opportunities, increased mobility, and protection against disturbances and predation risk (TOKESHI 1993) – more information on this subject is needed, especially regarding the Oligochaeta fauna.

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