

ORIGINAL ARTICLE / ARTÍCULO ORIGINAL**HELMINTH PARASITES OF THE WHITE-RUMPED SANDPIPER, *CALIDRIS FUSCICOLLIS* (AVES: SCOLOPACIDAE), FROM BRAZIL****HELMINTOS PARÁSITOS DEL PILRITO-DE-UROPÍGIO-BRANCO, *CALIDRIS FUSCICOLLIS* (AVES: SCOLOPACIDAE), DE BRASIL**Sâmara Nunes Gomes^{1*}, Tatiana Cheuiche Pesenti¹ & Gertrud Müller¹¹Universidade Federal de Pelotas, Departamento de Microbiologia e Parasitologia, Laboratório de Parasitologia de Animais Silvestres, Pelotas, Rio Grande do Sul, Brasil, *sng.bio@hotmail.com, (55-51-91350993)

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ABSTRACT

Eighty white-rumped sandpipers (*Calidris fuscicollis*) from the State of Rio Grande do Sul, Brazil, were collected and examined for helminth parasites during the period 2010-2012. Helminthes consisting of two trematodes (*Selfcoelum brasilianum*, *Maritrema* sp.), two cestodes (*Nadejdolepis smithi*, *Nadejdolepis* sp.) and one acanthocephalan species (*Polymorphus cucullatus*) were identified. *Selfcoelum brasilianum*, *Maritrema* sp., *N. smithi*, *Nadejdolepis* sp. and *P. cucullatus* were reported, for the first time, in *C. fuscicollis*.

Keywords: Acanthocephala – Brazil – *Calidris fuscicollis* – Cestoda – Trematoda**RESUMO**

Oitenta maçaricos da espécie *Calidris fuscicollis* foram coletados no Estado do Rio Grande do Sul, para análise de helmintos, no período de 2010-2012. Foram identificadas dois trematódeos (*Selfcoelum brasilianum*, *Maritrema* sp.), dois cestóides (*Nadejdolepis smithi*, *Nadejdolepis* sp.) e um acantocéfalo (*Polymorphus cucullatus*). *Selfcoelum brasilianum*, *Maritrema* sp., *N. smithi*, *Nadejdolepis* sp. e *P. cucullatus* são reportados, pela primeira vez, em *C. fuscicollis*.

Palavras chave: Acanthocephala – Brasil – *Calidris fuscicollis* – Cestoda – Trematoda**INTRODUCTION**

The coastal region of Rio Grande do Sul, where birds find an extensive coastal area for feeding and resting, is of utmost importance for bird species that migrate annually and use different food resources (Belton, 1994). *Calidris fuscicollis* (Vieillot, 1819), a nearctic migrant, nests in the arctic tundra of Alaska and northern Canada and migrates to the

southern hemisphere during the non-breeding season, when it can be found in lagoons and other coastal regions of South America (Piersma *et al.*, 1996). According to Antas (1989), the spring migration of the white-rumped sandpiper follows the Amazon and Central Brazil route, where these birds frequently stop on sandbars and riverbanks. They feed on small crustaceans, molluscs and marine worms, and also eat insects and plants on lagoon shores (Novelli, 1997).

There are few publications on *Calidris fuscicollis* helminths. Deblock & Canaris (2000) made some taxonomic considerations upon describing the cestode *Nadejdolepis litoralis* (Webster, 1947) in Belize; Canaris & Kinsella (2001) identified the cestodes *N. litoralis* and *N. paranitidulans* (Golikova, 1959), as well as the acanthocephalan *Arhythmorhynchus longicolle* (Villot, 1875) in only one specimen, also from the Belizean coast. The aim of this study was to report *Calidris fuscicollis* helminth parasites in Brazil.

MATERIAL AND METHODS

Between April 2010 and September 2012, 80 specimens of *Calidris fuscicollis* (ICMBIO License N. 26234-1) were collected on the southern coast of Rio Grande do Sul State, Brazil (-32°15'32.57"S; -52°14'00.04" W) by means of a mist net (Mistnets). The birds were sedated and euthanized following Federal Council of Veterinary Medicine procedures (2012), placed in individual plastic bags and referred to the Wildlife Parasitology Laboratory of the Federal University of Pelotas, where they were necropsied and had their organs analyzed individually on a stereomicroscope. Females were identified during necropsy by the presence of the ovaries. The parasites found were preserved in 70° GL alcohol for further processing. The trematodes, cestodes and acanthocephalans were compressed, fixed in AFA, stained with Langeron's carmine and mounted in Canada balsam.

Helminths were identified by specialized bibliography references for each group, and representative specimens were deposited in the collection of the Laboratory of Wild Animals Parasites of the University: *Selfcoelum brasilianum* CHLAPASIL 639; *Maritrema* sp. CHLAPASIL 640; *Nadejdolepis smithi*

CHLAPASIL 641; *Nadejdolepis* sp. CHLAPASIL 642; *Polymorphus cucullatus* CHLAPASIL 643. Prevalence, mean abundance and mean intensity of parasitism parameters were calculated according to Bush *et al.* (1997), and statistical analyzes were performed by means of the Chi-square test using the Statistix 9.0 software.

RESULTS AND DISCUSSION

Of the 80 birds collected, 29 were males and 51 females; 98% of the birds were parasitized by at least one species of helminth belonging to the Phylum Acanthocephala and Classes Cestoda and Trematoda. The highest prevalence was found in the small intestine. The following parasites were identified: *Selfcoelum brasilianum* (Stossich, 1902) and *Maritrema* sp. of the Class Trematoda; *Polymorphus cucullatus* (Van Cleave & Starrett, 1940) of Phylum Acanthocephala; *Nadejdolepis smithi* (Deblock & Canaris, 2001) and *Nadejdolepis* sp. of Class Cestoda. Table 1 shows the list of helminths, infection site and their respective parameters (prevalence, mean abundance and mean intensity).

Maritrema sp. showed the highest prevalence (57.5%), followed by the acanthocephalan *Polymorphus cucullatus* (33.75%). The trematode *Selfcoelum brasilianum* showed low prevalence, as only two hosts were parasitized by one specimen each. It was not possible to calculate cestode parameters because only a few specimens were sufficiently stained for correct identification.

According to Gibson *et al.*, (2002), the Cyclocoelidae family (Stossich, 1902) is divided into three subfamilies, which are classified according to the position of the ovary: Cyclocoelinae (Stossich, 1902) is located between the testicles;

Ophthalmophaginae (Harrah, 1922) is post-testicular, and Haematotrephinae (Dollfus, 1948) is pre-testicular. The genus *Selfcoelum* (Stossich, 1902) (Syn. *Corpopyrum* Witenberg, 1923; *Haematoprimum* Witenberg, 1923; *Harrahium* Witenberg, 1923; *Haematotrephus* Stossich, 1902) belongs to the subfamily Cyclocoelinae (Dollfus, 1948) (Blend & Dronen, 2008) for having a genital pore posterior to the pharynx, with no vitelline glands in the posterior end, and diagonal testis forming a triangle with the ovary, which is pre-testicular and opposite to the anterior testis (Blend & Dronen, 2008). Parasites of this genus are commonly found parasitizing the abdominal cavity and air sacs of birds (Gibson *et al.*, 2002). According to Skrjabin *et al.*, (1964), species are differentiated by the disposition of the vitelline glands, which in *S. brasilianum* reach the pharynx level.

The Family Microphallidae (Ward, 1901) is made up of very small trematodes (500±300µm). They have a ventrally flattened back and are thin, generally linguiform, piriform or fusiform in shape and adults are mostly found in the intestine of vertebrates (Bray *et al.*, 2008). The genus *Maritrema* (Nicoll, 1907) includes a series of small distomata that occur in different parts of the world, most of which are parasites of shorebirds (Hadley & Castle, 1940). Adult forms are found parasitizing the intestine of birds, causing enteritis and ulceration (Swales, 1933). Their life cycle involves gastropods as intermediate hosts and crustaceans as second intermediate hosts (DeBlock, 1971). The arrangement of the vitelline glands, which are almost at the rear end and the similar size of suckers, are marked morphological features of this group (Hadley & Castle, 1940).

The family Polymorphidae (Meyer, 1931) includes three subfamilies, 10 genera, 88 species and two ambiguous species. There is taxonomic confusion involving acanthocephala of the genus *Polymorphus*

(Luhe, 1911): According to Amin (1992), a number of species had been formerly attributed to the genera *Profilicollis* (Meyer, 1931), *Falsifilicollis* (Webster, 1948), *Parafilicollis* (Petrochenko, 1956), *Subfilicollis* (Hoklova, 1967), *Arhythmorhynchus* (Luhe, 1911), *Filicollis* (Luhe, 1911) and *Plagiorhynchus* (Luhe, 1911) (= *Prosthorhynchus* Kostylev, 1915); according to Petrochenko (1971), the genus *Polymorphus* (Lühe, 1911) has a fusiform body, its anterior section is separated from the rest by a constriction, and it has a cylindrical or oval proboscis, four tubular cement glands, fusiform eggs and wavy protrusions at the ends; according to Hoklova (1971) and Amin (1992), the differentiation between genera of the family Polymorphidae is given the number and shape of cement glands, which are tubular and four in number in *Polymorphus*; to Amin (1992), the genus includes 36 species, all parasites of waterfowl *P. cucullatus* (Van Cleave et Starrett, 1940) and has a slightly larger body in the proboscis section, which is divided by a constriction, proboscis hooks in 22 longitudinal rows ordered with 12 hooks each, lemnisci about twice as long as the sheath and four long, tubular cement glands (Petrochenko, 1971).

Nadejdolepis, a cestode of the family Hymenolepididae (Spasskii & Spaskaya, 1954), is common in wader birds. However, little is known about cestodes of the genus *Nadejdolepis* - the few studies on these helminths were performed by Deblock & Canaris (2000), who identified *N. paranitidulans* (Golikova, 1959) in *Charadrius alexandrinus* (Linnaeus, 1758), *N. arenarie* (Cabot, 1969) in *Arenaria interpres* (Linnaeus, 1758), and *N. litoralis* (Webster, 1947) in *Calidris fuscicollis* on the coast of Belize; Canaris & Kinsella (1998) found *N. paranitidulans* in *Calidris ferruginea* in King Island, Tasmania; Deblock & Canaris (2001b), who identified *N. bealli* and *Nadejdolepis* sp. in *Arenaria interpres* and *Calidris alpina*

(Linnaeus, 1758) in Alaska, *N. smithi* (Deblock & Canaris, 2001a) in *Charadrius ruficapillus* (Temminck, 1822), and *Arenaria interpres* and *N. kinsellai* in *C. ruficapillus* in Australia. *Nadejdolepis smithi* was found to parasitize the large intestine of *C. ruficapillus* in Australia, and was described by Canaris and Kinsella in 1998 as *N. lauriei* (Davies, 1939).

There were no significant differences between infected and uninfected birds as to different helminth species and as to male and female bird infection were found by data analysis and the chi-square test ($P > 0.05$).

Many seabirds feed on invertebrates, such as arthropods and aquatic mollusks, which are infected with helminth eggs (Mouritsen *et al.*, 1997). According to Bush *et al.* (1990), the variety of helminth species is on average lower in terrestrial hosts than that in water and migratory birds which, as opposed to resident birds, are exposed to more than a single environment and, consequently, their parasites (Moller & Erritzøe, 1999).

By feeding in aquatic environments, *C. fuscicollis* is subject to helminth infections, inasmuch as the habitat plays an important role in the host-parasite relationship. The migratory habits and varied diet of this host facilitate its infection by various helminth genera, once these birds have greater exposure to

gastropods, intermediate hosts of trematodes, thus justifying their higher prevalence in the host bird. The same role may be attributed to acanthocephalans and cestodes found in *C. fuscicollis*, which have water microcrustaceans as intermediary hosts.

The number of species found in this study was higher than that found by Canaris & Kinsella (2001); these authors reported two cestode and one acanthocephalan species in only one specimen captured in Belize, contrasting with the 80 specimens analyzed in this work.

By feeding in aquatic environments that allow the presence of intermediate hosts of helminths, such as gastropods and microcrustaceans, *Calidris fuscicollis* showed a greater number of trematode and cestode species.

The trematodes *Selfcoelum brasilianum* and *Maritrema* sp., the cestodes *Nadejdolepis smithi* and *Nadejdolepis* sp., and the acanthocephalan *Polymorphus cucullatus* have been first reported in *Calidris fuscicollis*.

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Table 1. Helminths in *Calidris fuscicollis* (Aves: Scolopacidae) in southern Brazil, (2010-2012).

Helminths	Habitat	P%	MI	MA
Acanthocephala				
<i>Polymorphus cucullatus</i>	SI	33,75	3,74	1,26
Cestoda				
<i>Nadejdelipis burgessi</i>	SI	-	-	-
<i>Nadejdolepis</i> sp.	SI	-	-	-
Trematoda				
<i>Maritrema</i> sp.	SI	57,5	13,32	7,66
<i>Haematotrophus brasilianum</i>	AC	1,25	2	0,025

P = Prevalence; MI = Mean Intensity; MA = Mean Abundance; SI = Small Intestine; AC = Abdominal Cavity.

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