

Nasal mites (Mesostigmata, Rhinonyssidae) in Sternidae (Aves: Charadriiformes) on the southern Coast of Brazil

Ácaros nasais (Mesostigmata, Rhinonyssidae) em Sternidae (Aves: Charadriiformes) na Costa do Extremo Sul do Brasil

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Abstract

Six species of birds of the family Sternidae are often found on the southern coast of South America. *Sterna trudeaui*, *S. hirundinacea*, *Thalasseus maximus*, *T. acuflavidus* and *Sternula superciliaris* are South American residents and *Sterna hirundo*, a Nearctic migrant. At least 500 species of nasal mites have been described around the world, and Rhinonyssidae is the most diverse family. These mites are bloodsucking endoparasites that inhabit the respiratory system of birds. This study aimed to report on occurrences of nasal mites in Sternidae on the southern coast of Brazil. Of the 106 birds analyzed, 8.5% (9 birds) were parasitized by nasal mites. This report provides the first record in the Neotropical region for two mite species, *Sternostoma boydi* and *Larinyssus orbicularis* parasitizing *Thalasseus acuflavidus* and *Sternula superciliaris*. No nasal mites were found in *Sterna trudeaui* or *Thalasseus maximus*. One host individual (*T. acuflavidus*) was parasitized by two species of nasal mites, *S. boydi* and *L. orbicularis*.

Keywords: Nasal mites, *Sternostoma*, *Larinyssus*, birds, Southern Brazil.

Resumo

Seis espécies de aves pertencentes à família Sternidae são encontradas frequentemente na costa sul da América do Sul. *Sterna trudeaui*, *S. hirundinacea*, *Thalasseus maximus*, *T. acuflavidus* e *Sternula superciliaris* residentes sul-americanos e *Sterna hirundo*, migrante neártico. Existem pelo menos 500 espécies descritas de ácaros nasais ao redor do mundo, sendo Rhinonyssidae a família mais diversa. Estes ácaros são endoparasitos hematófagos que habitam o sistema respiratório das aves. Este estudo objetivou reportar a ocorrência de ácaros nasais em Sternidae na costa do sul do Brasil. Das 106 aves analisadas, 8,5% (9 aves) estavam parasitadas por ácaros nasais. Este é o primeiro registro para duas espécies de ácaros na região neotropical, *Sternostoma boydi* e *Larinyssus orbicularis*, parasitando *Thalasseus acuflavidus* and *Sternula superciliaris*. Em *Sterna trudeaui* e *Thalasseus maximus* não foram encontrados ácaros nasais. Um único hospedeiro (*T. acuflavidus*) estava parasitado por duas espécies de ácaros nasais, *S. boydi* e *L. orbicularis*.

Palavras-chave: Ácaros nasais, *Sternostoma*, *Larinyssus*, aves, sul do Brasil.

At least 500 species of nasal mites have been described around the world, and Rhinonyssidae (Mesostigmata) are the most diverse group (PROCTOR & OWENS, 2000; DIMOV & SPICER, 2013). These mites are hematophagous endoparasites that inhabit the respiratory system of birds. They are found preferentially in the membrane that lines the turbinates. However, they are frequently also found in the anterior portion of the nostrils, larynx, trachea, lung, air sacs and conjunctival sacs (AMARAL & REBOUÇAS, 1974). Transmission occurs through direct contact with parasitized individuals, especially during the reproductive period (AMERSON, 1967).

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Rhinonyssidae mites are distributed into eight genera with characteristics that vary according to the specificity of their hosts. Some genera are found only in a particular host family, while others parasitize birds of different orders (KNEE et al., 2008).

Parasitism by nasal mites can cause damage to the nasal epithelium. However, typically these mites are not considered to cause any significant pathological condition in their hosts (KNEE et al., 2008).

Six species of birds belonging to family Sternidae are often found on the southern coast of South America. Five of these are South American residents: *Sterna trudeaui* Audubon, 1838; *Sterna hirundinacea* Lesson, 1831; *Thalasseus maximus* Boddaert, 1783; *Thalasseus acuflavidus* Cabot, 1847; and *Sternula superciliaris* Vieillot, 1819. The sixth species is *Sterna hirundo* Linnaeus, 1758, a Nearctic migrant that nests in the United States and Canada and



which is found in great numbers on the Brazilian coast outside of the reproductive period (BELTON, 1994).

Of these six species, there are records of parasitism by nasal mites only for *S. hirundo* and *T. maximus* around the world. In *S. hirundo* there are records of the mites *Neoboydaia philomachi* Fain, 1956, *Sternostoma boydi* Strandtmann, 1951, *Larynissus orbicularis* Strandtmann, 1948, *Larynissus iohanssenae* Dimov, 2013 and *Larynissus substerna* Butenko, 1975 (PENCE, 1972; FAIN & HYLAND, 1975; DIMOV, 2013). In *T. maximus* there is only the record of the mite *N. philomachi* (FAIN & HYLAND, 1975).

This study aimed to report on occurrences of nasal mites in Sternidae (Aves: Charadriiformes) on the southern coast of Brazil. One hundred and six individuals belonging to the genera *Sterna*, *Thalasseus* and *Sternula* (terns) were collected during 2013, 2014 and 2015. Field activities were developed on Cassino beach in the municipality of Rio Grande, State of Rio Grande do Sul, along a 220 km stretch between 32° 16' 39.92" S 52° 10' 14.24" W

and 34° 05' 30.28" W 53° 23' 55.48" S (Figure 1). The birds were caught by a licensed hunter using a hunting rifle and were euthanized for other studies to be developed (Ministry of the Environment license no. 39691-3). Birds species were identified following Belton (1994) and Novelli (1997).

Nasal mites were collected using an adaptation of the technique of Fain & Hyland (1975), as described by Amaral & Rebouças (1974). This consisted of opening the nasal cavities by means of an incision that split the nostril to the external orifice of the ear on the corresponding side, thus allowing the upper head to be opened up. The nasal cavity was washed with distilled water and its contents and mucosa were examined under a stereomicroscope. The mites were mounted in Hoyer's fluid according to Amaral & Rebouças (1974) and were identified following Pence (1972) and Dimov (2013). The prevalence of mites was calculated using the software Quantitative Parasitology 3.0.

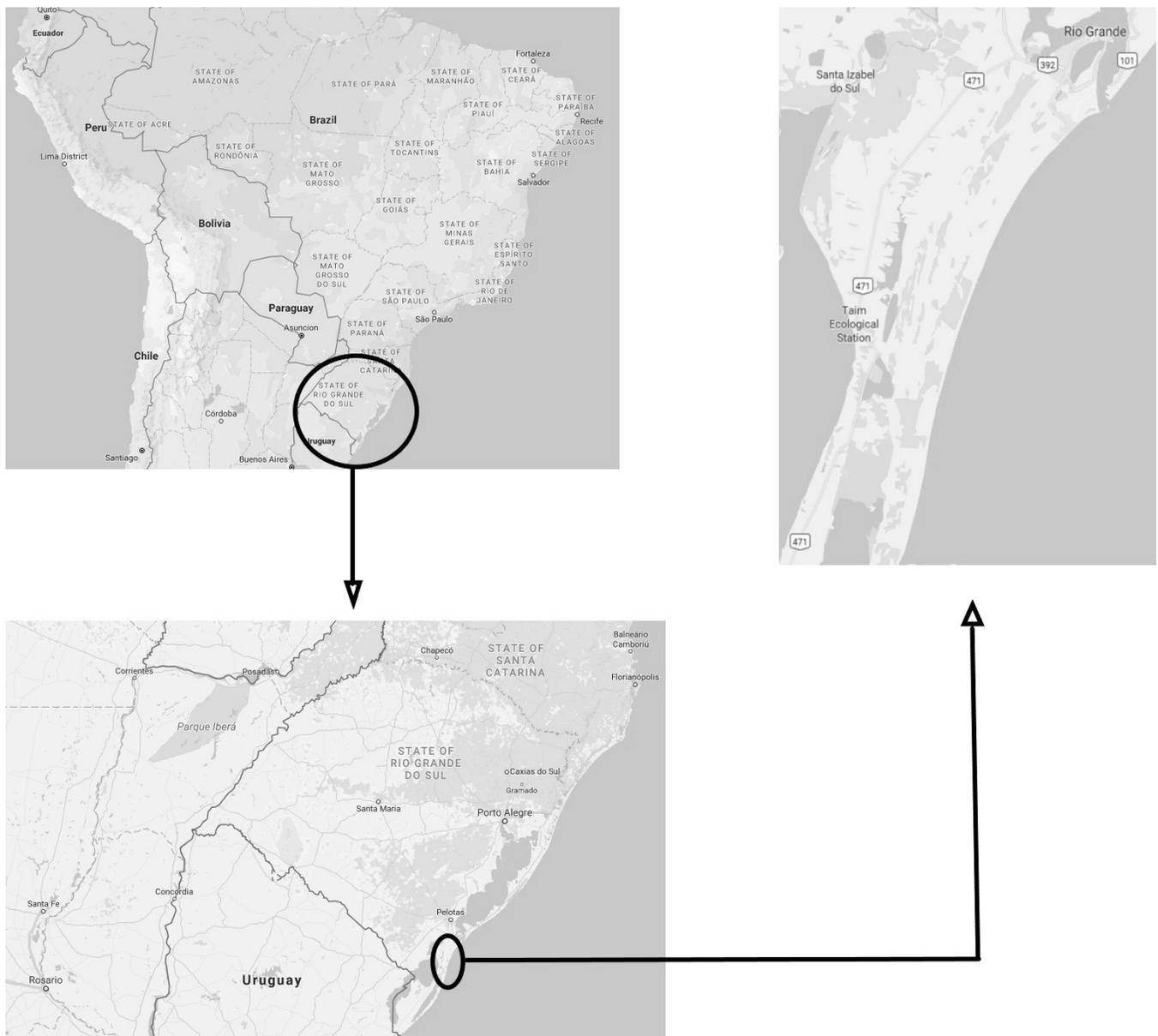


Figure 1. Collection area of birds (Charadriiformes: Sternidae), Cassino beach, Rio Grande, State of Rio Grande do Sul, Brazil.

Voucher specimens (male and female) were deposited in the Collection of Arthropods from the Laboratory of Wild Animals Parasitology of the Biology Institute, Federal University of Pelotas (n° 413-416).

Of the 106 birds analyzed, 8.5% (9 birds) were parasitized by nasal mites (49 specimens). Two species were found: *S. boydi* (12 mites, prevalence 4.7%) and *L. orbicularis* (37 mites, prevalence 4.7%) (Table 1).

The low prevalence and intensity of nasal mites can be attributed to the collection period. According to Amerson (1967), the highest prevalence of Rhinonyssidae is observed during the reproductive period, until the hatching of the chicks. After this period, the prevalence and intensity of infection tend to decrease. All the birds collected were outside of their reproductive periods.

An exemplar of *T. acufavidus*, was parasitized by two mite species simultaneously: *L. orbicularis* (nine specimens), and *S. boydi* (two specimens).

Sternostoma and *Larinyssus* seem to be the most common genera in Sternidae. Amerson (1967) analyzed 460 individuals of *Sterna fuscata* Linnaeus, 1766, in Hawaii, and only found these two genera.

Sternostoma is among the genera with lower specificity in Rhinonyssidae. There are records of this genus in Passeriformes, Piciformes and Charadriiformes. The species *S. boydi* was mentioned by Pence (1972) in *S. hirundo* in North America, but the present

study provides the first record of *S. boydi* in the Neotropical region and the first record of this parasite in *T. acufavidus* and *S. superciliaris*.

Larinyssus is among the more specific genera of Rhinonyssidae. It only occurs in the family Laridae. The species *L. orbicularis* was also found in North America, in *S. hirundo* (PENCE, 1972). The present report provides the first record of *L. orbicularis* in the Neotropical region and the first record of this mite parasitizing *S. hirundinacea* and *T. acufavidus*.

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Table 1. Birds of the family Sternidae collected in the southern coast of Brazil parasitized by nasal mites (Rhinonyssidae).

Bird Species	Mite Species	P% (Infected Hosts)	MI
<i>Sterna hirundo</i> (n=16)	<i>Sternostoma boydi</i> (n=7)	6.3 (1)	7.0
<i>Sterna hirundinacea</i> (n=11)	<i>Larinyssus orbicularis</i> (n=1)	9.1 (1)	1.0
<i>Thalasseus acufavidus</i> (n=8)	<i>Sternostoma boydi</i> (n=2)	12.5 (1)	2.0
	<i>Larinyssus orbicularis</i> (n=36)	50 (4)	9.0
<i>Sternula superciliaris</i> (n=22)	<i>Sternostoma boydi</i> (n=3)	13.6 (3)	1.0

n = number of specimens, P = prevalence, MI = mean intensity.