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Short Communication

First report of Davaneidae and Strongylida parasitizing *Ramphocelus carbo* (Aves: Passeriformes: Thraupidae) in the southwest of the Brazilian Amazon region

Primeiro relato de Davaneidae e Strongylida parasitando Ramphocelus carbo (Aves: Passeriformes: Thraupidae) no sudoeste da Amazônia brasileira

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Abstract

In Brazil, species of the genus *Ramphocelus* with the presence of various endoparasites have already been reported. Coccidia have been the parasites most frequently found. All species of this genus have similar habitats and ecological niches, which makes parasite transmission easy. The aim of this study was to diagnose the presence of endoparasites in fecal samples from specimens of *Ramphocelus carbo* that were caught in the Cazumbá-Iracema Extractive Reserve (Cazumbá Resex), in the State of Acre. The specimens (n = 30) were caught in mist nets arranged in different ecosystems of the Reserve. After identification, the bird specimens were placed in cloth bags for a maximum of 30 minutes to collect feces. Among the 22 samples collected, 63.63% (n = 14) were positive for endoparasites. The coccidia were the parasites most frequently. Helminths belonging to Ascaridiidae (Nematoda), Strongylida (Nematoda) and Davaneidae (Cestoda) were recorded for the first time in *R. carbo* in the State of Acre. Parasites belonging to Strongylida and Davaneidae were recorded for the first time in a species of *Ramphocelus.* These findings add information on the parasitic fauna of wild birds, since in the Amazon region there are few studies on this subject.

Keywords: State of Acre, wild birds, coccidia, reserva extrativa de Cazumbá-Iracema, gastrintestinal parasites.

Resumo

No Brasil, espécies do gênero *Ramphocelus* ja foram relatadas com a presença de vários endoparasitos, sendo os coccídios os parasitos mais frequentes. Todas as espécies do gênero possuem habitats e nichos ecológicos semelhantes, facilitando a transmissão desses parasitos. O presente estudo teve como objetivo diagnosticar a presença de endoparasitos em amostras fecais de *Ramphocelus carbo* capturadas na Reserva Extrativista Cazumbá-Iracema (Resex do

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Cazumbá), localizada no estado do Acre. Os espécimes (n=30) foram capturados em redes de neblina dispostas em diferentes ecossistemas da Reserva. Após a identificação das aves, os espécimes foram colocadas em sacos de pano por no máximo 30 minutos para coleta das fezes. Das 22 amostras coletadas, 63,63% (n = 14) foram positivas para endoparasitas. Os coccídios foram os parasitos mais frequentes. Os helmintos Ascaridiidae (Nematoda), Strongylida(Nematoda) e Davaneidae (Cestoda) foram registrados pela primeira vez em *R. carbo*, no estado do Acre. Strongylida e Davaneidae são registrados pela primeira vez em uma espécie pertencente a *Ramphocelus*. Esses achados acrescentam informações sobre a fauna parasitária de aves silvestres, pois na Amazônia existem poucos estudos nessa área.

Palavras-chave: Estado do Acre, aves silvestres, coccídeos, reserva extrativa de Cazumbá-Iracema, parasitos gastrintestinais.

Introduction

Ramphocelus (Aves: Thraupidae) includes 10 species (Hilty, 2018), of which only three (*R. carbo, R. nigrogularis* and *R. bresilius*) occur in Brazil (Piacentini et al., 2015).

The silver-beaked tanager (*Ramphocelus carbo*, Pallas 1764) is widely distributed in South America. The occurrence of these species in Brazil extends from the Amazon eastwards to Piauí and southwards to western Parana and southern Mato Grosso do Sul (Carvalho, 1957; Hilty, 2018). These birds have been found all over the state of Acre (Guilherme, 2016), as well as in other Brazilian Amazon states (Sick, 1997).

This species forages in diverse Amazon ecosystems such as in bushes at forest edges, overgrown clearings, plantations around dwellings and shrubby dense vegetation along riverbanks in wetlands and, especially, in anthropized areas (Hilty, 2018).

Among the species of the genus *Ramphocelus*, *Ramphocelus bresilius* is the one most frequently reported as having the presence of endoparasites (Berto et al., 2008; Berto et al., 2009; Lopes et al., 2013; Rojas, 2016). The presence of these endoparasites is directly related to these birds' behavior, nutrition and reproductive development, which lead to secondary infections in all tissues and organs (Freitas et al., 2002; Marietto-Goncalves et al., 2009). Such infections have serious consequences for the preservation of bird species and, especially, those that are threatened with extinction (Costa et al., 2010).

Despite the wide distribution of *R. carbo* in the Amazon region, there are only two studies reporting endoparasites in these species (Brito et al., 2017; Boughton et al., 1938). Hence, it is opportune to expand the knowledge of its parasitic fauna in this biome. From this perspective, the aim of this study was to diagnose occurrences of endoparasites in fecal samples from specimens of *R. carbo* that were caught in the Reserva Extrativa de Cazumbá-Iracema in the State of Acre.

Materials and Methods

This investigation was carried out in the "Comunidade Cuidado" ("Care Community") in the Cazumbá Resex, which is located in the Municipality of Sena Madureira, in the eastern part of the state of Acre, which is in the southwestern part of the Amazon region (9°08'46.7" S; 69°01'17.7" W).

Thirty birds were caught, from which 22 feces samples were collected. The collections were carried out twice a week from January to March 2017, using five mist nets measuring 12 m long (each net) and 2.5 m high, with mesh size of 36 mm. The nets were opened in the morning and afternoon in two different ecosystems of the reserve: (a) open areas (anthropic), close to dwellings; and (b) areas covered by primary forest, secondary forest and cleared areas. After capture, the specimens were identified and put into cloth bags for 30 minutes to collect feces and then were released back to nature. The fecal samples were stored in collectors and sent to the Laboratório de Suporte em Vida Selvagem of the Universidade Federal do Acre (UFAC), where the parasitological tests were carried out.

The parasitological diagnosis was made by means of direct examination of the feces samples under an optical microscope, with staining of the samples using Lugol's solution; and by the NaCl solution centrifugal flotation method, using 10X and 40X objective lenses (Olympus CX40). The parasites were identified in accordance with Foreyt (2005) and Zajac & Conboy (2006).

The specimens studied were collected under authorization from the Ethics Committee for Animal Use of the UFAC, through protocol no. 2107.009788/2016-01, and from the Authorization and Information System on Biodiversity (SISBIO), no. 67436297. Statistical analyzes were performed using OpenEpi version 3 software, using Clopper-Pearson confidence interval (1934).

Results and Discussion

Among the feces samples collected, 63.63% (n = 14) were positive for gastrointestinal parasites. Five types of endoparasites were identified (Table 1; Figure 1).

Table 1. Endoparasite frequency distribution found among 14 fecal samples from *Ramphocelus carbo* specimens that were caught in the Reserva Extrativa de Cazumbá-Iracema in Sena Madureira, Acre.

Parasites	Prevalence (%)	IC 95 (%)
Isospora spp. (Eimeriidae)	57.14	32.59 - 78.62
Entamoeba spp.(Endamoebidae)	7.14	1.272 - 31.47
Davaneidae (Cestoda)	14.28	4.01 - 39.94
Ascaridiidae (Nematoda)	35.71	16.35 - 61.23
Strongylida (Nematoda)	7.14	1.272 - 31.47

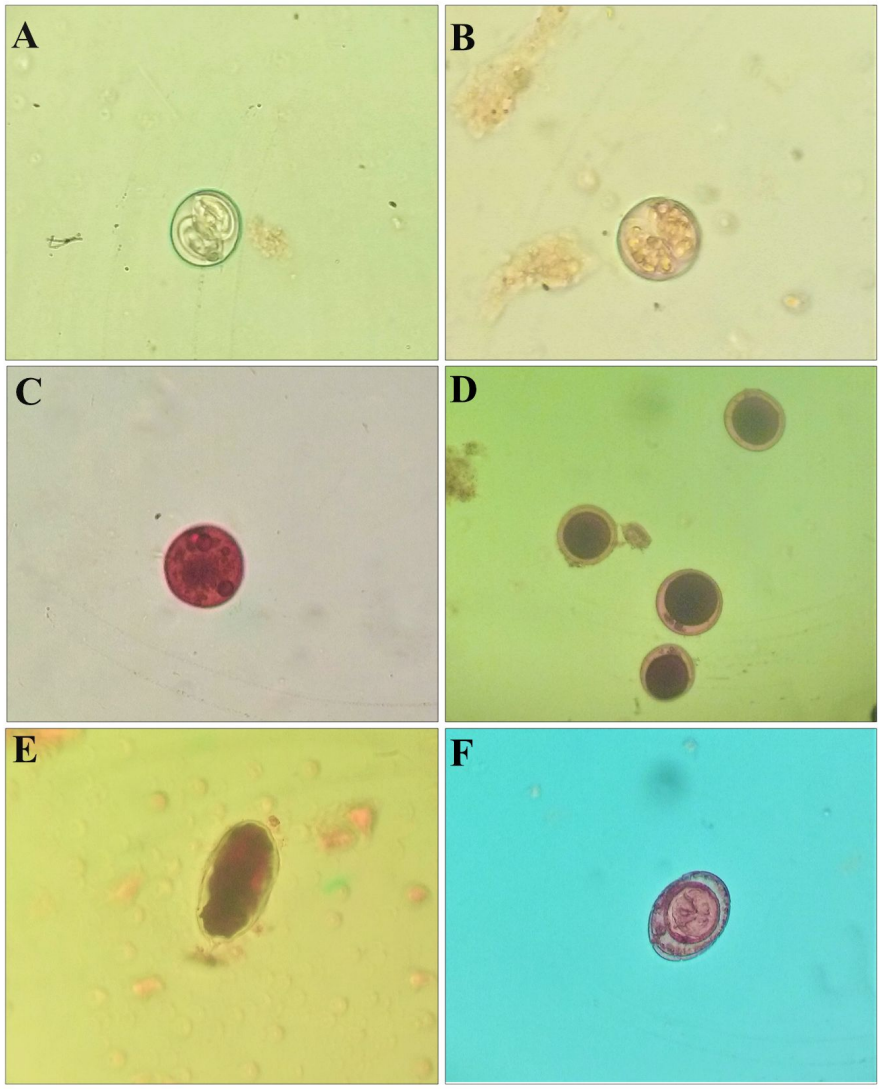

Figure 1. Endoparasites found in the feces of *Ramphocelus carbo* specimens that were caught in the Reserva Extrativa do Cazumbá-Iracema, Acre. (A-B) Oocysts of *Isospora* spp.; (C) Cysts of *Entamoeba* spp.; (D) Eggs of Ascaridiidae; (E) Egg of Strongylida; (F) Eggs of Davaneidae. Figures photographed in saturated NaCl solution and stained with Lugol (40X lenses).

The presence of coccidia in *R. carbo* feces was reported by Boughton (1938) in their study on host birds of the genus *Isospora.* These protozoa were also found in *R. bresilius* in southeastern Brazil (Berto et al., 2008; Berto et al., 2009; Berto, 2010; Berto et al., 2010a,b; Berto et al., 2011; Lopes et al., 2013). Brito et al. (2017) also found individuals of *R. carbo* parasitized by *Isospora* and *Entamoeba* on the *campus* of the UFAC, and these data corroborate the results from the present study. According to Lopes et al. (2013), just like other vertebrates, Passerines can be parasitized by Coccidia, among which the genus *Isospora* was considered to be the most significant, followed by the genus *Eimeria*. Birds of the family Thraupidae have similar habitats and ecological niches (Piacentini et al., 2015; Sick, 1997). Transmission of parasites among these birds is easy: not only because of their foraging habits but also because the presence of a huge number of bird species in diverse ecosystems ensures wide distribution of these parasites (Berto et al., 2009; Berto, 2010).

In the present study, parasites like Ascaridiidae, Davaneidae and Strongylida were recorded for the first time in *Ramphocelus* in the State of Acre, since they were not found by Brito et al. (2017). Among the 193 fecal samples that they analyzed, only 2.59% (5/193) were from *R. carbo* and these were parasitized with oocysts of *Eimeria* spp. and *Isospora* sp. and by cysts of *Entamoeba histolytica*. In the same study, the authors found eggs of ascarids and strongylids in other Passerine species. Eggs of *Choanotaenia* spp. were found in a species of Thaupidae (*Tangara episcopus*). Souza et al. (2019) found samples of *Sporophila caerulescens* (Thaupidae) parasitized by oocysts Coccidia, cysts of *E. coli* and *E. histolytica* and eggs of Davaineidae. These data suggest a possible source of infection among bird species in the region.

Wild specimens of *Ramphocelus passerinii* in southern Costa Rica were reported to have the presence of *Capillaria* and ascarids eggs (Rojas, 2016). However, eggs of parasites belonging to Strongylida and Davaneidae were first recorded in a species of *Ramphocelus* in the present study.

Infected individuals of the species *R. carbo* can generate numerous health problems affecting a diversity of birds and, most probably, other organisms related to them (Costa et al., 2010; Berto et al., 2008, 2009; Brito et al., 2017; Freitas et al., 2002; Marietto-Goncalves et al., 2009; Souza et al., 2019). New molecular research techniques need to be implemented so that such findings can become increasingly reliable and authoritative.

Conclusion

This study recorded occurrences of protozoa and helminths in *R. carbo* in the Amazon region, from where there are very few parasitological studies on wild birds.

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