DOI: 10.2478/s11686-009-0053-z

Acta Parasitologica, 2009, 54(4), 301–304; ISSN 1230-2821

VERSITA

Isospora mionectesi sp. nov. (Apicomplexa, Eimeriidae) from the grey-hooded flycatcher, *Mionectes rufiventris* in Brazil

Bruno P. Berto[1]*, Walter Flausino[2], Hermes Ribeiro Luz[3], Ildemar Ferreira[3] and Carlos Wilson G. Lopes[2]*

[1]Curso de Pós-Graduação em Ciências Veterinárias, Universidade Federal Rural do Rio de Janeiro (UFRRJ) – REUNI scholarship;
[2]Departamento de Parasitologia Animal, Instituto de Veterinária, UFRRJ, BR-465 km 7, 23890-000 Seropédica, RJ, Brazil – CNPq fellowship;
[3]Departamento de Biologia Animal, Instituto de Biologia, UFRRJ, BR-465 km 7, 23890-000 Seropédica, RJ, Brazil

Abstract

A new isosporoid coccidian (Apicomplexa, Eimeriidae) species from the grey-hooded flycatcher, *Mionectes rufiventris*, from Brazil, is reported in the current study. *Isospora mionectesi* sp. nov. oocysts are ellipsoidal, 28.3 × 21.2 µm, with smooth, bi-layered wall, ~1.3 µm. Micropyle and oocyst residuum are absent, but one or two polar granules are present. Sporocysts are elongate ellipsoidal, 19.7 × 11.7 µm. Stieda body rounded and substieda body prominent. Sporocyst residuum is subspherical and compact. Sporozoites are vermiform with one refractile body and a nucleus.

Keywords

Isospora mionectesi sp. nov., oocysts, coccidiosis, Passeriformes, Tyrannidae, Rio de Janeiro, Marambaia Island, Brazil

Introduction

The grey-hooded flycatcher, *Mionectes rufiventris* Cabanis, 1846, is a tyrannid bird with a large host range. This host species is found in Argentina, Brazil and Paraguay. Its natural habitats are subtropical or tropical moist lowland forests and subtropical or tropical moist montane forests (Stotz *et al*. 1996, Sick 1997).

Descriptions of coccidia parasitizing birds of the Tyrannidae are scarce. Boughton *et al*. (1938) and Kawazoe *et al*. (1989) recovered isosporoid oocysts from feces of the eastern phoebe *Sayornis phoebe* Latham, 1790 and blue-billed black-tyrant *Knipolegus cyanirostris* Vieillot, 1818, respectively. These oocysts, however, were not described or named.

The first descriptions in this host family were done by Berto *et al*. (2008, 2009c). *Eimeria divinolimai* Berto, Flausino, Ferreira et Lopes, 2008 parasitized the rufous casiornis *Casiornis rufus* Vieillot, 1816 and *Isospora feroxis* Berto, Luz, Flausino, Ferreira et Lopes, 2009 and *E. sicki* Berto, Luz, Flausino, Ferreira et Lopes, 2009 were recovered from feces of the short-crested flycatcher *Myiarchus ferox* Gmelin, 1789.

According to Prum (1990), Birdsley (2002) and Barber and Rice (2007), the Cotingidae and Pipridae are morphologically and phylogenetically similar to the Tyrannidae. From these families, only a single coccidium has been described, *I. araponga* Doležalová, Torres, Fernández et Modrý, 2004, as parasitizing a bare-throated bellbird *Procnias nudicollis* Vieillot, 1817 (Doležalová *et al*. 2004).

The current study describes a new *Isospora* species infecting the grey-hooded flycatcher *M. rufiventris* on Marambaia Island, Rio de Janeiro State, Brazil.

Materials and methods

Two grey-hooded flycatchers were captured using nets on Marambaia Island (23°04′S and 43°53′W). They were kept in individual cages, and feces were collected immediately after defecation. After identification the birds were released, and the fecal samples were placed into plastic vials containing 2.5% (w/v) solution of $K_2Cr_2O_7$ in 1:6 (v/v). Samples were carried to the Laboratório de Coccídios e Coccidioses located at Universidade Federal Rural do Rio de Janeiro (UFRRJ). Samples were placed in a thin layer (~ 5 mm) of $K_2Cr_2O_7$ 2.5% solution in Petri plates, and incubated at 23–28°C for 10 days or until 70% of oocysts were sporulated. Oocysts were recovered by flotation in Sheather's sugar solution (S.G. 1.20) and micro-

*Corresponding authors: lopescwg@ufrrj.br/bertobp@ufrrj.br

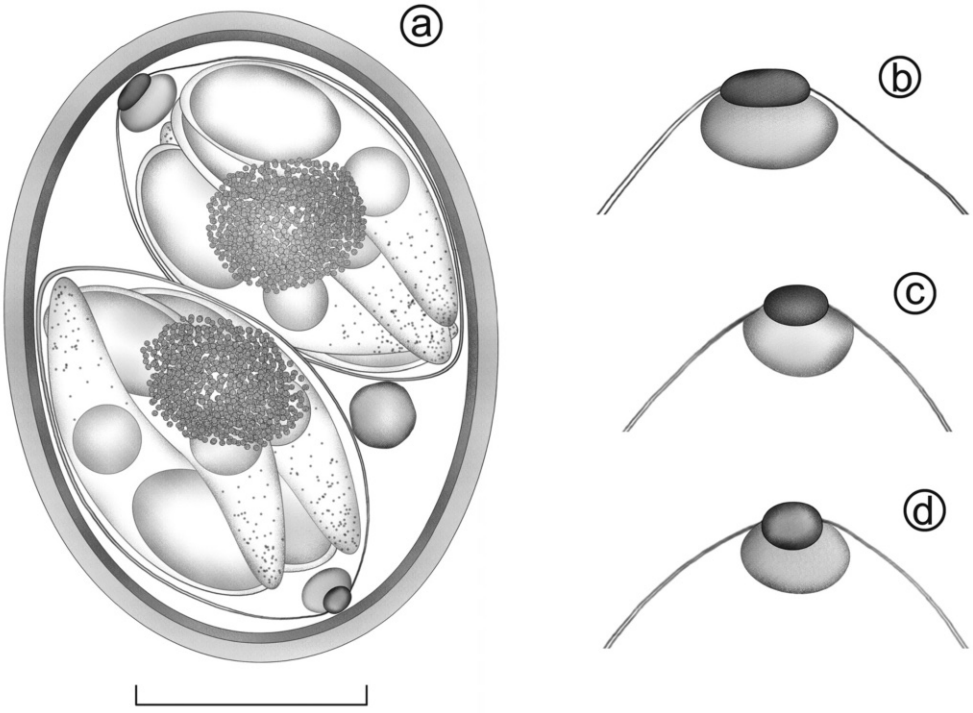

Fig. 1. Line drawings of *Isospora mionectesi*, a new coccidium species recovered from the grey-hooded flycatcher, *Mionectes rufiventris*: (a) sporulated oocyst with its respective variations of (b, c, d) Stieda and substieda bodies detached. Scale bar = 10 µm for oocysts, and 5 µm for Stieda and substieda bodies

scopically examined using the technique described by Duszynski and Wilber (1997). Morphological observations (micropyle [M], oocyst residuum [OR], polar granule [PG], Stieda body [SB], substieda body [SSB], parastieda body [PSB], sporocyst residuum [SR], sporozoite [SZ], refractile body [SRB], nucleus [N]) and measurements, in µm, were performed using a binocular microscope Carl Zeiss with apochromatic oil immersion objective lens and ocular micrometer K-15X PZO (Poland). Line drawings were prepared using a binocular microscope Wild M-20 with drawing tube. Pictures were taken using a digital camera model CD Mavica MVC-CD250 Sony®. Size ranges are shown in parenthesis followed by average and shape index (L/W ratio).

Results

Two grey-hooded flycatchers were examined; one of them shed oocysts in the feces. Initially, the oocysts were non-sporulated, while 70% sporulated by day eight.

***Isospora mionectesi* sp. nov.** (Figs 1a-d, 2a-c)

Description of sporulated oocyst: Oocyst shape (n = 15) ellipsoidal; number of walls 2; wall thickness 1.3 (1.2–1.4); outer wall smooth, about 2/3 of total thickness; L × W 28.3 × 21.2 (26–31 × 19–23), with L/W ratio 1.3 (1.2–1.4); M and O absent; PG present, usually 1 or 2.

Description of sporocyst and sporozoites: Sporocyst shape (n = 10) elongate ellipsoidal, tapering toward 1 end; L × W 19.7 × 11.7 (17–22 × 10–13); L/W ratio 1.7 (1.6–1.8); SB present, rounded, 0.8 high × 1.1 wide; SSB present, prominent, 1.4 high × 2.1 wide; PSB absent; SR present; SR characteristics, forms a subspherical and compact mass of granules; SZ vermiform with 1 posterior SRB and a N.

Type-host: The grey-hooded flycatcher, *Mionectes rufiventris* Cabanis, 1846 (Passeriformes, Tyrannidae).

Type-locality: Marambaia Island (23°04´S and 43°53´W), Rio de Janeiro, Brazil.

Material deposited: Oocysts stored in 10% aqueous buffered formalin (v/v), and deposited in the Parasitology Collection, in the Department of Animal Parasitology, at UFRRJ, located in Seropédica, Rio de Janeiro, Brazil. Phototypes and line drawings are deposited at the same location. The repository number is P-33/2009.

Site of infection: Unknown. Oocysts collected from fecal samples.

Prevalence: 50% (one of two examined birds).

Etymology: The specific epitaph is derived from the generic name of the type host.

Remarks: The *I. mionectesi* oocysts can be easily distinguished by the shape of the oocysts and sporocysts. *Isospora*

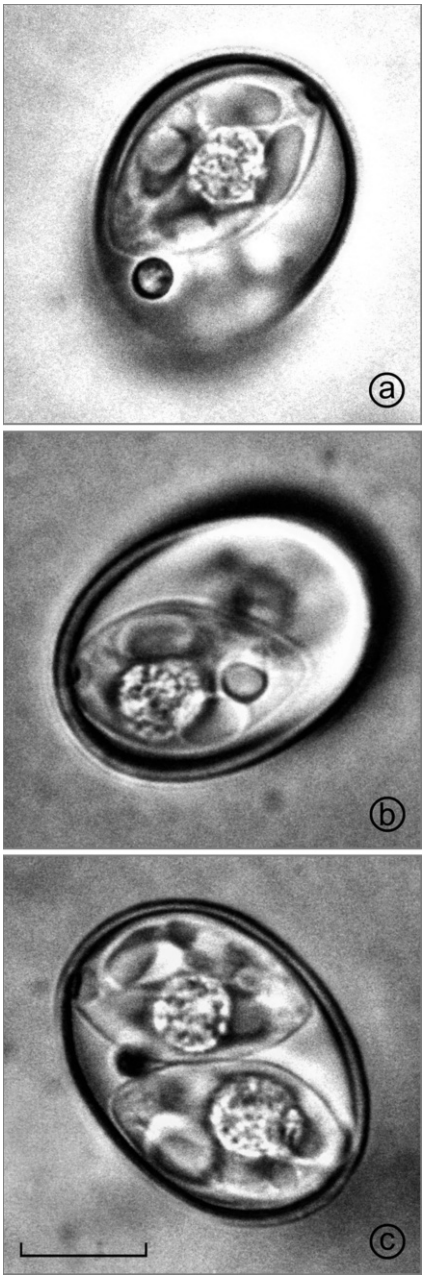

Fig. 2. Photographs (a, b, c) of *Isospora mionectesi*, a new coccidium species recovered from the grey-hooded flycatcher, *Mionectes rufiventris*. Scale bar = 10 μm

feroxis oocysts are minor than *I. mionectesi* oocysts and present subspheroidal shape.

Isospora araponga can be differentiated from *I. mionectesi* because it presents subspherical to ellipsoidal oocysts and an indistinguishable SSB.

Discussion

According to Duszynski and Wilber (1997), a new coccidian species should be compared in details to coccidian species that is most feature-similar to it, and belong to the same host family. Therefore, due to the lack of descriptions of coccidian parasites from tyrannids, *I. mionectesi* was compared to the coccidia from the Cotingidae and Pipridae, which are close to the Tyrannidae (Prum 1990, Birdsley 2002, Barber and Rice 2007).

Based on its morphological features, this new coccidium described above is considered as new to science, representing the second *Isospora* species described from the Tyrannidae.

In agreement with Grulet *et al*. (1982) and Berto *et al*. (2009a, b, c), some variations in the SB and SSB (Fig. 1b-d) were observed in the sporocysts of this new species; however, these variations are not sufficient enough to describe another new species. These variations may be a result of the sporulation process, the position of the SZ inside of the sporocyst, or the position of the oocyst and sporocyst under the coverslip.

The shortage of reports of coccidia parasitizing birds of Tyrannidae is relevant, once in Brazil it is the more representative family, with 211 distinct species catalogued (CBRO 2007). Besides, the easiness of transmission of isosporoid coccidian, the geographic range of the host *M. rufiventris* and the large quantity of sympatric tyrannids would trigger the dissemination of the coccidia to tyrannids in Brazil, Argentina, Paraguay and, successively, throughout the Americas.

Acknowledgements. We are thankful to the Brazilian Navy, especially to the commander of CADIM (Centro de Adestramento da Ilha da Marambaia), who enabled our access to Marambaia Island. We are also grateful for the use of some of the facilities of CADIM during the fieldwork.

References

Barber B.R., Rice N.H. 2007. Systematics and evolution in the Tityrinae (Passeriformes: Tyrannoidea). *Auk*, 124, 1317–1329. DOI: 10.1642/0004-8038(2007)124[1317: SAEITT]2.0.CO;2.

Berto B.P., Balthazar L.M.C., Flausino W., Lopes C.W.G. 2009a. New isosporoid coccidian parasites of sayaca tanager, *Thraupis sayaca*, from South America. *Acta Parasitologica*, 54, 90–94. DOI: 10.2478/s11686-009-0014-6.

Berto B.P., Flausino W., Ferreira I., Lopes C.W.G. 2008. *Eimeria divinolimai* sp. n. (Apicomplexa: Eimeriidae) in the rufous casiornis *Casiornis rufus* Vieillot, 1816 (Passeriformes: Tyrannidae) in Brazil. *Revista Brasileira de Parasitologia Veterinária*, 17, 33–35.

Berto B.P., Flausino W., Luz H.B., Ferreira I., Lopes C.W.G. 2009b. Two new *Isospora* species from Brazilian tanager (*Ramphocelus bresilius dorsalis*) of South America. *Parasitology Research*, 105, 635–639. DOI: 10.1007/s00436-009-1432-y.

Berto B.P., Luz H.B., Flausino W., Ferreira I., Lopes C.W.G. 2009c. New species of *Eimeria* Schneider, 1875 and *Isospora* Schneider, 1881 (Apicomplexa: Eimeriidae) from the short-crested flycatcher *Myiarchus ferox* (Gmelin) (Passeriformes: Tyrannidae) in South America. *Systematic Parasitology*, 74, 75–80. DOI: 10.1007/s11230-009-9197-3.

Birdsley J.S. 2002. Phylogeny of the tyrant flycatchers (Tyrannidae) based on morphology and behavior. *Auk*, 119**,** 715–734. DOI: 10.1642/0004-8038(2002)119 [0715:POTTFT]2.0.CO;2

Boughton D.C., Boughton R.B., Volk J. 1938. Avian hosts of the genus *Isospora* (Coccidiidae). *Ohio Journal of Science*, 38, 149–163.

CBRO. 2007. Lista das aves do Brasil. Comitê Brasileiro de Registros Ornitológicos, Rio de Janeiro, 32 pp.

Doležalová M., Torres J., Fernández H., Modrý D. 2004. *Isospora araponga* sp. n. (Apicomplexa: Eimeriidae), a new species of *Isospora* Schneider from a Bare-throated Bellbird, *Procnias nudicollis* (Vieillot, 1817) (Passeriformes: Cotingidae) from Brazil. *Memórias do Instituto Oswaldo Cruz*, 99, 829–830. DOI: 10.1590/S0074-02762004000800008.

Duszynski D., Wilber P. 1997. A guideline for the preparation of species descriptions in the Eimeriidae. *Journal of Parasitology*, 83, 333–336. DOI: 10.2307/3284470.

Grulet O., Landau I., Baccam D. 1982. Les *Isospora* du Moineau domestique; multiplicite des especes. *Annales de Parasitologie Humaine et Comparée*, 57, 209–235.

Kawazoe U., Gouvêa H., Jorge P., Caputo C.M.E., Perdigão J.C. 1989. A survey of intestinal coccidiosis from wild birds from the Itatiaia National Park, Minas Gerais, Brazil. *Journal of Protozoology*, 36, 11a.

Prum R.O. 1990. Phylogenetic analysis of the evolution of display behavior in the Neotropical manakins (Aves: Pipridae). *Ethology*, 84, 202–231.

Sick H. 1997. Ornitologia Brasileira. Nova Fronteira, Rio de Janeiro, 862 pp.

Stotz D.F., Fitzpatrick J.W., Parker T.A., Moskovits D.K. 1996. Neotropical birds: ecology and conservation. University of Chicago Press, Chicago, 546 pp.

(Accepted July 21, 2009)