Isospora vanriperorum LEVINE, 1982 (APICOMPLEXA: EIMERIIDAE) IN THE GREEN-WINGED SALTATOR, *Saltator similis* LAFRESNAYE AND D'ORBIGNY, 1837 (PASSERIFORMES: CARDINALINAE) IN SOUTHEASTERN BRAZIL*

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ABSTRACT:- LOPES, B. DO B.; BERTO, B.P.; MASSAD, F.V.; LOPES, C.W.G. ***Isospora vanriperorum* Levine, 1982 (Apicomplexa: Eimeriidae) in the green-winged saltator, *Saltator similis* (Passeriformes: Cardinalinae) in southeastern Brazil.** [*Isospora vanriperorum* Levine, 1982 (Apicomplexa: Eimeriidae) no Trinca-ferro *Saltator similis* Lafresnaye and D'orbigny, 1837 (Passeriformes: Cardinalinae) no sudeste do Brasil]. *Revista Brasileira de Parasitologia Veterinária*, v. 16, n. 4, p. 211-214, 2007. Departamento de Parasitologia Animal, Instituto de Veterinária, Universidade Federal Rural do Rio de Janeiro, Km 7 da BR 465, Seropédica, RJ 23.890-000, Brasil. E-mail: lopescwg@ufrrj.br

Isospora vanriperorum from the green-winged saltator (*Saltator similis*) is described in Southeastern Brazil. Oocysts are spherical to subspherical, 19.4-26 by 18.3-26µm (23.1 by 22.4µm), shape index 1.04 with a single layered wall, fine, smooth and yellowish. Micropyle and residuum are absents, but one elliptical polar granule is present. Sporocysts are ovoid, 14.5-20.2 by 8.1-12.5µm (16.3 by 10.8µm), shape index 1.53 with prominent Stieda body, barely discernible substieda body and residuum centered and granulated.

KEY WORDS: *Isospora vanriperorum*, oocysts, green-winged saltator, *Saltator similis*

RESUMO

Isospora vanriperorum de trinca-ferro verdadeiro (*Saltator similis*) é descrita no sudeste do Brasil. Os oocistos são esféricos a subesféricos medindo 19,4-26 por 18,3-26µm (23,1 por 22,4µm), índice morfométrico de 1,04 com parede única, fina, lisa e amarelada. A micrópila e o resíduo estão ausentes, mas um grânulo polar elíptico está presente. Os esporocistos são ovóides medindo 14,5-20,2 por 8,1-12,5µm (16,3 por 10,8µm), índice morfométrico de 1,53 com corpo de Stieda proeminente, corpo de substieda mal discernível e resíduo central e granular.

PALAVRAS-CHAVE: *Isospora vanriperorum*, oocistos, trinca-ferro verdadeiro, *Saltator similis*.

INTRODUCTION

The green-winged saltator *Saltator similis* Lafresnaye and D'Orbigny, 1837 is a native bird of South America. This species has a large range, with an estimated global extent of occurrence of 3,100,000 km^2. Its global distribution is limited to the countries of Argentina, Brazil, Bolivia, Paraguay and Uruguay. In Brazil, it is occurs from Bahia to Rio Grande do Sul (BIRD LIFE INTERNATIONAL, 2004; LOUSADA et al., 2007).

Coccidiosis associated with genus *Isospora* in birds of the Emberizidae family, buntings and sparrows, was reported since Labeé (1896), where *Isospora* oocysts were described how the yellowhammer, *Emberiza citrinella* (DUSZYNSKI; COUCH, 2004).

Isospora vanriperorum was primarily described in northern cardinal, *Cardinalis cardinalis*, in Hawaii by Levine et al. (1980). The aim of this paper is to report and describe the sporulated oocysts of *I. vanriperorum* from the green-winged saltator, *S. similis* from Southeastern Brazil.

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MATERIAL AND METHODS

Samples. Fecal samples were collected from a cage bird, green-winged saltator, at the west zone in the City of Rio de Janeiro, Brazil. They were placed into plastic vials containing potassium dichromate solution ($K_2Cr_2O_7$) at 2.5% 1:6 v/v and transported to the Laboratório de Coccídios e Coccidioses at Projeto Sanidade Animal (Embrapa/UFRRJ), Departamento de Parasitologia Animal, Instituto de Veterinária da Universidade Federal Rural do Rio de Janeiro. To induce sporulation, the fecal material was filtrated with double gauze and placed on Petri dishes at room temperature (23-28°C) for ten days, until most oocysts are sporulated. Oocysts were recovered from the fecal samples by using saturated sugar flotation technique according Duszinsky and Wilber (1997).

Morphology. Morphological observations and measurements were performed by using a binocular microscope Carl Zeiss with apochromatic oil immersion objective and ocular micrometer K-15X PZO (Poland). Line drawings were prepared with a binocular microscope Wild M-20 with drawing tube.

Photographies. Pictures were prepared by using a digital camera model CD Mavica MVC-CD250 Sony®.

RESULTS

Isospora vanriperorum Levine, 1982

Morphology. Oocysts (Figures 1and 2) are spherical to subspherical, 19.4-26 by 18.3-26µm (23.1 by 22.4µm), shape index 1.04, with a single layered wall, fine, smooth and yellowish. Micropyle and residuum are absents, but one elliptical polar granule is present. Sporocysts are ovoid, 14.5-20.2 by 8.1-12.5µm (16.3 by 10.8µm), shape index 1.53, with prominent Stieda body, barely discernible Substieda body and residuum centered and granulated.

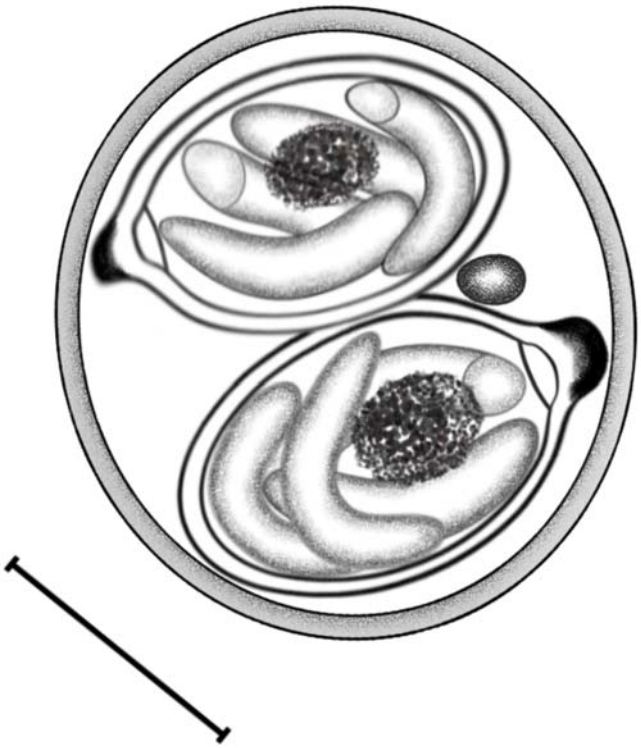

Figure 1. *Isospora vanriperorum* from *Saltator similes.* Sporulated oocyst. Line draw. (— = 10µm)

Figure 2. *Isospora vanriperorum* from *Saltator similes.* Sporulated oocyst. Saturated sugar solution. 1000X.

Taxonomic summary

Host: The green-winged saltator, *Saltator similis* (Passeriformes: Emberizidae: Cardinalinae).

Site of infection: not investigated.

Locality: City of Rio de Janeiro, Brazil.

Geographic distribution of the host: since the central region of Brazil until the southwest of South America.

Type material and specimens deposited: oocysts in 10% formaldehyde-saline solution deposited at the Parasitology Collection, in the Department of Animal Parasitology, UFRRJ, Seropédica, State of Rio de Janeiro, Brazil. Repository number is 06/2006, including phototypes and line drawings.

***Disease*:** None reported.

DISCUSSION

According to the data presented above the oocysts found in the green-winged saltator, *S. similis*, belongs to the species of *I. vanriperorum*. This species was originally described as *I. cardinalis* by Levine et al. (1980), with others new species: *I. brayi*, *I. ivensae*, *I. loxopis* and *I. phaernis*. However, as this name was preoccupied for Gottschalk (1972), it was later renamed by Levine (1982) as *I. vanriperorum*.

Numerous coccidia have been described from birds of Emberizidae family. *Isospora emberizae* (MANDAL; CHAKRAVARTY,1964), whose host *Emberiza bruniceps*

(Red-headed bunting) (Emberezidae: Emberezinae) is distributed in Asia and Europe, *I. exigua, I. fragmenta, I. rotunda, I. temeraria* (MCQUISTION; WILSON, 1988), whose host *Camarhynchus parvulus* (Small tree finch) (Emberezidae: Emberezinae) is observed in Galapagos Islands, and *I. geospizae* (MCQUISTION; WILSON, 1989) and *I. daphnensis* (MCQUISTION, 1990), whose host *Geospiza fortis (*Medium-ground finch) (Emberezidae: Emberezinae) is also observed in Galapagos Islands, inhabit South America. Theses species meet in geographic isolation disabling the hypothesis of cross transmission.

In the American continent, 10 species of *Isospora* were described in birds simpatric with *Saltator similis* of Emberizidae family: *I. paroariae* reported by Upton et al. (1985) from the red-crested cardinal, *Paroaria coronata* (Emberezidae: Emberezinae), differs from the oocysts described in this paper because of a bi-layered wall and no polar granule.

McQuistion and Capparella (1992) described *I. pityli* and *I. formarum* from slate-colored grosbeak *Saltator grossus* (= *Pitylus grossus*) (Emberezidae: Cardinalinae) in Ecuador. *Isospora pityli* differs completely, therefore the oocysts are smaller (20-20.5 by 17-20µm), presents bi-layered wall and no polar granule and substieda body are observed. *Isospora formarum* is different by presenting bi-layered wall, the substieda body is larger and triangular and no presents polar granule.

Isospora tiaris by Ball and Daszak (1997), was described from soot grassquit, *Tiaris fuliginosa (Emberezidae: Emberezinae)* in Venezuela. Oocysts (20-20.5 by 17-20µm) are smaller than those described in this paper and present bi-layered wall.

Carvalho Filho et al. (2005), identified three new species from the double-collared seed eater, *Sporophila caurelescens* (Emberezidae: Emberezinae), from Eastern Brazil: *Isospora sporophilae*, *I. flausinoi* and *I. teixeirafilhoi*. First of all, these three species differ by having bi-layered wall and no present substieda body and, in second; the diameters of oocysts of the *I. flausinoi* (14-20.00 by 13.60-20.00) and *I. teixeirafilhoi* (15.60-19.40 by 14.20-18.80) are smaller.

Recently, Silva et al. (2006) identified three new species from the lesser seed-finch *Oryzoborus angolensis* from Brazil. *Isospora curio* and *I. braziliensis*. Both do not have a polar granule and substieda body; however *I. paranaensis* of the same host had a similar morphology with the oocysts described in this paper, excepted the substieda body which is large and prominent in the *I. paranaensis* sporocysts, while in the sporocysts described in this paper were barely discernible.

Descriptions of *Isospora* species in subfamily Cardinalinae, where *C. cardinalis* and *S. similis*, are inserted and scarce. Beyond Levine et al. (1980) and this paper that described *I. vanriperorum* in Brazil, only McQuistion and Capparella (1992) have described two others species, *I. pityli* and *I. formarum* from the slate-colored grosbeak, *P. grossus* in Ecuador.

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