

# *Isospora iridosornisi*, a new coccidian parasite (Apicomplexa, Eimeriidae) from the yellow-throated tanager, *Iridosornis analis* of South America

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## Abstract

A new isosporan parasite, *Isospora iridosornisi*, is identified from the fecal contents of the yellow-throated tanager, *Iridosornis analis*, from Peru. Sporulated oocysts are ovoidal,  $22.1 \times 18.9$  ( $20\text{--}25 \times 16\text{--}23$ )  $\mu\text{m}$  with a smooth, colorless, bilayered wall; the inner wall is darker than the outer wall. The average shape index is 1.2. No micropyle or oocyst residuum are present but the oocyst contains one ovoid polar granule. Sporocysts are ovoid,  $13.6 \times 9$  ( $9\text{--}17 \times 8\text{--}11$ )  $\mu\text{m}$  with a smooth single layered wall and an average shape index of 1.5. The Stieda body is bubble-shaped with a collar-shaped substieda body. Within the sporocyst is a large spherical residuum composed of coarse non-uniform granules and 4 randomly arranged vermiform sporozoites with a subspherical, posterior refractile body and a centrally located nucleus.

## Key words

Coccidia, *Isospora iridosornisi*, birds, *Iridosornis analis*, South America

## Introduction

The yellow-throated tanager, *Iridosornis analis* (Passeriformes, Thraupidae) is endemic throughout the Andes Mountain range from southeast Columbia, eastern Ecuador, and eastern Peru in South America at elevation of 1300–2100 meters. This species is found in pairs or accompanies mixed flocks of other species. They are often inconspicuous and relatively inactive, primarily inhabiting lower growth humid forests and less often forest borders (Ridgely and Tudor 1989). This paper describes the only isosporan parasite that has been reported in the genus *Iridosornis*.

## Materials and methods

Fecal samples were obtained from the yellow-throated tanager during a bird collecting expedition in Peru on July 30, 2002 and were sent to the third author's laboratory for examination. Procedures for preserving fecal material and for measuring and photographing oocysts are described by McQuiston and Wilson (1989). All measurements are given in micrometers

with size ranges in parentheses following the means. Oocysts were between five and seven months old when examined.

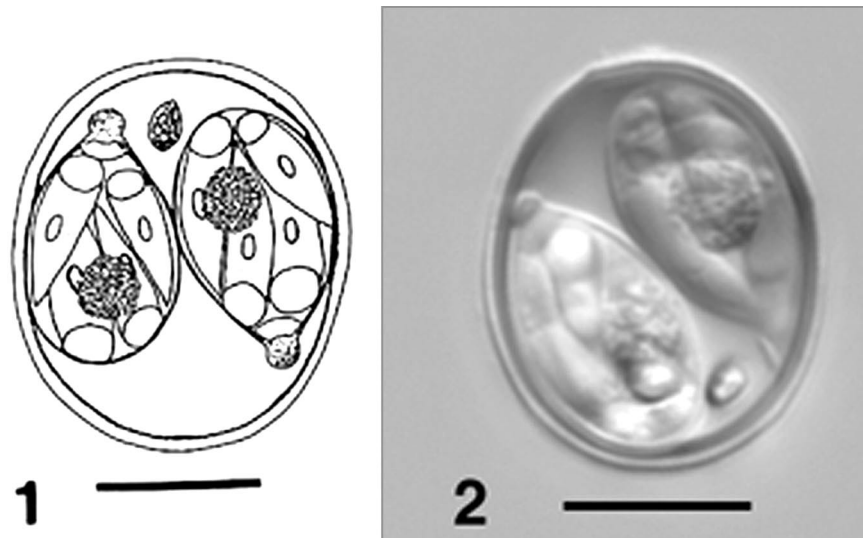
## Results

### *Isospora iridosornisi* sp.nov. (Figs 1 and 2)

Description of oocysts: Oocysts ovoid,  $22.1 \times 18.9$  ( $20\text{--}25$ ,  $SD = 2.096 \times 16\text{--}23$ ,  $SD = 1.792$ ) ( $N = 23$ ) with a smooth, bilayered wall; the inner layer is darker than the outer layer. The shape index (length/width) is 1.2 ( $1.1\text{--}1.3$ ,  $SD = 0.07$ ). Micropyle and oocyst residuum absent but one ovoid polar granule is present. Sporocysts are ovoid,  $13.6 \times 9.0$  ( $9\text{--}17$ ,  $SD = 2.37 \times 8\text{--}11$ ,  $SD = 1$ ) ( $N = 17$ ); shape index 1.5 ( $1\text{--}1.75$ ,  $SD = 0.22$ ). The Stieda body is bubble-shaped with a collar-shaped substieda body. Within the sporocyst is a large spherical residuum composed of coarse nonuniform granules and 4 randomly arranged, vermiform sporozoites with a subspherical, posterior refractile body and a centrally located nucleus.

Type host: *Iridosornis analis* yellow-throated tanager (Passeriformes, Thraupidae), JLK 511, captured July 30, 2002.

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**Fig. 1.** Composite line drawing of sporulated oocyst of *Isospora iridosornisi* from *Iridosornis analis*. Scale bar = 10  $\mu$ m. **Fig. 2.** A differential interference photomicrograph of sporulated oocyst of *I. iridosornisi*. Scale bar = 10  $\mu$ m

**Type specimens:** A phototype series and formalin preserved sporulated oocysts are deposited in Harold W. Menter Laboratory of Parasitology at the University of Nebraska State Museum, Lincoln, NE 68588-0514, accession no. HWML 38844 (for formalin specimens) and HWML 38843 (for phototypes).

**Type location:** San Martin Departamento; ca. 24 km ENE of Florida (village), Peru. 5°41'09"S 77°45'16"W, ca. 1700 m elevation.

**Prevalence:** 1/2 50% was infected within the same locality.

**Sporulation time:** Unknown, oocysts were partially sporulated upon arrival and became fully sporulated after several days with exposure to air prior to examination.

**Site of infection:** Unknown, oocysts found in feces.

**Etymology:** The specific epithet refers to the host genus name and is the third Latin declension.

## Discussion

Tanagers (Passeriformes, Thraupidae) are not definable as a monophyletic group (Isler and Isler 1987, Ridgely and Tudor 1989). No taxonomic character exists that specifically defines the tanagers (Ridgely and Tudor 1989). They are mainly tropical in distribution, and reach maximum diversity in the Andes Mountains.

Boughton *et al.* (1938) reported coccidia in three genera of Andean tanagers; the southern palm tanager, *Thraupis palmarum palmarum*, the Brazilian silver-beaked tanager, *Rham-*

**Table I.** Isosporan species in tanager hosts sympatric with *Iridosornis analis*

Isosporan species	<i>I. iridosornisi</i> sp. nov.	<i>I. andesensis</i>	<i>I. thraupis</i>
Type host	<i>Iridosornis analis</i>	<i>Chlorospingus ophthalmicus</i>	<i>Thraupis melanoptera</i>
Oocyst length/width	22.1 $\times$ 18.9	22.6 $\times$ 18.7	19.9 $\times$ 19
Oocyst l/w ratio	1.2	1.2	1.0
Oocyst wall	smooth, bilayered	smooth, bilayered	smooth, single layered
Polar granules	1	1	0
Sporocyst l/w	13.6 $\times$ 9	14.1 $\times$ 8.5	14.2 $\times$ 9.2
Sporocyst l/w ratio	1.5	1.7	1.5
Sporocyst shape	ovoid	ovoid	pear-shaped
Sporocyst residuum	spherical, nonuniform granules	spherical, uniform granules	spherical, nonuniform granules
Stieda body	bubble-shaped	triangular	small, delicate
Substieda body	collar-shaped	not present	small, bubble-like
Sporozoite shape	vermiform	vermiform	banana-shaped
Sporozoite features	one, subspherical refractile body	one, ovoid refractile body	two, terminal refractile bodies
Reference	present report	Templar <i>et al.</i> 2004	Lainson 1994

*phocelus brasilius*, the magpie tanager, *Cissopis leveriana*, and the southern silver-beaked tanager, *Rhamphocelus carbo carbo*. However, all were reported from captured birds in zoos and none of the coccidia were described or named. Lainson (1994) described *Isospora thraupis* from the palm tanager, *Thraupis palmarum melanoptera*, a possible sympatric species with *Iridosornis analis*. Although the average oocysts of *Isospora thraupis* are similar in size ( $19.9 \times 19 \mu\text{m}$ ) and shape index (1.0) to *Isospora iridosornisi* ( $22.1 \times 18.9 \mu\text{m}$  and 1.2), the sporocysts and sporozoites are quite different between the two species (Table I). *I. thraupis* has an inconspicuous Stieda body and a very small, but distinct substieda body. *I. iridosornisi* has a prominent, bubble-shaped Stieda body and a collar-shaped substieda body. Sporozoites of *I. thraupis* have two refractile bodies while *I. iridosornisi* sporozoites have only one refractile body. Additionally, no polar granule is reported in *I. thraupis* oocysts while *I. andesensis* has one polar granule.

Templar *et al.* (2004) described *Isospora andesensis* from the common bush tanager (*Chlorospingus ophthalmicus*), also a sympatric species with *Iridosornis analis*. However, *I. andesensis* sporulated oocysts differ from *I. iridosornisi* oocysts by having sporocysts with triangular-shaped Stieda bodies and no substieda bodies.

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