Eimeria curvata n. sp. (Apicomplexa: Eimeriidae) in *Columbina talpacoti* and *Scardafella squammata* (Aves: Columbidae) from Brazil

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Eimeria curvata *is a new coccidian described in the doves* Columbina talpacoti *and* Scardafella squammata *from western of the State of São Paulo, Brazil. The oocysts are ovoid to ellipsoid, 18.3 (17-19) µm x 15.5 (15-17) µm, with a shape index of 1.2 (1.1-1.3). The wall is colorless, smooth and double-layered. A polar granule is present, but there is no micropyle or oocyst residuum. The sporocysts are elongate, 12.3 (11.5-13) µm x 5.8 (5.5-6) µm with a curved anterior portion and a smooth, thin, single-layered wall. The Stieda body is protuberant and nipple-like; there is no substieda body. The sporozoites lie head-to-tail in the sporocyst and contain a large refractile body at the extremities. The sporocyst residuum contains small granules uniformly distributed in the middle of the sporocyst. The prevalence of* E. curvata *n. sp. was 17.4% and 12.8% in* C. talpacoti *and* S. squammata, *respectively.*

Key words: *Eimeria curvata* n. sp. - *Columbina talpacoti* - *Scardafella squammata* - coccidia - Apicomplexa - Brazil

At least 65 species of the family Columbidae occur in the neotropical region (Stotz et al. 1996). *Columbina talpacoti* Temminck, 1810, a small dove found in dry, open areas such as fields and farms as well as around human dwellings (Hilty & Brown 1986), occurs mainly in the tropics and, occasionally, in the subtropics (Schauensee & Phelps Jr 1978). *Scardafella squammata* Lesson,1831, another small columbid, is also common in arid scrub areas and around dwellings. This species occurs only in the neotropics (Schauensee & Phelps Jr 1978).

There is no record of coccidian parasites in these columbid species. In this paper, we report in both *C. talpacoti* and *S. squammata* the occurrence of a previously undescribed *Eimeria* species. The parasite is described as a new species of *Eimeria.*

MATERIALS AND METHODS

Forty-six adult specimens of *C. talpacoti* and 39 adult specimens of *S. squammata* were captured using gauze-traps (Ibama 1994) in the municipality of Junqueirópolis, in western of the State of São Paulo, Brazil (21º31'S, 51º27'W), between January and December 1998. The birds were housed individually in appropriate cages for 2 h, tagged and then released. Faecal samples from all birds were stored in 2.5% potassium dichromate solution ($K_2Cr_2O_7$), maintained at room temperature (23-28^{0}C) and examined microscopically after flotation using Sheather's sugar solution.

Photomicrographs were obtained using a Zeiss Standard microscope and Kodak TMAX 100 film. Thirty-six oocysts and 32 sporocysts were measured and compared with those of *Eimeria* species already reported for the family Columbidae. All measurements and averages are given in µm, followed by the range within parentheses and then by the shape-index (ratio of length/width).

RESULTS

Eight out of 46 *C. talpacoti* and five out of 39 *S. squammata* were found to contain coccidial oocysts. Morphological differences were observed between these oocysts and all other known *Eimeria* spp. from Columbiformes. This finding lead us to regard this oocyst as belonging to a new species of *Eimeria.* The parasite is described below.

Eimeria curvata n. sp.
(Figs 1-5)

Description: ovoid to ellipsoidal oocysts (Figs 1-2) (n=36), 18.3 (17-19) x 15.5 (15-17); shape index 1.2 (1.1-1.3). The bilayered wall is 1.3 thick, and is composed of a colourless outer layer 0.9 thick, and a brown inner layer 0.4 thick. Micropyle and oocyst residuum are absent. A polar gran-

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ule is present (Fig. 1). Sporocysts elongate (Figs 3-5) (n=32), 12.3 (11.5-13) x 5.8 (5.5-6), shape index 2.1 (2-2.2), with a curved anterior portion and a smooth, thin, single-layered wall (Figs 3-5). Sporozoites lie head-to-tail in the sporocyst, each with a large refractile at the extremities. There is a protuberant, nipple-like Stieda body (Figs 4-5) but no apparent substieda body. The sporocyst residuum is composed of small granules uniformly concentrated in the middle of the sporocyst.

Sporulation time: not determined.

Site of infection: unknown. Oocysts observed in the faeces.

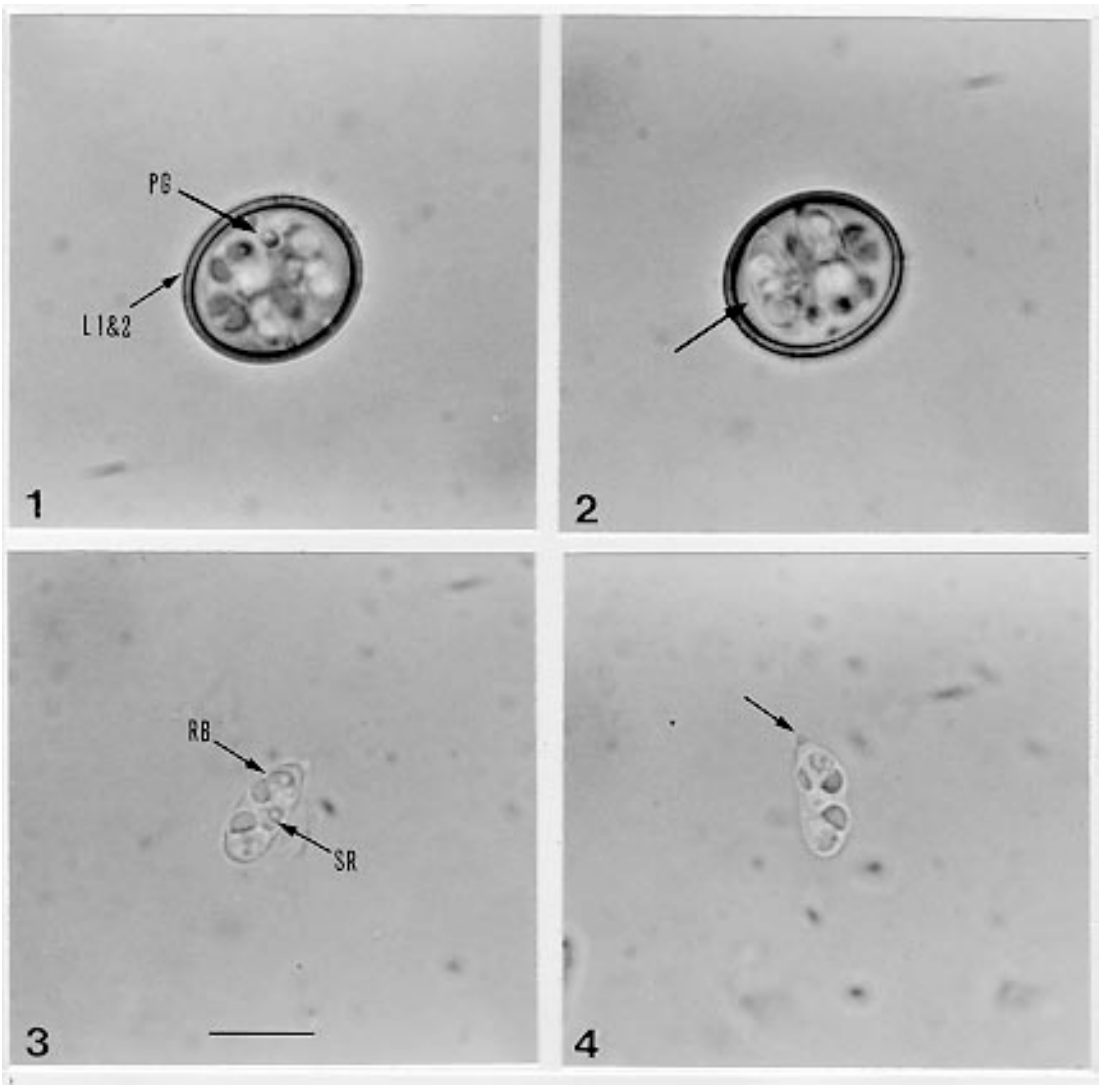
Type material: phototypes of oocysts are deposited in the Department of Parasitology, Institute of Biology, State University of Campinas, State of São Paulo, Brazil (n. 10/99).

Type host: Columbina talpacoti Temminck, 1810 (Aves: Columbidae).

Additional host: Scardafella squammata Lesson, 1831 (Aves: Columbidae).

Locality: municipality of Junqueirópolis, western of the State of São Paulo, Brazil (21º31'S,51º 27'W).

Prevalence: 8/46 (17.4%) *C. talpacoti* and 5/39 (12.8%) *S. squammata* were infected.



Photomicrographs of sporulated oocysts of *Eimeria curvata* n. sp. Fig. 1: cross-section of oocyst wall showing a colorless outer layer (L_1) and a brown inner layer (L_2). Note the polar granule (PG). Fig. 2: mature oocyst. Note the sporocyst. Photomicrographs of free sporocysts. Fig. 3: note the sporocyst residuum (SR) and refractile body (RB) in the extremities of the sporozoites. Fig. 4: protuberant Stieda body. Bar = 10 µm.

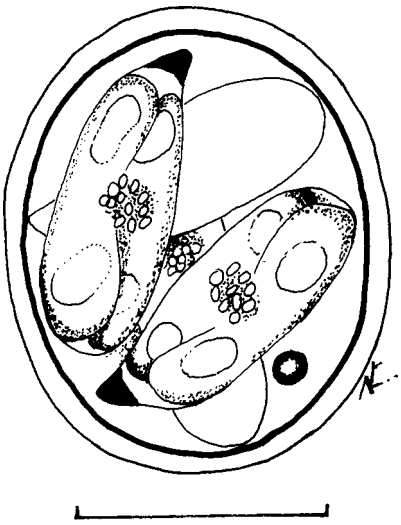


Fig. 5: line-drawing of a mature oocyst of *Eimeria curvata* n. sp. Bar = 10 µm.

Pathogenicity: infected doves appeared healthy. The histopathology of the infection remains to be studied.

Etymology: the species name is based on the curved appearence of the sporocysts.

DISCUSSION

So far, only ten species of coccidian parasites have been described from Columbiformes (McQuistion 1991). These are *E. labbeana* Pinto, 1928, *E. columbarum* Nieschulz, 1935, *E. columbae* Mitra and Das-Gupta, 1937, *E. tropicalis* Malhotra and Ray, 1961 and *E. kapotei* Chatterjee and Ray, 1969, all parasites of *Columba* L., 1758 species; *E. waiganiensis* Varghese, 1978 of *Chaloephaps indica* L., 1758 and *Otidiphaps nobilis* Gould, 1870; *E. gourai* Varghese, 1980 of *Goura victoria* Fraser, 1844; *E. duculai* Varghese, 1980 of *Ducula spilorrhoa* Gray, GR, 1858; *E. palumbis* McQuistion, 1990 of *Zenaida galapagoensis* Gould, 1839 and *Isospora gallicolumbae* Varghese, 1978 of *Gallicolumba beccarii* Salvadori, 1876.

This is the first report of an *Eimeria* species in *Columbina* Spix, 1825 and *Scardafella* Bonaparte, 1855. Comparison of *E. curvata* n. sp. with the nine previously described species mentioned above shows that the oocysts this new especies of *Eimeria* most resemble those of *E. columbae*. However, the oocysts of *E. curvata* n. sp. can be easily distinguished from those of *E. columbae* as they have only one polar granule, no oocyst residuum and a curved anterior portion of the sporocyst.

Lillehoj and Trout (1993) pointed out that *Eimeria* are generally very host-specific, with no species naturally infecting more than one host species. However, Long (1990) asserted that closely related species or subspecies may serve as adequate hosts for a given species of *Eimeria*. According to Lainson (1992), host specificity of *Eimeria* species is relatively strictly maintained, at least within host genus. Varghese (1978) reported *E. waiganiensis* in both *C. indica* and *O. nobilis*. According to the same author, *E. labbeana* also was reported parasitizing two species of host of two different genus *C. livia* and *Streptopelia orientalis* Latham, 1790. In the same way, *E. curvata* n. sp. was found in *C. talpacoti* and *S. squammata* suggesting that some *Eimeria* species of Columbiformes are specific at the family level.

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