

## ***Eimeria leuckarti* Flesch, 1883 (Apicomplexa: Eimeriidae) from horse foals in Rio de Janeiro**

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Submitted in 06.02.2014

Accepted in 15.03.2014

**Abstract** Santos CS, Berto BP, Jesus VLT, Lopes CWG. 2014. *Eimeria leuckarti* Flesch, 1883 (Apicomplexa: Eimeriidae) from horse foals in Rio de Janeiro [*Eimeria leuckarti* Flesch, 1883 (Apicomplexa: Eimeriidae) de potros no Rio de Janeiro] *Coccidia* 2, 40-44. Curso de Pós-Graduação em Ciências Veterinárias. Universidade Federal Rural do Rio de Janeiro. BR-465 km 7, 23897-970 Seropédica, RJ, Brasil. E-mail: carolinespitz@yahoo.com.br

*Eimeria leuckarti* Flesch, 1883 is a cosmopolitan coccidium of equines. It has oocysts quite distinct from other coccidia, due to the larger size, very thick outer wall and considerably longer period of sporulation. The current work reports *E. leuckarti* from horse foals of a farm in Seropédica, Rio de Janeiro, Brazil and makes some notes on the sporulation process, apart from the unsporulated oocyst morphology. Ten of the 57 fecal samples of the horse foals had unsporulated oocysts of *E. leuckarti*, which were recovered by sedimentation and flotation. Noteworthy in the morphological study the identification of a enlarged region in the inner layer of the oocyst wall, always in the opposite end of the micropyle. Finally, the oocysts do not sporulated, even when kept in Petri dishes or in bottles under aeration. Comments and an assumption was introduced in this sense.

**Keywords** coccidia, morphology, unsporulated oocysts, oocyst wall, sporogony, equines.

**Resumo** *Eimeria leuckarti* Flesch, 1883 é um coccídio cosmopolita de eqüinos. Tem oocistos muito distintos dos outros coccídios, devido ao maior tamanho, camada externa da parede do oocisto muito espessa e longo período período de esporulação. O presente

trabalho relata *E. leuckarti* de potros de uma fazenda em Seropédica, Rio de Janeiro, Brasil e faz algumas anotações sobre o processo de esporulação, além da morfologia do oocisto esporulado. Dez de 57 amostras fecais de potros, possuíam oocistos não esporulados de *E. leuckarti*, os quais foram recuperados por sedimentação e flutuação. Destaca-se no estudo morfológico a observação de uma região dilatada na camada interna da parede do oocisto, sempre na extremidade oposta da micrópila. Finalmente, os oocistos não esporularam, mesmo quando mantidos em placas de Petri, ou em garrafas sob arejamento. Comentários e uma suposição foi introduzida neste sentido.

**Palavras-chave** coccidia, morfologia, oocistos esporulados, parede do oocisto, esporogonia,

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equinos.

## Introduction

*Eimeria leuckarti* Flesch, 1883 is a coccidium reported from equines in diverse localities of the world (Dunlap 1970, Sutoh et al. 1975, Sheahan 1976, McQueary et al. 1977, Bauer 1988, Lyons et al. 1988, Reppas & Collins 1995, Hirayama 2002, Lyons & Tolliver 2004, Studzińska 2008, De Souza et al. 2009, Kornaś 2011, Sudan 2013).

In most cases the infection is asymptomatic; however, Figueiredo et al. (1993) reported a case of *E. leuckarti* associated to ceco-colic intussusception in a foal and, recently, Sudan (2013) report a subclinical enteric infection with *E. leuckarti* and piroplasms of *Theileria equi* (Laveran, 1901) in the circulating erythrocytes.

In Brazil, this species was reported for the first time by Figueiredo et al. (1993). After this, only one study reported de infection in adults animals from populations of different breeds and farms (De Souza et al. 2009).

*Eimeria leuckarti* has oocysts quite distinct from other coccidia, due to the larger size, very thick outer wall and considerably longer period of sporulation (Studzińska 2008, De Souza et al. 2009).

Thus, the current work reports *E. leuckarti* from horse foals of a farm in Seropédica, Rio de Janeiro, Brazil and makes some notes on the methodology of sporulation and isolation, apart from the unsporulated oocyst morphology.

## Materials and methods

### *Collection of samples*

Fecal samples were collected from 57 horse foals of a farm in the municipality of Seropédica, state of Rio de Janeiro, Brazil. Feces were collected directly from the rectum and placed labeled plastic bags. Samples were transported to the Laboratório de Coccídios e Coccidioses located at the Universidade Federal Rural do Rio de Janeiro (UFRRJ).

### *Samples processing*

Oocysts were recovered by centrifugal-flotation in Sheather's sugar solution (S.G. 1.24) or by centrifugal-sedimentation in distilled water and microscopically examined using the technique described by Duszynski & Wilber (1997).

### *Induction to sporulation*

One half of the each positive sample was placed in thin layers (~5 mm) of  $K_2Cr_2O_7$  2.5% solution in Petri dishes. The other half of each positive sample was placed in small bottles, which was coupled with artificial aerators. In both methodologies the samples were incubated at 23–28°C for 60 days.

### *Description of the oocysts*

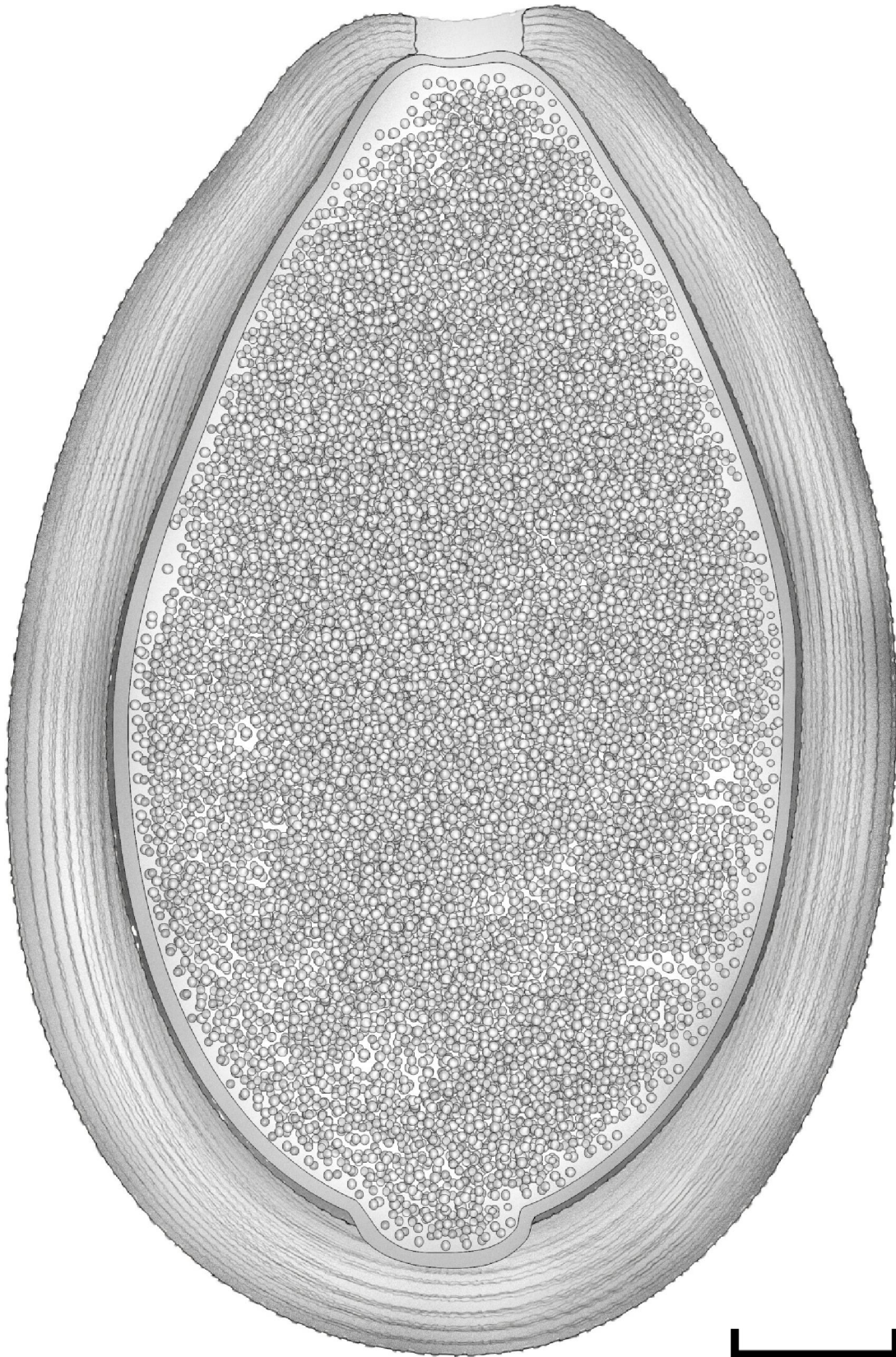
Morphological observations, photomicrographs and measurements, given in micrometers, were made using a Olympus BX binocular microscope coupled to a digital camera Eurocam 5.0. Size ranges are in parentheses following the means.

## Results and discussion

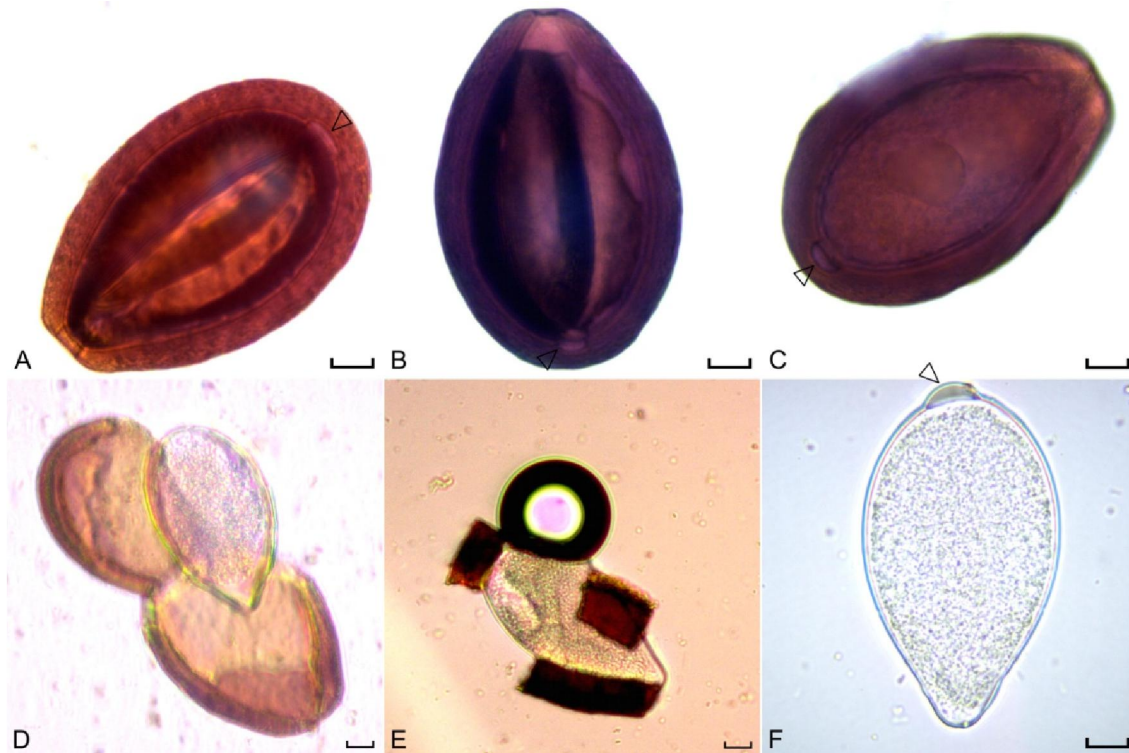
Unsporulated oocysts of *E. leuckarti* (Figures 1, 2) were recovered and identified from 10 of the 57 of horse foals, by both methods, sedimentation and flotation.

The identified unsporulated oocysts were ovoidal, 79.7 (77-90) x 53.8 (50-55)  $\mu\text{m}$ , with shape-index of 1.48 (1.4-1.6). Oocyst wall bilayered, 7.3  $\mu\text{m}$  thick. The outer layer is dense, rough and large; while the inner layer is smooth and thin. The micropyle in the outer layer is prominent and easily distinguishable. At the opposite end of the micropyle was always observed a projection/enlargement in the inner layer, which is easily observed after the rupture of the outer layer (Figures 2d-f).

The morphology of these unsporulated oocysts were quite similar to those described by Sutoh et al. (1975), Sheahan (1976), McQueary et al. (1977), Bauer (1988), Lyons et al. (1988), Reppas & Collins (1995), Hirayama (2002), Lyons & Tolliver (2004), Studzińska (2008), De Souza et al. (2009), Kornaś



**Fig. 1.** Line drawing of a unsporulated oocyst of *Eimeria leuckarti* recovered from horse foals of Seropédica, Rio de Janeiro, Brazil. Scale: 10µm.



**Fig. 2.** Oocysts of *Eimeria leuckarti* recovered from horse foals of Seropédica, Rio de Janeiro, Brazil. Arrowheads point an enlarged region in the inner layer of the oocyst wall, always in the opposite end of the micropyle. Scale: 10µm.

(2011), Sudan (2013).

As emphasized by Barta & Remmier (1972), in the current work was observed a enlarged region in the inner layer of the oocyst wall, always in the opposite end of the micropyle. This characteristic feature was observed in all oocysts identified.

Unexpectedly, the oocysts not sporulate by both methods, even after 60 days in appropriate conditions of sporulation. By comparing the morphology of the oocysts reported by Dunlap (1970), Barta & Remmier (1972) and De Souza et al. (2009), where the sporulation of the oocysts was observed, with the current work, it is observed that the sporoblast forms a subspherical compact mass within the oocysts, while in the current work the sporoblast was granulate and dispersed within the oocyst (Figure 1 and 2f). Thus, it can suppose that some condition, endogenous or exogenous, can have impeded and/or altered, the sporogony development in this specimen/host.

A condition that could have impeded/altered the sporogony process is the administration of coccidiostatic drugs, as described by Jingui (2010) for *Eimeria tenella* in

chickens. However, we do not know if there was drug administration in the horse foals of the current work.

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