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## ON SOME COCCIDIA OF *Kobus defassa* RUPPEL, 1835, IN ZAIRE

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**Abstract:** Four species of coccidia are described which were found in *Kobus defassa* Rüppel, in the National Park Albert (Zaire). These coccidia appear to be different from any of the coccidia so far described in African ruminants and seem to represent new species. For three of these the authors propose the names *Eimeria kobi*, *E. congolensis* and *E. katangensis*.

The fourth species is reported as *Eimeria* sp. because it was not possible to appreciate the morphology of the sporocysts completely.

### INTRODUCTION AND METHODS

Our research has been conducted on samples of faeces from four waterbuck, *Kobus defassa*, captured in different areas of the National Park Albert (Kivu and North Katanga).

The freshly collected faeces were diluted in a 2.5% potassium dichromate solution and sent by air to our Institute. A part of each sample was used for immediate examination, while the remainder was kept at room temperature (20-25°C) in order to allow sporulation of coccidia and subsequent examination.

The microscopic examinations were performed on direct smears, by previous flotation in a solution with specific gravity 1.3.

The measurements were made with a microscope provided with an immersion objective (x 100), an ocular micrometer (x 10) and an auxiliary magnification device (auxiliary microscope) (x 2.5).

### RESULTS

Of the four samples of faeces, the first was positive for two species of coccidia (*E. kobi* and *E. congolensis*), the second was also positive for two species (*E. katangensis* and *E. sp.*), the third was positive for one species only (*E. sp.*) and the fourth was negative.

We could not calculate the sporulation time in our coccidia for technical reasons.

### Description of the Coccidia

#### *E. kobi* (Fig. 1)

Oocysts elliptical; wall about 2  $\mu$  thick, rough and brown, consisting of two easily detachable layers of which the external is granular and brown and the inner smooth and colourless; the external layer becomes progressively thinner at the anterior pole until it disappears. Micropyle in the inner layer is not visible; cap and polar granule absent. Measurements of 51 oocysts are (mean, min. and max., Standard Deviation and Standard Error):

length 37.8 (33.6-41.4)  $\mu$ ; S.D. 1.76; S.E. 0.24

width 27.9 (26.3-29.7)  $\mu$ ; S.D. 0.72; S.E. 0.10

length/width ratio 1.36 (1.19-1.54); S.D. 0.07; S.E. 0.01

In mature oocysts the inner details can be observed only after breaking and removal of the internal layer of the wall. Sporocysts elliptical, measuring 21.0 x 7.7  $\mu$ ; Stieda body present; oocyst residuum not visible; sporocyst residuum consisting of refractile granules arranged along the separation line of the sporozoites. These sporozoites are comma-shaped and contain several rounded, light-coloured vacuoles.

**Note:** *E. kobi* resembles *E. congolensis*; the differences will be discussed under the latter.

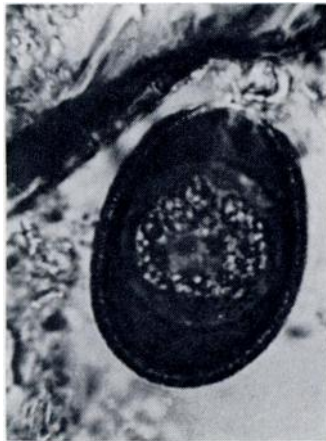


Fig. 1a

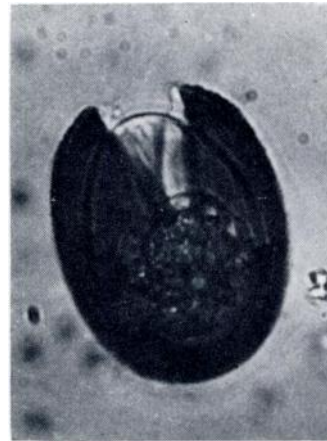


Fig. 1b

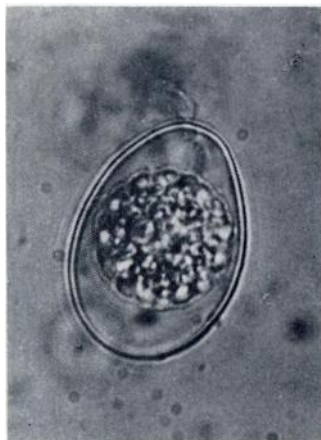


Fig. 1c



Fig. 1d



Fig. 1e



Fig. 1f



Fig. 1g

FIGURE 1. *E. kofi* (×1000):

- a) and b) unsporulated oocyst
- c) unsporulated oocyst without the external layer of the wall
- d) sporulated oocyst
- e) sporulated oocyst without the external layer of the wall
- f) release of the sporozoites
- g) schematic drawing of sporulated oocyst

*E. congolensis* (Fig. 2)

Oocysts ovoidal; wall about  $1.5\ \mu$  thick, rough and brown, consisting of two easily detachable layers of which the external is finely granular and brown and the inner smooth and colourless. The external layer has an opening at the anterior pole; the inner layer is without micropyle. Cap and polar granule absent.

The measurements of 49 oocysts are:  
length  $29.7\ (26.9-32.5)\ \mu$ ; S.D. 1.73; S.E. 0.24  
width  $22.0\ (19.0-24.1)\ \mu$ ; S.D. 1.12; S.E. 0.16  
length/width ratio 1.35; S.D. 0.10; S.E. 0.01

Sporocysts are elliptical with a pointed end, sometimes containing two granules which may represent the sporocyst residuum; the sporozoites contain two or more refractile, rounded vacuoles. Mean measurements of sporocysts are  $14.2 \times 7.1\ \mu$ ; Stieda body present, very small and hardly visible; oocysts residuum not visible.

*Note:* *E. congolensis* resembles *E. kofi*, but differs in oocyst size and in length and morphology of sporocysts. The statistical analysis of the differences in sizes between the oocysts of the above *Eimeria* spp. proved significant for length and width (Student's  $T = 1\%$ ) but not for length/width ratio.



Fig. 2a



Fig. 2b

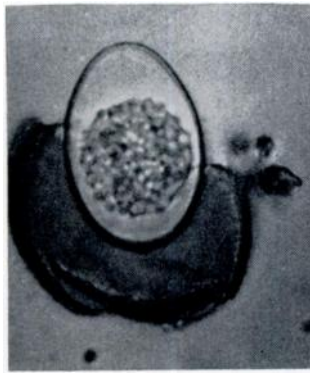


Fig. 2c



Fig. 2d

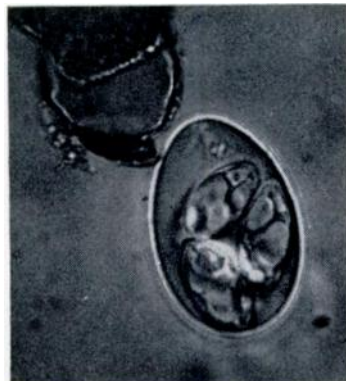


Fig. 2e

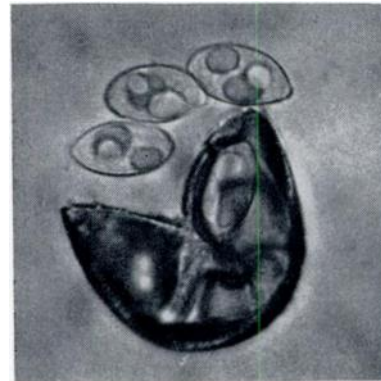


Fig. 2f



Fig. 2g

FIGURE 2. *E. congolensis* (x1000):

- a) and b) unsporulated oocyst
- c) unsporulated oocyst without the external layer of the wall
- d) sporulated oocyst
- e) sporulated oocyst without the external layer of the wall
- f) release of the sporozoites
- g) schematic drawing of the sporulated oocyst



*E. katangensis* (Fig. 3)

Oocysts ovoidal; wall about  $2\ \mu$  thick, smooth and brown, consisting of a single layer; micropyle present; cap and polar granule absent. The measurements of 26 oocysts are:

length  $41.0\ (34.2-43.7)\ \mu$ ; S.D. 2.06; S.E. 0.40

width  $24.6\ (22.4-25.8)\ \mu$ ; S.D. 0.66; S.E. 0.12

length/width ratio 1.66 (1.35-1.81); S.D. 0.08; S.E. 0.01

Sporocysts elliptical with pointed ends, measuring  $19.7 \times 7.5\ \mu$ ; little Stieda body present; oocyst residuum not visible; sporocyst residuum appears in the form of numerous refractile granules grouped into irregular heap; the sporozoites, comma-shaped, contain several rounded vacuoles.



Fig. 3a



Fig. 3b

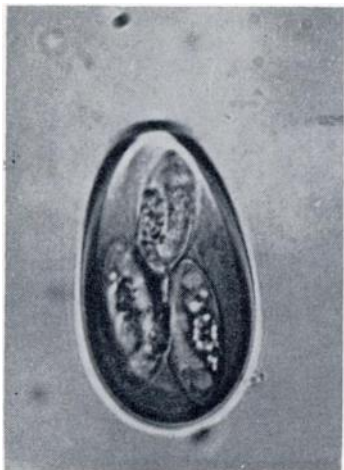


Fig. 3c

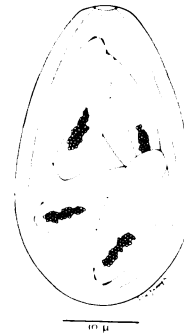


Fig. 3d

FIGURE 3. *E. katangensis* ( $\times 1000$ ):

- a) unsporulated oocyst
- b) and c) sporulated oocyst
- d) schematic drawing of sporulated oocyst

*Eimeria* sp. (Fig. 4)

Oocysts subspherical; wall about  $1\ \mu$  thick, smooth and colourless, consisting of a single layer; micropyle is seen as a thinning of the wall; cap and polar granule absent.

The measurements of 100 oocysts are:  
length  $17.8\ (15.7-20.2)\ \mu$ ; S.D. 1.07; S.E. 0.10  
width  $16.0\ (14.0-17.9)\ \mu$ ; S.D. 0.81; S.E. 0.08  
length/width ratio  $1.11\ (1.00-1.26)$ ; S.D. 0.05; S.E. 0.00

Sporocysts elliptical, measuring  $9.7\ \times\ 4.9\ \mu$ ; oocyst residuum in the form of several scattered refractile granules. We could not establish the presence of Stieda body and of the sporocysts residuum owing to the small size and to the extreme transparency of the sporocysts. On the other hand, even the release of the sporocysts obtained by pressure on the coverslip does not improve the detectability of the morphological details of the sporocysts.

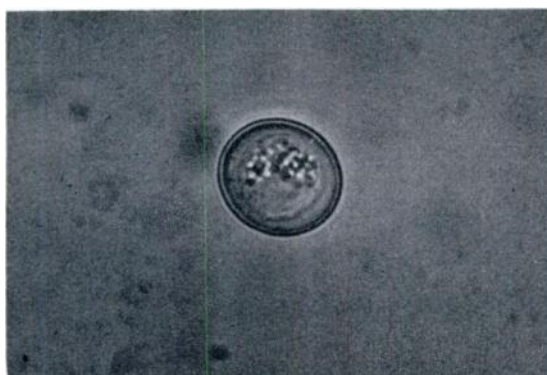


Fig. 4a

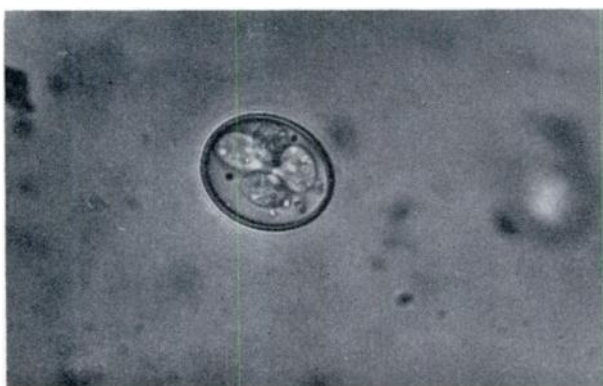


Fig. 4b

FIGURE 4. *Eimeria* sp. ( $\times 1000$ ):

- a) unsporulated oocyst
- b) sporulated oocyst



#### DISCUSSION

In the genus *Kobus* Smith, 1840, namely in *K. ellipsiprymnus* Ogilby, 1833, only one coccidium has been previously described: *Eimeria macieli* Yakimoff and Matchulsky, 1938.<sup>2</sup> This coccidium is quite different from the four species we

studied, above all for the radial strips in its wall and for the other features described.

The comparative study of our four *Eimeria* shows that our species are not identical with any of other coccidia described in wild and domestic ruminants.<sup>1</sup>

#### Acknowledgements

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