EIMERIA VEJSOVI SP. N. FROM THE BAT NYCTALUS NOCTULA

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Abstract. A description is given of a new coccidian species Eimeria vejsovi sp. n. from the bat Nyctalus noctula.

At present, descriptions are available of a total of 11 coccidian species of the genus Eimeria from bats, but the evidence given for three of these species is considerably incomplete. Labbé (1893, 1896) described Eimeria viridis from Rhinolophus ferrumequinum as a small coccidian with oval or pyriform oocysts, size 20 × 13.5 μm, or spherical oocysts, size 15 μm in diameter. In the pyriform oocysts Labbé observed a micropyle. These are the only data given in his description. Gottschalk (1969) described Eimeria plecoti from Plecotus auritus and Eimeria nyctalis from Myotis myotis. In view of the fact that the identity of these species was established from his material of unsporulated oocysts, it is doubtful whether these coccidians were members of the genus Eimeria. Pellérdy (1974) included them in his monograph, but the validity of these species appears to be doubtful. This reduces members of the genus Eimeria recovered from bats of Europe, America, Africa and Asia, to 8 species. In Europe Eimeria hesseli Lavier, 1924 was described from Rhinolophus hipposideros in France and Eimeria nyctalis Gottschalk, 1974 from Nyctalus noctula in the German Democratic Republic. In the U.S.S.R. descriptions are available of the following species from Azerbaijan: Eimeria melkelyi Musajev et Gauzer, 1971 from Rhinolophus melkelyi, Eimeria vespertillii Musajev et Vejsov, 1961, and Eimeria zakiini Musajev, 1967 from Vespertilio kuehli. Eimeria ducet Lavier, 1927 from Nyctinomus limbatus and Nyctinomus pusillus were recovered from Africa, and Eimeria europs Marinkelle, 1968, host Eumops trumballi, from South America (for details see Table 1).

Intracellular developmental stages were found for three species only: Lavier (1924) described and figured the development of E. hesseli in the small intestine of the bat. Rhinolophus hipposideros, Marinkelle (1968) described intestinal stages of E. europs from the epithelial cells in the anterior part of the small intestine of Eumops trumballi, and Bray (1958) reported the finding of schizonts and gametocytes of E. leucii in the anterior part of the small intestine of the bat Trachyderma bembeliceni.

Recently, we received a specimen of Nyctalus noctula for parasitological examination from the Department of Systematic Zoology, Faculty of Natural Sciences, Charles University, Prague. The bat was caught on November 19, 1974 at Srbsko near Prague*). Oocysts from the intestine of the bat were left to sporulate in 1.5 % K2Cr2O7, and the intestine was fixed with Bouin’s solution, treated with histological methods, and sections of intestinal tissue were stained with Harris’ hematoxylin.

The description of the coccidian found, which represents a new species, is given in the following text.

Oocysts: Mostly spherical with a thin, doubly outlined membrane (1—1.5 μm); micropyle absent, colour a faint brown, measurements 16—20 μm on the average (most frequently 18 μm) (30 oocysts measured). Several oocysts were widely ovate, size 19—22 × 17—20 μm (most frequently 21 × 18 μm) (average of 30 oocysts). Sporulated oocysts contained one marked, polar granule, oocyst residuum absent (Fig. 1).

Sporocysts: Oval, moderate attenuation towards one of the poles, size 4—5 μm, Stieda body not clearly visible. Sporocysts harbour a spherical, finely granular,

*) Our thanks are due to Dr J. Chalupský for the coccidian-infected intestinal material.
distinct, residuum, 3.5 μm in diameter. Sexual and asexual developmental stages were found everywhere in the intestinal epithelium.

**Schizogony:** One type of schizogony was encountered together with developing gametocytes. Mature schizonts measured 11 × 10 μm and contained 3 sickle-shaped merozoites measuring 8—9 × 2 μm (Fig. 5).

**Gamogony:** Macrogametocytes mostly spherical, close to 10 μm in diameter, or oval, size 11—13 × 8—11 μm. Nucleus large (4 × 3.5 μm) containing large nucleolus (2 μm in diameter) (Fig. 6). Zygotes mostly widely oval, 13—19 × 10—15 μm. Microgametocytes widely oval, 11—13 × 8—10 μm, containing approximately 30—40 microgametes (Fig. 7).

**DISCUSSION**

Coccidians from bats still represent a very little-known field. Gottschalk (1974) gave an incomplete

<table>
<thead>
<tr>
<th>Species</th>
<th>Author</th>
<th>Host</th>
<th>size in μm</th>
<th>shape</th>
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<tbody>
<tr>
<td>Eimeria hessei</td>
<td>Lavier 1924</td>
<td>Rhinolophus hipposideros</td>
<td>16—20</td>
<td>spherical</td>
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<td>15—18 × 13—15</td>
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<tr>
<td>Eimeria dukei</td>
<td>Lavier 1927</td>
<td>Nyctinomus limbatus, Nyctinomus pumilus</td>
<td>20—24</td>
<td>spherical</td>
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<td></td>
<td></td>
<td></td>
<td>23—25 × 18—22</td>
<td>subspherical</td>
</tr>
<tr>
<td>Eimeria levinei</td>
<td>Bray 1958</td>
<td>Tadarida bemmelini</td>
<td>10—24 × 17—19</td>
<td>oval</td>
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<tr>
<td>Eimeria vespertilii</td>
<td>Musajcev, Vejsvo 1961</td>
<td>Vespertilio kuchlii</td>
<td>20—27 × 18—25</td>
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<td>Eimeria zahirica</td>
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<td>Vespertilio kuchlii</td>
<td>20—30 × 16—26</td>
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<td>Eimeria eumops</td>
<td>Marinkelle 1968</td>
<td>Eumops trumbulli</td>
<td>24—31 × 23—29</td>
<td>oval and spherical</td>
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<td>34—36 × 27—28</td>
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<td>Eimeria melheli</td>
<td>Musajcev, Gauzer 1971</td>
<td>Rhinolophus melheli</td>
<td>36—46 × 28—40</td>
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<tr>
<td>Eimeria nyctali</td>
<td>Gottschalk 1974</td>
<td>Nyctalus noctula</td>
<td>17—23 × 16—20</td>
<td>spherical and widely oval</td>
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<tr>
<td>Eimeria vejsovi</td>
<td>sp. n.</td>
<td>Nyctalus noctula</td>
<td>16—20</td>
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<td>19—22 × 17—20</td>
<td>subspherical</td>
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description of *Eimeria nyctali* from the bat *Nyctalus noctula*. The drawings of the new species suggest that the author described a not fully sporulated oocyst. Although closest to my new species in shape and size (17—23×16—20 μm) the author did not mention the finding of a residuum, Stieda body and polar granule in *E. nyctali*, which I found in sporulated oocysts of our species. A comparison of this species with other known *Eimeria* species from different bats disclosed that, in shape and size of the oocysts and its development in the intestinal epithelium of bats, our species is similar to *Eimeria hessei* Lav. 1924 from *Rhinolophus hipposideros*. In both species, the oocysts are spherical of widely oval, the micropyle absent. After sporulation, oocysts of *E. hessei* do not posses a residuum, but residual sporocyst bodies are present. By contrast, according to Lavier, oocysts of *E. hessei* have a considerably thick membrane ("La paroi en est assez épaisse"), while the membrane of oocysts from *Nyctalus noctula* did not measure more than 1—1.5 μm. In all sporulated oocysts of our material, we always found a clearly visible polar granule, which has neither been figured nor referred to by Lavier in his description of *E. hessei*. Merozoites in schizonts of *E. hessei* recovered from the intestine of *R. hipposideros* together with gamogony measured 5—6×1 μm and numbered 8—10; merozoites in schizonts

<table>
<thead>
<tr>
<th>Oocysts</th>
<th>Sporocysts</th>
<th>Development</th>
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<tr>
<td>residuum</td>
<td>micropyle</td>
<td>polar granule</td>
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<tr>
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</tbody>
</table>
| — | — | + | 10.5—11.8×  
	 6.5—8.1 | + | + | epithelium of anterior part of small intestine |
| — | — | + | 12—20×8—16 | + | — | not observed |
| — | — | — | 10—13×6—9 | — | — | not observed |
| — | — | — | 8—10×4—5 | — | + | throughout length of intestinal epithel |

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Fig. 2. *E. vejzensi* - unsporulated oocyst (×1000).

Fig. 3. Sporulated oocyst with clearly visible residual bodies of the sporocyst (arrow) (×1000).

Fig. 4. Sporulated oocyst focused on polar granule (arrow) (×1000).

Fig. 5. Merozoites in the schizont (×2000)

Fig. 6. Macrogametocyte (×2500)

Fig. 7. Microgametocyte (×2000).
of our species were larger in size (8—9 × 2 μm) and lower in number (4—6) than those of the former species.

In view of differences in morphology and the host genus we consider the coecidian found in *Nyctalus noctula* in Czechoslovakia to be a new species. It has been named *Eimeria vejsovi* in honour of Dr. A. M. Vejsov, who has contributed considerably to the understanding of coecidians of small mammals from Azerbaidzhan.

REFERENCES


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