

Eimeria pipistrellus n. sp. from *Pipistrellus kuhlii* (Chiroptera: Vespertilionidae) in Saudi Arabia

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Abstract: Fecal samples from 12 *Pipistrellus kuhlii* captured at Shagrah, Saudi Arabia, were examined for coccidia and three (25%) found to harbor a undescribed eimerian, herein described as *Eimeria pipistrellus* n. sp. Sporulated oocysts were subspherical, 24.8×23.2 ($22-27 \times 20-25$) μm , with a bilayered and smooth wall. The micropyle was absent, but a large oocyst residuum and a single polar granule were present. Sporocysts were ovoid, 11.6×8.3 ($10.5-13 \times 7.5-9$) μm , with a prominent Stieda body, but without a substiedal body; sporozoites lay head to tail in sporocysts and contained one large posterior refractile body. *Eimeria pipistrellus* n. sp. is the 3rd species of the genus *Eimeria* found from bats of the genus *Pipistrellus*.

Key words: *Eimeria pipistrellus*, *Pipistrellus kuhlii*, Chiroptera, bats

INTRODUCTION

To date 17 eimerian species have been described from chiropterans worldwide (Duszynski and Barkley, 1985; Duszynski et al., 1988; Duszynski, 1997; Scott and Duszynski, 1997), but only two species of *Eimeria* have been reported from members of the genus *Pipistrellus*; *E. macyi* from *Pipistrellus subflavus* from USA (Wheat, 1975) and *E. redukeri* from *P. javanicus* from Japan (Duszynski, 1997).

No *Eimeria* species has been described from *Pipistrellus kuhlii*, herein we describe a new species of *Eimeria* from *P. kuhlii* from Shagrah, Saudi Arabia.

MATERIALS AND METHODS

Twelve bats, *P. kuhlii* (Natterer, 1819) were trapped alive at Shagrah during November, 1997 with the aid of mist nets. All bats were killed in the laboratory, and the abdominal cavity was opened. The intestinal tract, caecum, rectum and colon were slit lengthwise, and their contents were collected separately and mixed with 2.5% (w/v) aqueous potassium dichromate solution to inhibit bacterial growth. The suspension was then spread in a thin layer in petri dishes and incubated at $26 \pm 2^\circ\text{C}$ for 1 week so that the oocysts could sporulate. The preparations were then microscopically examined for sporulation at 12 hr intervals. Sporulated oocysts were concentrated by flotation with Sheather's sugar solution (McAllister et al., 1995). Fifty sporulated oocysts and 50 sporocysts were examined, and measured with a microscope fitted with a $\times 100$ apochromatic oil immersion objective and a $\times 10$ ocular

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micrometer. The number of layers of the oocyst wall, its thickness, and detailed structure of the sporocysts were examined after crushing the oocysts by pressure on the coverslip. All measurements are in micrometers (μm) with the mean followed by the range in parentheses.

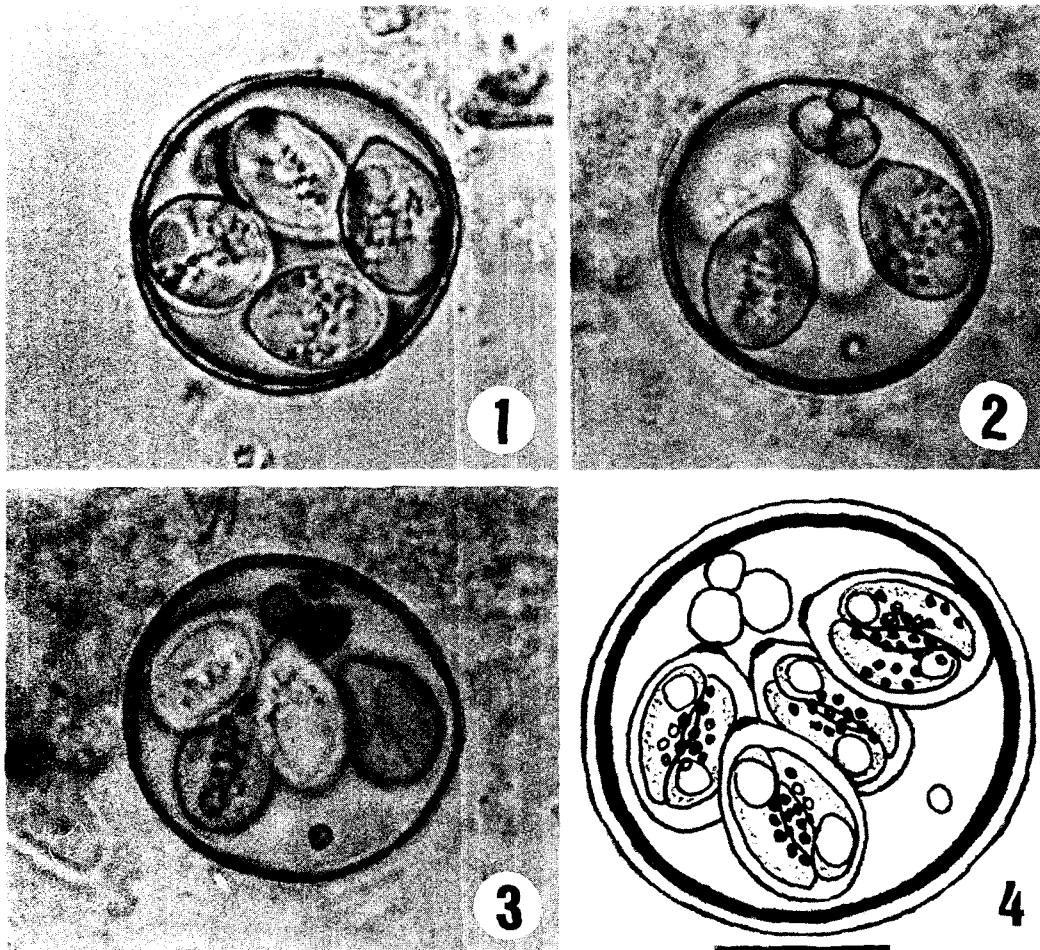
RESULTS

Eimeria pipistrellus (Figs. 1-4)

Description

Oocyst wall 1.2-1.5 (1.3) thick consisting of 2 layers of approximately equal thickness;

outer, light brownish-yellow, smooth; inner dark, smooth; a micropyle is absent, but an oocyst residuum, consisting of one to three large globules, 5.2 (4.5-6.0), and a polar granule approximately 1.6 both are present. Sporulated oocysts ($n=50$) subspheroidal 24.8×23.2 (22-27 \times 20-25) with L:W ratio 1.0-1.2 (1.06). Sporocysts ovoidal, slightly pointed at one end, 11.6×8.3 (10.5-13 \times 7.5-9) with L:W ratio 1.4-1.5 (1.45). Stieda body present, but sub- and parastieda bodies absent. Sporocyst residuum present as numerous minute dispersed granules. Sporozoites elongate, lying head to tail, each with one large posterior



Figs. 1-4. Photomicrographs and an drawing of sporulated oocysts of *Eimeria pipistrellus* from naturally infected *Pipistrellus kuhlii* ($\times 1,000$).

Fig. 1. The Stieda body and refractile globules. **Fig. 2.** The oocyst and sporocyst residuum. **Fig. 3.** The spherical, small polar granule. **Fig. 4.** A camera lucida drawing of sporulated oocyst of *E. pipistrellus*. Scale bar = 10 μm .

Table 1. Comparative data of *Eimeria* species from pipistrelle bats

| | <i>E. macyi</i> | <i>E. redukeri</i> | <i>E. pipistrellus</i> |
|------------------------|--|--|--|
| Oocyst shape | subspherical to broadly ellipsoid | subspherical | subspherical |
| size (μm) | 16-21 \times 15-19 (19 \times 17.6) | 16-25 \times 14-21 (20.3 \times 18.1) | 22.3-27.2 \times 20-25.4 (24.8 \times 23.2) |
| wall | rough | mammillated | smooth |
| micopyle | absent | absent | absent |
| residium | bsent | single (2.0 \times 3.8) | one to three 5.2 (4.5-5.6) |
| polar granule | ellipsoid | ellipsoid | spheroid |
| Sporocyst shape | ovoid | ovoid | ovoid |
| size (μm) | 10-12 \times 6-8 (11 \times 7) | 8-12 \times 5-8 (10.6 \times 6.6) | 10.5-12.9 \times 7.5-9.4 (11.6 \times 8.3) |
| residium | several granules | 1-3 globules | several granules |
| Host | <i>Pipistrellus subflavus</i> | <i>Pipistrellus javanicus</i> | <i>Pipistrellus kuhlii</i> |
| Locality | USA | Japan | Saudi Arabia |
| Citation | Wheat (1975) | Duszynski (1997) | Present study |

refractile body.

Taxonomic summary

Type host: *Pipistrellus kuhlii* (Kuhl, 1819)
Vespertilionidae

Type locality: Shagrah, central region, Saudi Arabia

Prevalence: Found in three of twelve (25%) *P. kuhlii*.

Site of infection: Unknown. oocysts recovered from intestinal contents.

Sporulation time: Six days at $26 \pm 2^\circ\text{C}$

Etymology: The specific name *pipistrellus* is derived from the generic name of the host.

Type specimens: Oocysts in 10% formalin and a phototype are deposited in the Parasitological Collection, Department of Zoology, College of Science, King Saud University, Riyadh, Saudi Arabia both as KSUC 105.

DISCUSSION

Only two species of *Eimeria* have been described previously from the genus *Pipistrellus* (Vespertilionidae), *E. macyi* (Wheat, 1975) and *E. redukeri* (Duszynski, 1997). *Eimeria pipistrellus* n. sp. differs considerably from both of the above mentioned two species in having a larger oocyst with smooth outer

wall. Moreover, *E. pipistrellus* can be distinguished easily from *E. macyi* because it has an oocyst residuum and lacks a substiedal body, and from *E. redukeri* in having a larger oocyst residuum composed of one to three large globules, in having larger sporocysts with smaller length/width ratio, and in having small, dispersed granules as a sporocyst residuum rather than only one to three large globules seen in the sporocysts of *E. redukeri*.

These differences in structural features, geographic distribution, and host species make us suggest that *E. pipistrellus* is a distinct form.

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