A NEW *EIMERIA* SPECIES (PROTOZOA: APICOMPLEXA: SPOROZOEA) FROM THE BLUE ROCK PIGEON *COLUMBA LIVIA* (AVES: COLUMBIDAE)

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plus web supplement of 1 page

ABSTRACT

A new species of Eimeria *is described from the faeces of the Blue Rock Pigeon,* Columba livia *Gmelin, 1789. Sporulation is exogenous and fully developed oocysts are ellipsoidal, 24.3µm x 19.8µm; the shape index (length/width ratio) is 1.2. The oocyst wall is smooth and bilayered. There is no micropyle or oocyst residuum, but a prominent spherical polar granule is present. Sporocysts are pyriform, 12.06µm x 10.1µm; the shape index is 1.2µm. A large and prominent stieda body is present. The sporocyst residuum is present with numerous, nearly uniform granules. Sporozoites are banana-shaped lying lengthwise head to tail inside the sporocyst.*

KEYWORDS

Coccidia, Columba livia, Eimeria janovyi *sp. nov., Blue Rock Pigeon, parasite*

The family Columbidae consists of about 300 species of primarily granivorous and fructivorous birds with a cosmopolitan distribution (Bennett & Peirce, 1990). The Blue Rock Pigeon *Columba livia* Gmelin, 1789 is common in South Asia.

The catarrhal enteric disease provoked in pigeons by coccidia is in India due primarily to *E. columbae* and *E. tropicalis*. Outbreaks, which affect chiefly the three- to four-month old pigeons, can cause considerable losses (Pellerdy, 1974). Coccidiosis can cause occasional economically important losses. The picture being catarrhal enteritis, its common symptoms are diarrhoea, emaciation and maldevelopment. During a survey of protozoan parasites in birds, carried out in the Kalyani area, West Bengal, India, we found a new species of *Eimeria* in the faeces of Blue Rock Pigeon. This is described below.

MATERIAL AND METHOD

Faecal samples were collected immediately after defecation from 145 adult specimens of Blue Rock Pigeons and mixed with 2.5% potassium dichromate ($K_2Cr_2O_7$) solution. For sporulation, samples were kept in a petridish in 2.5% potassium dichromate at room temperature. The samples were examined microscopically after flotation, using Sheather's sugar solution. Observations focused largely on sporulated oocysts. Photomicrographs were obtained using a phase contrast microscope (Olympus™ CX41) and an Olympus™ digital camera (Model no. C-5060, 4X wide zoom lens). Thirty-two oocysts were measured and compared to those of *Eimeria* spp. previously reported in Blue Rock Pigeon in India. All measurements and means are in µm with the range given in parentheses followed by the shape index (length/width ratio).

RESULTS

Of 145 adult specimens of *Columba livia* examined, 42 (28.96%) had coccidian oocysts. A morphological comparison of these oocysts revealed differences between them and those of other *Eimeria* spp. from the Blue Rock Pigeon, as described below.

Eimeria janovyi sp. nov.

(Fig. 1; Image 1[w])

Taxonomic summary

Type specimens: The syntype no. IP/CO/07/05 deposited in the Department of Zoology, University of Kalyani, Kalyani.
Type-host: Blue Rock Pigeon, *Columba livia* Gmelin, 1789 (Aves: Columbidae).
Type location: Kalyani area, West Bengal, India (23°24'N & 88°33'E)
Prevalence: Forty-two out of 145 (28.96%) *Columba livia* examined were infected.
Site of infection: Unknown, oocysts collected directly from host faeces.
Time of sporulation: Most oocysts sporulated within 48 hours at 30°C.

Etymology

The specific epithet "*janovyi*" is given after the name of Prof. John Janovy Jr. of University of Nebraska, Lincoln, USA, for his outstanding contribution in the field of Apicomplexan

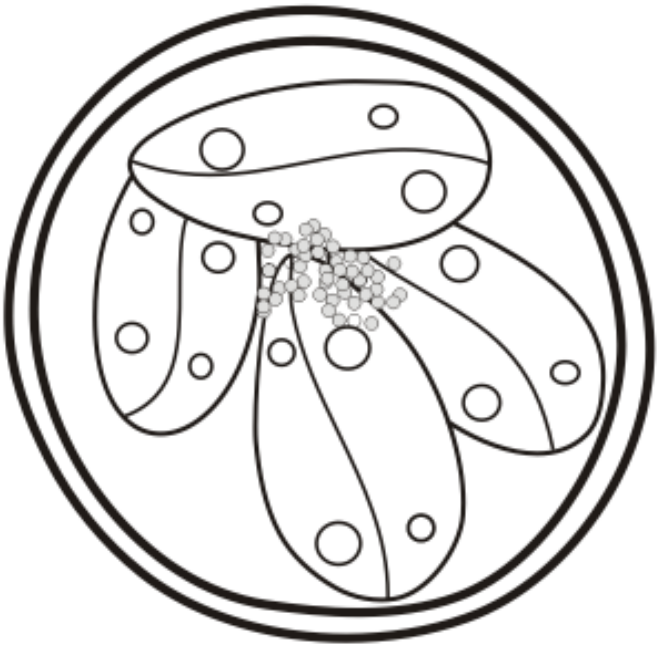

Figure 1. Composite line drawing of a sporulated oocyst of* Eimeria janovyi *sp. nov.

[w] See Image 1 in the web supplement at www.zoosprint.org

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Table 1. Comparative studies of* Eimeria janovyi *sp. nov. along with related coccidian species (Mandal, 1987)

Name	Author	Shape of the oocyst	Measurement (µm)	Micropyle	Polar granule	Oocyst residuum	Shape of the sporocyst	Measurment (µm)	Steida body	Sporocyst residuum	Sporulation time	Shape of the sporozoite	Measurement (µm)
Eimeria columbae	Mitra & Dasgupta, 1937	Sub spherical	16.5x14.5	-	*	+	Ellipsoidal	7.3x4.6	*	+	3-4 days	Curved	*
Eimeria columbarum	Nieschulz, 1935	Spherical/subspherical	20.0x18.0	-	+	–	Elongated	8.0-11.0 x5.0-6.0	+	*	34-38hrs	*	*
Eimeria kapotei	Chatterjee & Ray, 1969	Oval	26.1-23.5	+	*	*	Ovoid	8.5x9.5	+	+	3-4 days	Bean shaped	5.6
Eimeria labbeana	Pinto, 1928	Oval or spherical	20.1x 16.9	+	*	–	Oval	12.4x6.4	*	+	24-36 hrs	Elongated	6.5x2.3
Eimeria tropicalis	Malhotra & Ray, 1961	Spherical or subspherical	20.4x17.0	–	+	+	Ellipsoid	10.0-6.0	+	+	40-48 hrs	*	7.0-2.6
***Eimeria janovyi* sp. nov.**	This paper	Ellipsoidal	24.3x19.8	–	+	–	Pyriform	12.06x10.1	+	+	48 hrs	Elongated or banana shaped	*

+ - present; - - absent; * - data not available

biology.

Diagnosis

Oocysts ellipsoidal (Figs. 1; Image 1[w]), length 24.3µm, width 19.8µm, shape index (length/width) 1.2, wall of uniform thickness (1.08) and bilayered. One prominent spherical polar granule is present, but a micropyle and oocyst residuum is absent (Image 1[w]). Sporocysts pyriform (Fig. 1), length 12.06µm, width 10.1µm, shape index 1.2. A large and prominent stieda body is present. Sporocyst residuum composed of numerous, nearly uniform granules. Sporozoites banana-shaped lying lengthwise head to tail inside the sporocyst.

Discussion

There have been so far recorded six coccidian species parasitising *Columba livia*: *Eimeria columbarum*, reported by Nieschulz (1935) found in Europe and *Eimeria* sp reported from India are *Eimeria columbae* described by Mitra and Dasgupta (1937), *Eimeria kapotei* described by Chatterjee and Ray (1969), *Eimeria tropicalis* reported by Malhotra and Ray (1961) and *Eimeria labbeana* reported by Pinto (1928). Among other coccidian parasites, *Wenyonella columbae* has been reported by Haldar and Chaudhry (1974).

The morphological characteristics of the sporulated oocysts of the described specimen were compared to those of other *Eimeria* sp. previously described in the Blue Rock Pigeon. Only *Eimeria tropicalis*, Malhotra and Ray (1961), found parasitising *Columba livia* from India, resembles the proposed new species. *E. tropicalis* only resembles *E. janovyi* sp. nov. in having polar granule, steida body and sporocyst residuum, but differs by a number of significant and stable characters. In *E. janovyi* the oocysts are ellipsoidal which are almost elongated in *E. tropicalis*. Sporocysts of the proposed species is pyriform and the shape index is 1.2 (12.06:10.1). But in *E. tropicalis* the shape is not pyriform and the shape index is 1.6 (10:6), which is significantly higher than the new species. The walls of the oocysts of *E. tropicalis* are two layered and of different thickness and take two different colours in staining. But in the new species, the two outer layers of the oocysts are uniform in thickness and do colour differently. Sporocyst residuum of *E. tropicalis* remain in compact condition, but in the sporocyst residuum of the new species the dark granules remain in scattered condition. Sporozoites of *E. tropicalis* are saucer shaped which carry large refractile globules, but sporozoites of the new species are banana-shaped and do not have any refractile globule.

Considering the differences between the two species, it is evident that no other *Eimeria* sp. described from the Blue Rock Pigeon so far, resemble the present one. Hence we propose it as *Eimeria janovyi* sp. nov. here.

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