

(From the Department of Zoology, University of Calcutta, Calcutta, India.)

Observations on a Coccidian, *Eimeria najae*, n. sp. from the intestine of an Indian cobra, *Naja naja*.

By

Harendranath Ray, M. Sc. (Cal.), Ph. D. (Lond.)

and

Matiranjjan Das-Gupta, M. Sc. (Cal.).

With plate 8.

Introduction.

In April 1934, we came across a coccidian belonging to the genus *Eimeria* in a male specimen of cobra, *Naja naja*. From the literature extant on the subject, we find that a parasite of this nature has hitherto been unrecorded from cobra. In the sections of the intestine we have found all the endogenous stages of development and also traces of sexual dimorphism. Although two types of schizogony is not as well marked as described for *E. laminata* RAY (1935) from *Bufo melanostictus* still, distinction could be made between the earliest stages of male gametocyte and female gametocyte.

We prefer to call this parasite *E. najae*, n. sp. the specific name being given after its host.

Material and Methods.

Three specimens, one male and two females ¹⁾ of *Naja naja* were purchased from the local dealers who usually capture them from the Sunderbans. Faecal matter of these snakes were examined for

¹⁾ One of the females contained *Isospora* in its intestine while the other was free from any infection.

oocysts and those showing oocysts were transferred to 1% chromic acid solution in separate pots. For studying the morphological details of the coccidium, portions of the intestine were fixed in BOUIN-DUBOSCQ-BRASIL's fluid and subsequently cut 6 μ thick and stained in HEIDENHAIN'S Iron-Alum haematoxylin. Oocysts kept in 1% chromic acid solution were examined from time to time and camera lucida drawings of various stages of their development made from them. Measurements of the oocysts were taken from fresh smear as well as from specimens in the chromic acid.

Observation on *Eimeria najae*, n. sp.

As we have not seen a sporozoite entering the intestinal epithelial cell, we shall begin our description by describing the smallest intracellular stages that are common in our preparations.

At the very beginning two types of smallest individuals measuring 3—4.12 μ in diameter can be distinguished from each other.

1. Spherical or oval forms (see Pl. 8 Fig. 1, 2 and 3) with vacuolar cytoplasm and a distinct karyosome in the nucleus. These give rise to eight merozoites measuring $7 \times 2.06 \mu$ with the same characteristic nucleus. Later on these forms are found to develop into female gametes (see Pl. 8 Fig. 10, 11 and 12).

2. Spherical or oval forms (see Pl. 8 Fig. 4) with hyaline cytoplasm and the nucleus, in addition to the karyosome, show few other chromatin granules. Eight merozoites measuring $7 \times 2.06 \mu$ also result from the schizogony of such forms. The forms later on give rise to male gametes and in the nucleus of these earliest male gametocyte only the karyosome can be seen while other chromatin granules have disappeared (see Pl. 8 Fig. 4, 5, 6 and 7a).

The male gametocyte with the increase in number of gamete nuclei grows in size (see Pl. 8 Fig. 7b, 8). When the gametes are fully formed the whole mass measures about 20—24 μ in diameter while in the centre a residuum is left. The biflagellated male gametes measure 6.15 μ long (see Pl. 8 Fig. 7).

A fully formed female gametocyte measures 23—27 μ in length and 16—18 μ in breadth. At this stage large number of reserve granules are seen occupying the alveoli of the vacuolar cytoplasm (see Pl. 8 Fig. 11). A micropyle is also visible at this stage but it disappears when it forms an oocyst. In Pl. 8 Fig. 12 we have represented a stage which has very often been met with in our preparation. Here we see a button-like plug at the micropylar end while a thin oocystic membrane is already formed. This is no doubt

a contrivance against 'polyspermy'. At a later stage, however, this plug disappears and oocysts in this condition are released from the epithelium.

Both unsegmented and segmented oocysts are found in the faecal matter and when kept in 1% chromic acid solution they complete their development within 4—5 days. Some of the oocysts showed abnormalities and sporozoites were formed without the sporoblasts. In this respect it very much resembled the stages of abnormal sporogony of *E. steidae* described by WASIELEWSKI (1904) and *Paracoccidium prevoti* of MESNIL. After the sporoblasts are formed a residue is left in the oocyst. Sporoblasts are spindle-shaped and measure 12—14 μ in length and 6—8 μ in breadth. Sporoblasts also contain a small residue (Pl. 8 Fig. 13).

Diagnosis: Systematic position. — *Eimeria najae* n. sp. *Coccidiida*, *Eimeridae*.

Thin-walled oocyst with a residue, 23—27 \times 16—18 μ . Sporocysts spindle-shaped 12.14 \times 6.8 μ with a small residue. Sexual dimorphism distinguishable at a very early stage. A button-like plug at the micropyle of the female gamete. Segmented and unsegmented oocyst discharged from the host. Sporulation time, 4—5 days.

Habitat: Small intestine (Intra epithelial) of *Naja naja* (Ophidia, Coluberidae).

Locality: Sunderbans, Bengal, India.

References.

- RAY, H. N. (1935): On a new Coccidian, *Eimeria laminata* n. sp., from the intestine of an Indian Toad, *Bufo melanostictus* SCHNEID. *Parasit.* Cambridge Vol. 27 p. 369.
- WASIELEWSKI, T. v. (1904): Studien und Mikrophotogramme zur Kenntnis der pathogenen Protozoen. I. Untersuchungen über den Bau, die Entwicklung und über der pathogenen Bedeutung der Coccidien. Leipzig.

Explanation of plate.

Plate 8.

All figures are camera-lucida drawings either of living specimens or from sections fixed in BOUIN-DUBOSCQ-BRASIL'S fluid and stained with HEIDENHAIN'S Iron-Haematoxylin. \times 1666 unless otherwise stated.

Eimeria najae n. sp.

Fig. 1. Two young female schizonts.

Fig. 2. Group of female merozoites. \times 3500.

Fig. 3. A female merozoite — this ultimately converts into a female gamete
× 3500.

Fig. 4. Young male schizont.

Fig. 5. Microschizogony. × 3500.

Fig. 6. A male merozoite — this ultimately develops into male gametocyte.
× 3500.

Fig. 7a. Young male gametocyte, b. microgamete formation, c. growing
macrogamete.

Fig. 8. Early stage in the formation of microgamete.

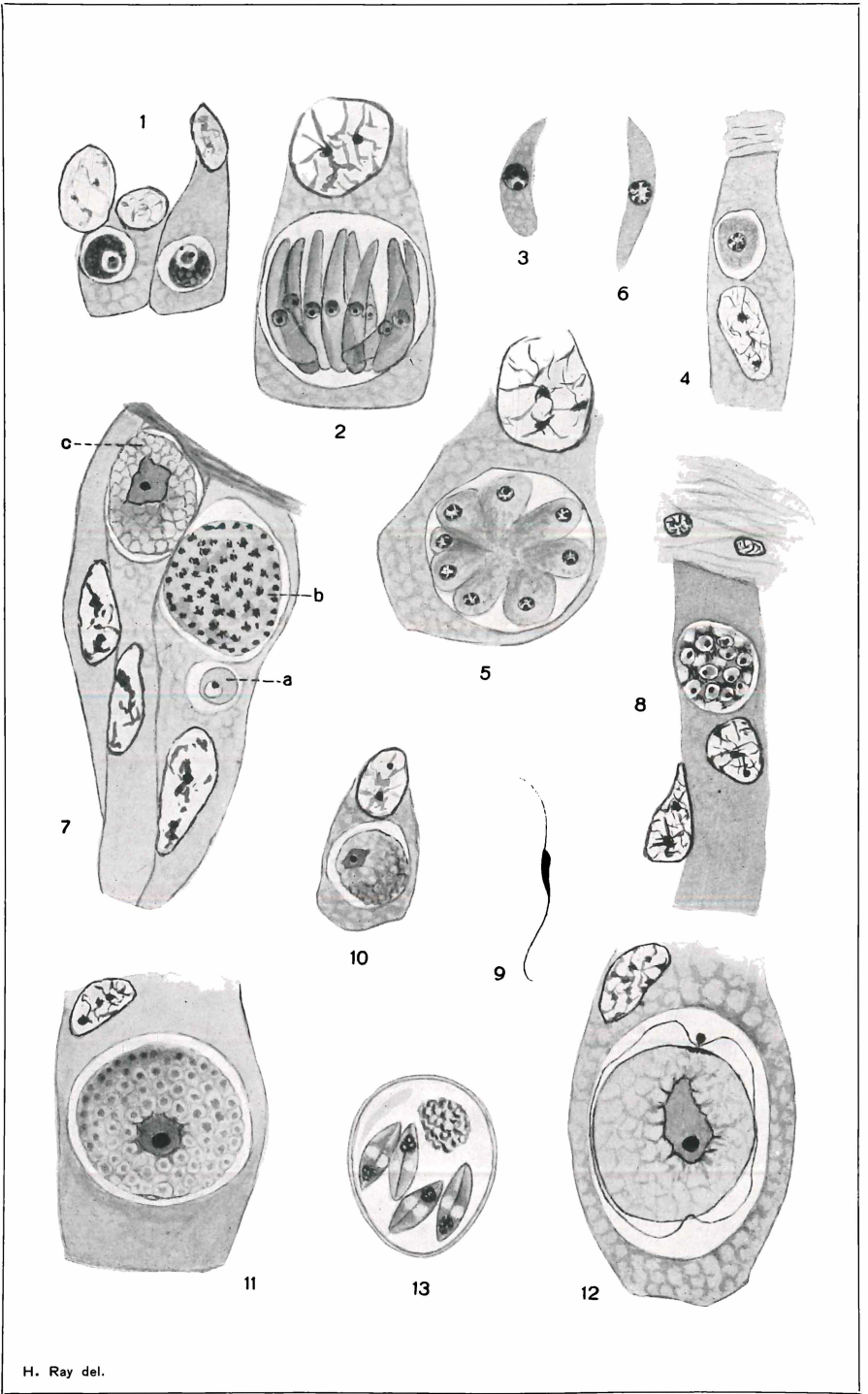
Fig. 9. Full grown microgamete. × 3500.

Fig. 10. Macrogamete, early stage.

Fig. 11. Macrogamete with micropyle and reserve granules.

Fig. 12. Oocyst, early stage showing a button-like plug at the micropyle.

Fig. 13. Mature oocyst (from sample, after maturation in 1% chromic acid.).



H. Ray del.

Ray u. Das Gupta.

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Autor(en)/Author(s): Ray Harendranath, Das-Gupta M.

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