

Study of *Eimeria ajantai* in Sheep from Beed, Maharashtra State India

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Abstract: During the study ten species of *Eimeria* from sheep and twelve species of *Eimeria* from goats were found. Out of these, five species of *Eimeria* were common to both the hosts, and seven different species only in goats and five different species only in sheep. The relative abundance of sheep and goats are analysed.

Keywords: *Eimeria*, Coccidia, Oocyst, Sporocyst, Sporozoite

I. INTRODUCTION

Coccidian parasites infect the intestinal tracts of animals, and are largest group of protozoa. *Eimeria* is a genus of apicomplexan parasites that includes various species responsible for the disease coccidiosis. These species cause pathological damage and mortality in poultry, cattle, sheep, goat, pig, rabbit and other animals. The genus *Eimeria* Schneider, 1975, with more than 1300 species described to date, is the largest genus, and may be the most specious genus of all animal genera. Sporulated oocyst of *Eimeria* contain four sporocysts, each with two sporozoites. Coccidia have a complex life cycle and other unusual characteristics which have stimulated investigations by increasing number of biologists.

II. MATERIAL AND METHODS

The material for the study of coccidia of goats and sheep was obtained from various slaughter houses as well as from different fields in and around Beed (M.S.). Different parts of the intestine of slaughtered goats were examined and processed within 4-5 hours after collection.

The faecal contents were diluted with distilled water and sieved to remove the large faecal debris. After repeated washing the oocysts were concentrated by centrifugation at 3000 rpm for 10 minutes. The oocysts were then spread out in shallow petri dishes and covered with 2.5% solution of potassium dichromate for sporulation.

III. OBSERVATION AND RESULTS

During the study ten species of *Eimeria* are found in sheep, eight species are redescribed and two are new species. *Eimeria crandallis* was the most frequent, being found in 108 out of 594 positive samples (18.18%) or 4.38% of the total samples. *Eimeria parva* was the second common species found in 90 out of 594 positive samples, representing 15.15% of the positive samples and 3.65% of the total samples examined. *Eimeria ajantai* was the eighth species found in 34 out of 594 positive samples, representing 5.72% of the positive samples and 1.38% of the total samples examined.

3.1 Description of the oocyst of *Eimeria ajantai*

The species was found only in sheep. The oocysts are generally bottle shaped or ovoidal in shape with micropyle and micropylar cap. Oocysts are covered with two layered wall which is 2.6µm thick. The outer layer is yellowish brown in colour and 1.5µm thick while inner layer is light brown in colour and 1.0µm thick. The micropyle is 6 to 10µm wide, covered with micropylar cap which is flattened, with its ends drawn out over the oocyst wall. Its lower edge is thickened, giving the characteristic appearance and measures 5 to 8.2µm wide and 2.2 to 4.0µm high. Polar granule and oocystic residuum are absent.

The unsporulated oocysts consist of spherical sporoblast which measures about 10 to 20µm in diameter. The sporulated oocyst consists of four sporocysts which are elongate and ovoid in shape with stieda body. Sporozoites lie head to tail

in sporocyst and having a shape like banana. They are placed vertically and consist of large refractile body at the broader end and smaller one at the narrower end. Sporocystic residuum is absent.

The dimensions of the sporulated oocysts of *Eimeria ajantai* from sheep are as follows:

(All measurements are in microns)

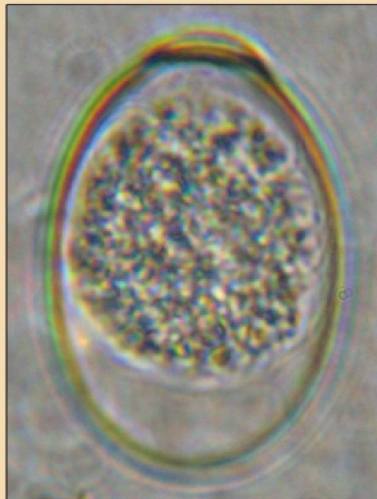
| Particulars | Oocyst from sheep |
|-------------------------------------|----------------------|
| Length of the oocyst | 20.4 – 36.12 (28.04) |
| Width of the oocyst | 16.2 – 28.3 (24.04) |
| Length width ratio of the oocyst | 1.1 – 1.2 (1.16) |
| Length of the sporocyst | 10.2 – 14.4 (12.33) |
| Width of the sporocyst | 6.8 – 10.6 (8.32) |
| Length width ratio of the sporocyst | 1.3 – 1.5 (1.4) |

The frequency distribution of the lengths and widths of the oocysts of *Eimeria ajantai* from sheep shown in **fig.1**

- **Sporulation time:** The sporulation time of the oocysts was 48 hours.
- **Prevalence:** The species was found in 1.38% of the 2462 sheep examined from Beed district.

PLATE - 14

Eimeria ajantai



Unsporulated oocyst of *Eimeria ajantai* from sheep



Sporulated oocyst of *Eimeria ajantai* from sheep

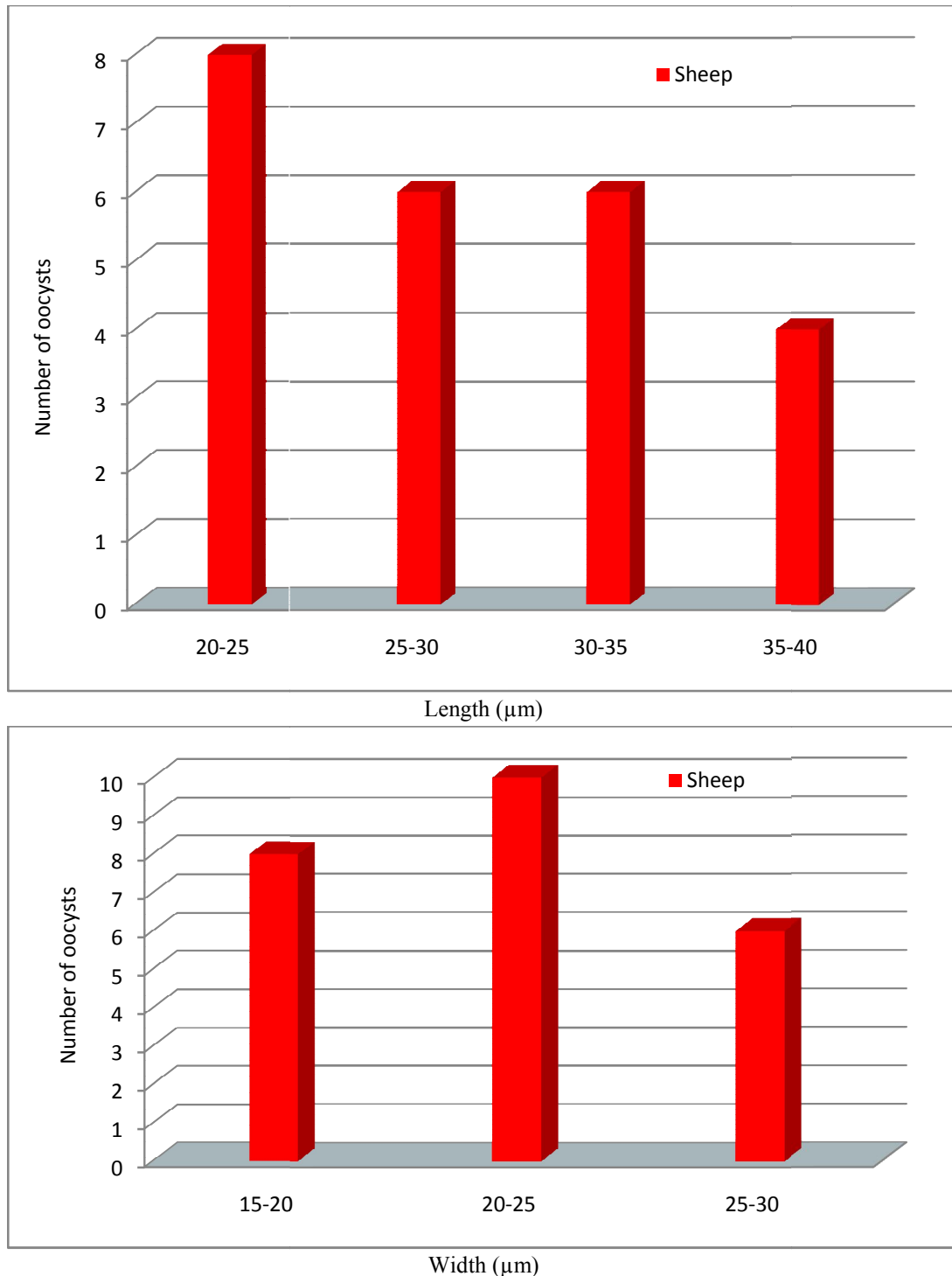


Fig.1 Showing the frequency distribution of the lengths and width of oocysts of *Eimeria ajantai* from sheep

IV. COMMENTS

Pellerdy (1974) listed ten species of *Eimeria* as occurring in sheep. Norton et.al. (1974) named an additional species. Thus there are at least eleven species of *Eimeria* described so far from sheep. Present author compared the species only with those which are with micropyle and micropyle cap. These are *E.intricata*, *E. ahsata*, *E. crandallis*, *E. granulosa*, *E. ovina* and *E. weybridgensis*. In its size range it is closer to *E. ahsata*, *E. crandallis* and *E. granulosa*. Distinctly smaller than *E. intricata*, *E. ovina* and *E. weybridgensis*. The oocysts of this species have a polar cap, which is distinctly different in its shape from those

of previous species. It has oocyst wall which is thicker and sporocysts which are smaller than *E. intricata*, *E. ahsata*, *E. ovina* and *E. weybridgeensis* and larger than *E. crandallis* and *E. granulosa*. The sporocystic residuum present in previous species is lacking here (Similar to *E. ajantai*). The stieda body is present in *E. intricata* and *E. ajantai* and present species while it is absent in *E. ahsata*, *E. crandallis*, *E. granulosa*, *E. ovina* and *E. weybridgeensis*. The present oocysts also differ from *E. ovina* is not having parallel sides. These oocysts have a close resemblance to those of *E. ajantai* particularly in the shape of oocyst and in having base of the micropylar cap drawn over the oocyst wall. However these oocysts are smaller in size and have a relatively smaller micropylar cap. The sporocysts of this species are smaller than Bawazir (10.2 – 14.4 x 6.8 – 10.6 μ m) as against (13.26-19.28 x 8.16 – 12.24 μ m). The sporulation time of *E. ajantai* (Bawazir) is 1 ½ - 4 days. It is 48 hours in the present species. When the present species is compared with all the above species it is found to be close to *E. ajantai*.sp. (Bawazir) and redescribed here as *E. ajantai*. (Comparative chart is given in **Table - 1**) There are however minor variations in the morphometrics.

Host - *Ovis aries*

Habitat- Oocyst found in intestinal content

Locality- Beed, (M.S)

Table 1: Comparative chart showing an account of old and new species of the genus *Eimeria* Schneider 1875

| Species character | <i>E. intricata</i> (Spiegl, 1935) | <i>E. ahsata</i> Honess, 1942 | <i>E. crandallis</i> , (Honess, 1942) | <i>E. granulosa</i> (Nikam, 1983) | <i>E. ovina</i> (Levine and Ivens 1970) | <i>E. Weybridgeensis</i> , (Norton Joyner and Catchpole, 1974) | <i>E. ajantai</i> .sp. (Bawzar, 1980) | <i>E. ajantai</i> present author |
|------------------------------|--|--------------------------------------|---|---|---|--|---|---|
| Shape of oocyst | Ellipsoidal or elongate | Elongate, ellipsoidal, or ovoidal | Ellipsoidal or ovoidal | ellipsoidal | Elongated | Ellipsoidal to ovoidal | Bottle shaped | Bottle shaped |
| Measurements in μ m | 40.0 – 65.2 x 29.0 – 57.0 | 27.0 – 42.1 x 16.0 – 25.1 | 19.0 – 34.3 x 15.0 – 28.0 | 17.5 – 42.0 x 12.0 – 30 | 35.5 – 50.2 x 30.2 – 42.4 | 25.2 – 45.4 x 20.3 – 33.1 | 28.56 – 41.42 x 20.4 – 29.58 | 20.4 – 36.12 x 16.2 – 28.3 |
| Micropyle and micropylar cap | Present | present | present | present | Present | present | present | Present |
| Polar granule | Absent | May or may not be present | Absent | One or two or absent | May or may not be present | Absent | Absent | Absent |
| Oocystic residuum | Absent | Absent | Absent | Absent | Absent | Absent | Absent | Absent |
| Shape of sporocyst | Elongate, ovoid | Elongate, oval | Elongate, ovoid | Elongated to ovoid | Elongate, ovoid and slightly tapering | Elongate | Elongate, ovoid. | Elongate, ovoid |
| Measurement in μ m | 14.1 - 23.4 x 10.4 – 19.7 | 11.0 – 17.1 x 5.0 – 10.0 | 6.2 – 10.1 x 5.3 – 8.0 | 8.0 – 15.0 – 5.0 – 12.0 | 10.5 – 20.8 x 6.5 – 13.4 | 8.4 – 16.2 x 5.2 – 12.2 | 13.26 – 19.28 x 8.16 – 22.24 | 10.2 – 14.4 x 6.8 – 10.6 |
| Stieda body | Small conspicuous button like stieda body. | Absent | Generally absent but in few cases minute ones are seen. | Absent | Absent | Absent | Present | Present |
| Sporocystic residuum | Present | present | present | present | Present | Present | Absent | Absent |
| Shape of sporozoites | Fusiform and lie head to tail in position | Length wise head to tail in position | Arranged transversely and occupy the entire within the sporocyst. | Elongated and lie head to tail | Elongated, comma shaped | Sporozoites are arranged head to tail in the sporocyst. | Banana shaped lie head to tail in the sporocyst | Banana shaped lie head to tail in the sporocyst |
| Refractile body | Two refractile globules are present | Two refractile globule present | A conspicuous refractile globule present. | Two or three refractile globule present | Two refractile globules are present. | A large refractile globules present. | Two refractile globules are present. | Two refractile globules are present. |
| Host | sheep | sheep | sheep | sheep | sheep | sheep | sheep | sheep |

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