



Research Article

## A NEW SPECIES OF GENUS *EIMERIA* (APICOMPLEXA : EUCCIDIORIDA) FROM SHEEP

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### ABSTRACT

The present communication deals with the description of a new species of genus *Eimeria*. This new species *Eimeria beedatus* is different from all known species of the genus in shape, length and width of the oocyst, sporocysts and sporozoites. Oocysts were collected from Beed District for the period of two years (June 2007 to may 2009). During the investigation total 2462 samples of sheep were collected, of which 594 were found to be positive for Eimerian oocysts. Sporulation time of species was also recorded.

**Keywords:** Coccidiosis, *Eimeria* Species, Apicomplexa, Sporozoite, Sporocyst.

### INTRODUCTION

Coccidia is one of the common intestinal disease found in Sheep Goats, chicken, Horse, and Pig etc. It causes coccidiosis in these organism. coccidia is one of the major group of protozoa have been progressively increasing as an intestinal parasites, causing extensive pathological damage and mortality in Sheep and Goats, which is results in to great economic losses of sheep and Goat owners. Studies on coccidia are one of the great biological, medical and veterinary importances. There are several species of coccidia are found worldwide in the recent time. Up to this time more than two hundred species of seventeen genera are well described in different publications. The necessity of basic taxonomic study of *Eimeria* is almost necessary to understand the pathogenesis, mortality and economic losses.

### 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.

### RESULTS AND DISCUSSION

During the study ten species of *Eimeria* are found in sheep, eight species are redscribed 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. *Eimeriaparva* 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. *Eimeriaway bridgensis* was the third species found in 82 out of 594 positive samples, representing 13.80% of the positive samples and 3.33% of the total samples examined. *Eimerianinakohlyakimovae* was the fourth found in 75 out of 594 positive samples, representing 12.62% of the positive samples and 3.04% of the total samples examined. *Eimeria intricata* was the fifth found in 61 out of 594 positive samples, representing 10.26% of the positive samples and 2.47% of the total

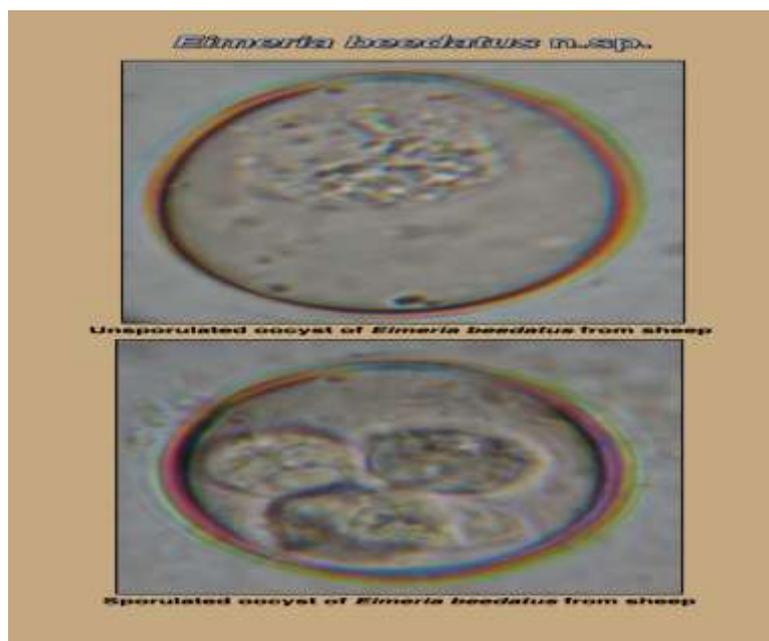
samples examined. *Eimeria ahsata* was the sixth species found in 55 out of 594 positive samples, representing 9.25% of the positive samples and 2.23% of the total samples examined. *Eimeria ovina* was the seventh species found in 41 out of 594 positive samples, representing 6.90% of the positive samples and 1.66% 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. Two new species are recorded, *Eimeria balloonii* and *Eimeria beedatus*. *Eimeria balloonii*(n.sp.) was the new species found in 26 out of 594 positive samples, representing 4.37% of the positive samples and 1.05% of the total samples examined. *Eimeria beedatus* (n.sp.) was the new species found in 22 out of 3.70% of the

positives samples and 0.89% of the total samples examined. The species was found only in sheep. The oocysts are egg shaped with micropyle but without micropylar cap. The oocyst wall is double layered and about 2.1µm thick. The outer layer is yellowish in colour and about 1.1µm thick. The inner layer is 1.0µm thick and brownish in colour. The micropyle measures 2µm wide. The unsporulated oocyst shows spherical sporoblast near the micropylar region of the oocyst, it measures about 12 to 14µm in diameter. The polar granule and oocystic residuum are absent. The four subspherical to ovoid sporocysts without stieda body are observed. The sporocystic residuum is in the form of compact granular mass in between two sporozoites. The sporozoites are roughly rounded in shape with a refractile globule.

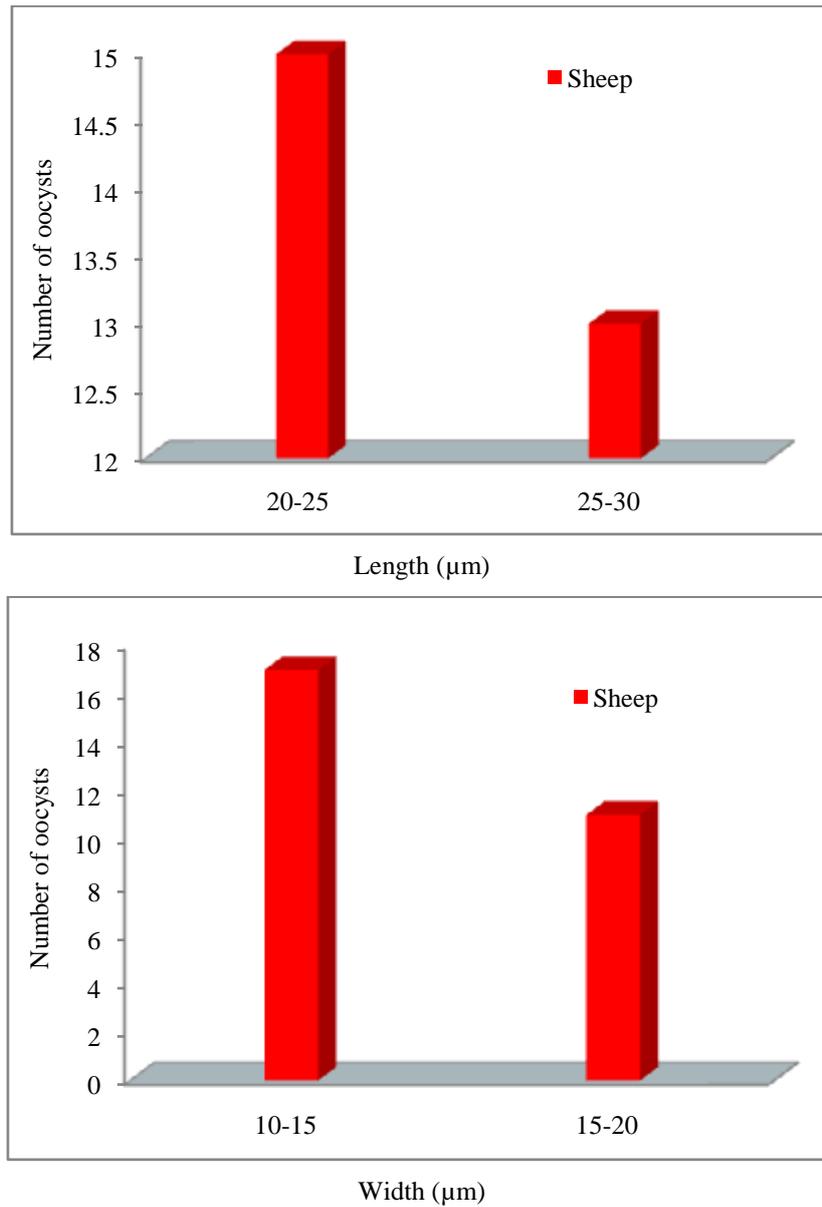
**Table 1.** The dimensions of the sporulated oocysts of *Eimeria beedatus* from sheep are as follows (All measurements are in microns).

Particulars	Oocyst from sheep
Length of the oocyst	20.2 -26.4 (23.41)
Width of the oocyst	10.4 -18.3 (16.10)
Length width ratio of the oocyst	1.4 -1.4 (1.45)
Length of the sporocyst	5.2 -6.4 (7.36)
Width of the sporocyst	5.2 -6.4 (7.36)
Length width ratio of the sporocyst	1.0 -1.0 (1.0)

Sporulation time: The sporulation time of the oocysts was 84 hours. Prevalence: The species was found in 0.89% of the 2462 sheep examined from Beed district.



**Figure 1.** The frequency distribution of the lengths and widths of the oocysts of *Eimeriabeedatus* from sheep shown.



**Figure 2.** Showing the frequency distribution of the lengths and widths of oocysts of *Eimeria beedatus* from sheep.

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

Species character	<i>E. faurei</i> (Moussu and Marotel, 1902 Martin, 1909)	<i>E. compactum</i> (Bawazir 1980)	<i>E. ninakohlyakimovae</i> (Yakim off and Rastegaieff, 1930)	n.sp.
Shape of oocyst	Ovoid or egg shaped (Single layer)	Ellipsoidal or ovoidal	Subspherical	Egg shaped
Measurement of oocyst in µm.	18.0 -31.0 x 14.5- 21.0	31.62 -39.78 x 22.44 x 27.54	17.0 -23.0 x 12.0 -19.5	20.2 -26.4 x 14.2 - 18.3
Micropyle and micropylar cap	Micropyle but without micropylar cap, ( 2µm. wide)	Prominent micropyle but without micropylar cap ,(4-8 µm wide)	Micropyle but without micropylar cap, (1µm. wide)	Micropyle present but without micropylar cap (2µm wide)
Polar granule	Absent	Absent	Present	Absent
Oocystic residuum	Absent	Absent	Absent	Absent

Shape of sporocyst	Ovoid to pyriform	Elongate, ovoid	Ovoid	Spherical to ovoid
Measurement of sporocyst in $\mu\text{m}$ .	8.0 -15.0 x 6.0 -9.0 (in sheep)	14.28 -19.38 x 7.14 - 10.2	5.0 -12.0 x 3.0 -8.0	5.2 -6.4 x 5.2 -6.4
Stieda body	Absent but in few cases very small	Conspicuous	Small stieda body present	Absent
Sporocystic residuum	Absent	Present in the form of a dark and compact granule on one side of the sporocyst	Present	Compact granular mass in between two sporozoites
Shape of sporozoites	Elongate	Lie head to tail and arranged more or less longitudinally in the sporocysts	Elongate lying wise in the sporocyst	Roughly round in shape
Refractile globule	Each sporozoites has two refractile globules one at each end	One or two refractile globule are present	A conspicuous refractile globule present	One refractile globule present
Host	Sheep / goat	Sheep	Sheep / goat	Sheep

When this species is studied by the present author it is observed that it is with a micropyle but without micropylar cap so it is compared with the species which are only with micropyles. *Eimeria faurei* (Mossu and Marotel, 1902, Martin 1909), *Eimerianinakohlyakimovae* (Yakimoff and Rastegaiff, 1930), *Eimeria compactum* (Bawazir, 1980) and *Eimeria balloonii* (from sheep) and *Eimeria straightatus* (from goat). The shape of the present species matches with *E. faurei*; remaining species are somewhat different in shapes than the present one. Oocysts of present species are smallest in size when compared with all above species except *E.ninakohlyakimovae* in sheep which is smaller than the present oocyst. Size of the micropyle similar to *E. faurei*, *E.balloonii* but smaller than *E.compactum*, *E.straightatus* and larger than *E.ninakohlyakimovae*. Oocystic residuum is absent in all above species including the present one. Shape of sporocysts of the present species is different than the previous species. (Sub spherical to ovoid, without stieda body). Stieda body is absent in *E.ninakohlyakimovae* (in goat) same feature is found in present species, in remaining species stieda body is present. Sporocystic residuum is present in *E.compactum*, *E.ninakohlyakimovae*, *E.straightatus* and *E.balloonii* except *E. faurei*. Shape of the sporozoites in all the previous species is elongate tapering while in the present species they are roughly rounded. When the species is compared with all the previous species it is seen that some distinguishing features are found in the present species. (Comparative chart is given in Table -1). The ovoid

sporocysts are smaller than all the previous species. Main distinguishing feature is its rounded sporozoite which is not seen in previous species. Ovoid to subspherical sporocysts and rounded sporozoites are very typical, not found in the previous species. Because of these distinct features the species is considered new to science and designated as *Eimeriabeedatus*. Host-Ovisaries, Habitat- Oocyst found in intestinal content Locality- Beed, (M.S).

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