A NEW SPECIES OF GENUS EIMERIA (APICOMPLEXA: EUOCOIDIIDORA) FROM GOAT.

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ABSTRACT
The present communication deals with the description of a new species of genus Eimeria. This new species Eimeria susheelensis 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 2636 samples of goat were collected, of which 528 were found to be positive for Eimerian oocysts. Sporulation time of species was also recorded.

KEY WORDS:
Abstract: Coccidiosis, Eimeria Species, goat (Capra hircus), Apicomplexa

INTRODUCTION
Genus Eimeria belongs to Phylum Myzozoa, Subphylum Apicomplexa, Class Conoidasida and Order Eucoccidiorida. The first Apicomplexan protozan was seen by Antony Van Leeuwenhoek (1674) in gall bladder of rabbit. The apicomplexan genus Eimeria comprises at least 1160 species that parasitize vertebrate animals (Levine, 1988). A number of coccidian parasites of sheep and goats have been described. Some of them are interchangeable between these two hosts Bandyopadhyay (2004), Martin (1909), Yakimoff and Rastegaieff (1930), Shah (1965), Chevalier (1965), Sivanarayan and Venkataratnum (1969), Lima (1979, 1980) and Musaev and Mamedova (1981) described several Eimerian species from the goat. Bandyopadhyay (2004) reported a new coccidium Eimeria sunderbanensis from Capra hircus. Here in present investigation oocysts were collected from faecal samples (pelletes) of goats (Capra hircus) of Beed, Maharashtra, India. E. susheelensis n.sp. is the new species reported and along with this species some other species were also recorded but those are not part of this communication.

MATERIALS AND METHODS
The material for the study of coccidia of goats 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 a period of two years i.e. from June-2007 to May-2009, total number of 2636 samples were examined. 528 of these were positive for coccidial infection, the percentage of prevalence being about 20.03%. During the present study twelve species of Eimeria are found in goats. Nine species are redescribed and three are new species. The commonest was Eimeria arloingi, Eimeria crandallis, Eimeria parva, Eimeria ninakohlyakimovae, Eimeria intricata, Eimeria christensenii, Eimeria ahsata, Eimeria hirci, Eimeria parbhaniensis, Eimeria straightatus, Eimeria susheelensis and Eimeria leaffii. Eimeria susheelensis was the new species found in 15 out of 528 positive samples, representing 2.84% and 0.56% of the total samples examined.

Description of Oocyst of Eimeria susheelensis n.sp.
The oocysts are oval to egg shaped without micropyle and micropylar cap. Oocyst wall is double layered and about 2.2µm thick. The outer layer is yellowish in colour and about 1.2µm thick. The inner layer is reddish brown in colour and 1.0µm thick. Unsporulated oocyst shows spherical sporoblast filling the middle portion of the oocyst and it measures about 14 to 18µm in diameter. The oocystic residuum is present but polar granule is absent. The four broad, elongate sporocysts with conspicuous large stieda body are observed. Sporocystic residuum is in the form of compact granular mass in between two sporozoites. Sporozoites are bean shaped with a refractile body.
The dimensions of the sporulated oocysts of *Eimeria susheelensis* from goats are as follows:

(All measurements are in microns)

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Oocyst from goat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of the oocyst</td>
<td>27.2 – 38.3 (31.97)</td>
</tr>
<tr>
<td>Width of the oocyst</td>
<td>20.5 – 32.4 (27.10)</td>
</tr>
<tr>
<td>Length width ratio of the oocyst</td>
<td>1.1 – 1.3 (1.17)</td>
</tr>
<tr>
<td>Length of the sporocyst</td>
<td>12.2 – 20.2 (15.98)</td>
</tr>
<tr>
<td>Width of the sporocyst</td>
<td>6.2 – 13.2 (9.16)</td>
</tr>
<tr>
<td>Length width ratio of the sporocyst</td>
<td>1.5 – 1.9 (1.74)</td>
</tr>
</tbody>
</table>

The frequency distribution of the lengths and widths of the oocysts of *Eimeria susheelensis* from goat shown in Graph 1.

**Sporulation time:**
The sporulation time of the oocysts was 72 hours.

**Prevalence:**
The species was found in 0.56% of the 2636 goats examined from Beed district.

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Fig.1: Unsporulated oocyst of *Eimeria susheelensis*

Fig.2: Sporulated oocyst of *Eimeria susheelensis*
Graph No.1. Showing the frequency distribution of the lengths and widths of oocysts of *Eimeria Susheelensis* from goats.

**COMMENTS**

The species described by the present author is different from the previous species described from sheep and goat. The present species is oval to egg shaped without micropyle and micropyler cup. Sporocystic residuum and oocystic residuum are present. Sporozoites are bean shaped.

Present author compared the species with *Eimeria ninakohlyakimovae* (Yakimoff and Rastegaiff, 1930) and *Eimeria parva* (Kotlan, Mocsy and Vajda 1929). It is compared with *E. ninakohlyakimovae* for its similar shape and size but in *E. ninakohlyakimovae* there is presence of micropyle where as it is absent in the present species. It is compared with *E. parva* as both are oval shaped and without micropyle and micropyler cup. But the present species is larger than the *E. parva*. Again *E. parva* is found in goat as well as in sheep where as the present species is found only in the goat. Polar granule is present in *E. ninakohlyakimovae* and *E. parva* where as it is absent in present species. Shapes and sizes of the sporocysts of the present species are different than the previous species. Small stieda body is present in *E. ninakohlyakimovae* (in sheep) and *E. parva* (in goat) where as it is large and conspicuous in the present species. Sporocystic residuum is composed of many scattered granules in *E. ninakohlyakimovae* and in *E. parva* but it is in the form of compact granular mass in the present species. Oocystic residuum is absent in the previous species but it is present in this species. Shape of sporozoites in *E. ninakohlyakimovae* are elongate, lying length wise in the sporocysts.
in *E. parva* they are ovoid to pyriform and lie obliquely where as they are bean shaped in the present species. (Comparative chart is given in Table No.1)

When the species is compared with the previous species found in sheep and goats some distinguishing characters are found. Main distinct features are the presence of the oocystic residuum, compact granular sporocystic residuum, large conspicuous stieda body and bean shaped sporozoites.

In view of these distinct characters it is considered new to science and designated as *Eimeria susheelensis*.

**Hosts** - *Capra hircus*

**Habitat** - Oocyst found in intestinal contents

**Locality** - Beed, (M.S).

### Table No. 1. Comparative chart showing an account of old and new species of the genus *Eimeria* Schneider 1975

<table>
<thead>
<tr>
<th>Species character</th>
<th><em>E. ninakohlyakimovae</em> (Yakimoff and Rastegaiff, 1930)</th>
<th><em>E. parva</em> (Kotlan, Mocsy and Vajda, 1929)</th>
<th>n.sp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shape of oocyst</td>
<td>Sub spherical</td>
<td>Subspherical or ovoid</td>
<td>Oval to egg shaped</td>
</tr>
<tr>
<td>Measurement of oocyst in µm</td>
<td>19.0 – 32.0 x 14.0 – 28.0</td>
<td>18.0 – 24.2 x 14.0 – 20.2</td>
<td>27.2 – 38.3 x 20.5 – 32.4</td>
</tr>
<tr>
<td>Micropyle and micropylar cap</td>
<td>Micropyle but without micropylar cap (1µm wide)</td>
<td>Absent</td>
<td>Micropyle and micropylar cap are absent.</td>
</tr>
<tr>
<td>Polar granular</td>
<td>Present</td>
<td>Present</td>
<td>Absent</td>
</tr>
<tr>
<td>Oocystic residuum</td>
<td>Absent</td>
<td>Absent</td>
<td>Present</td>
</tr>
<tr>
<td>Shape of sporocyst</td>
<td>Spindle shaped</td>
<td>Elongate, ovoid</td>
<td>Broad, elongate</td>
</tr>
<tr>
<td>Measurement of sporocyst in µm</td>
<td>10.0 – 16.0 x 4.0 – 9.0</td>
<td>9.1 – 13.2 x 5.1 – 10.1</td>
<td>12.2 – 20.2 x 6.2 – 13.1</td>
</tr>
<tr>
<td>Stieda body</td>
<td>Absent</td>
<td>Present</td>
<td>Large conspicuous stieda body present</td>
</tr>
<tr>
<td>Sporocystic residuum</td>
<td>Present</td>
<td>Present</td>
<td>Present compact granular mass in between two sporozoites</td>
</tr>
<tr>
<td>Shape of sporozoites</td>
<td>Elongate, lying length wise in the sporocyst.</td>
<td>Ovoid to pyriform and lie obliquely</td>
<td>Bean shaped</td>
</tr>
<tr>
<td>Refractile globule</td>
<td>A conspicuous refractile globule present</td>
<td>A refractile globule present</td>
<td>A refractile body present</td>
</tr>
<tr>
<td>Host.</td>
<td>Goat/sheep</td>
<td>Goat / sheep</td>
<td>Goat</td>
</tr>
</tbody>
</table>

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**REFERENCES**


