Study of *Eimeria canadensis* in *Bos indicus* from Marathwada Region

V. K. Bansode¹, S. V. Nikam², S. R. Sable³

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Abstract: *The objective of this study is first time describe Eimeria canadensis in cow. Bos indicus from Marathwada region. The described Eimeria canadensis, common to cattle have not been reported previously from Bos indicus in this region.*

Keywords: Bos indicus, Coccidiosis, Eimeria, Sporulated oocyst and Unsporulated oocyst

1. Introduction

Coccidiosis in cattle is one of the five most economically important diseases of the cattle industries. *Eimeria* are known to infect cow. Several eimeria species are pathogenic in cattle causing several clinical symptoms (Samson Himmelstjerna et al 2006, Sanchez, Romero, Foundroge 2008). Most pathogenic species in cow is *Eimeria zurnii* and *Eimeria bovis*.

In severe infection deaths occur within 7 to 10 days. In united state 2 to 3 millions cattle are treated annually, for clinical coccidiosis. It is reported that up to one in five of these animals dies. *Eimeria Canadensis* are studied and identified in different countries (Kasim, Al Shawa 1985, Munyua, Ngotho 1990 Chivonda et al 1997, Matjila, Penzhorn 2002, Sanchez, Romero, Foundroge 2008).

Several species of coccidia cause extensive pathological damage and mortality in poultry, cattle, sheep, goat, pig and other domestic animals. For this reason coccidia have attracted the attention of many workers. Here author is describing only one species i.e. *Eimeria Canadensis*.

2. Materials and Methods

The material for the study of species *Eimeria canadensis* in cow (B. indicus) was obtained from different localities in Marathwada region in the form of fecal matter. Fecal matter of each cow was collected in separate plastic vials. These samples were examined and processed within five to six days after collection. Used salt flotation tech. for the presence of oocyst after sieving and centrifugation. The oocysts collected were spread out in shallow petridishes in 2.5 % potassium dichromate solution for sporulation. The character included ware oocyst shape, presence or absence of micropile, polar granules and oocystic residuum. Similarly for sporosysts its shape, steida body, residuum and sporulation time was taken to consideration.

3. Description of the oocyst

The oocysts of this species are ovoid. Micropyle is inconspicuous and micropylar cap is absent. The wall of oocyst is two layered 1 to 1.5 µm thick. Outer layer is thicker than inner layer. Inner layer is light red and outer one is reddish brown. The unsporulated oocyst has spherical to ovoidal, sporoblast at the centre in the form of compact mass. The sporulated oocyst shows four sporocysts. No oocystic residium is seen. Sporocystic residium is in the form of loose granules in linear masses. Sporozoites are elongated, banana shaped and lie head to tail in the sporocyst and have two to three clear refractile globules each. Steida body is very clear.

4. Dimension of sporulatedoocysts are as follows:-

(All measurements are in µm) (Phase contrast at 100x X 10x)

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Oocyst from cow feces</th>
<th>Oocyst from cow feces</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of oocyst</td>
<td>29-33</td>
<td>31</td>
</tr>
<tr>
<td>Width of oocyst</td>
<td>23-26</td>
<td>24.5</td>
</tr>
<tr>
<td>L/W ratio of oocyst</td>
<td>1.26</td>
<td></td>
</tr>
<tr>
<td>Length of sporocyst</td>
<td>16-18</td>
<td>17</td>
</tr>
<tr>
<td>Width of sporocyst</td>
<td>05-07</td>
<td>06</td>
</tr>
<tr>
<td>L/W ratio of sporocyst</td>
<td>2.83</td>
<td></td>
</tr>
</tbody>
</table>

Sporulation time:

Sporulation time of the oocyst was 4-5 days.

Unsporulated

Sporulated
<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Author</th>
<th>Oocyst (µm)</th>
<th>length / width ratio</th>
<th>Micropyle</th>
<th>Sporocyst (µm)</th>
<th>length / width ratio</th>
<th>Oocyst wall thickness</th>
<th>Oocystic residuum</th>
<th>Sporozoea shape</th>
<th>Steatodymium</th>
<th>Refractile globule</th>
<th>Sporulation time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Nigeria research report 2004 parts of Plateau State</td>
<td>21.0 - 26.2</td>
<td>18.3</td>
<td>1.38</td>
<td>6 - 10</td>
<td>18.3x7.6</td>
<td>0.6</td>
<td>Ab</td>
<td>Ab</td>
<td>Elongate</td>
<td>-</td>
<td>2 - 3</td>
</tr>
<tr>
<td>2</td>
<td>M.A. Taylor, R.L. Coop, R.L. Wall (E-book Veterinary Parasitology)</td>
<td>32.5x2</td>
<td>1.54</td>
<td>P</td>
<td>6 - 10</td>
<td>17.0x8.0</td>
<td>2.12</td>
<td>-</td>
<td>P</td>
<td>P</td>
<td>-</td>
<td>P</td>
</tr>
<tr>
<td>3</td>
<td>Brian Lassen 2009 Estonian University of Life Sciences</td>
<td>32.5x2</td>
<td>1.38</td>
<td>P</td>
<td>6 - 10</td>
<td>18.5x8.0</td>
<td>2.31</td>
<td>-</td>
<td>-</td>
<td>P</td>
<td>P</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Institute of Parasitology University of Leipzig</td>
<td>32.5x2</td>
<td>1.38</td>
<td>P</td>
<td>-</td>
<td>-</td>
<td>Ab</td>
<td>P</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<tr>
<td>5</td>
<td>Zoologic Survey of India 1980 by A.K. Mandal</td>
<td>31.0x2</td>
<td>1.34</td>
<td>P</td>
<td>10 - 17</td>
<td>6.6 - 8.9</td>
<td>--</td>
<td>1.93</td>
<td>1.2</td>
<td>Ab</td>
<td>P</td>
<td>Elongated</td>
</tr>
<tr>
<td>6</td>
<td>Vasant Jadhav 2002</td>
<td>17 - 25</td>
<td>15.5x7.6</td>
<td>3.0</td>
<td>6 - 9</td>
<td>15.5x7.6</td>
<td>2.06</td>
<td>1.2</td>
<td>Ab</td>
<td>P</td>
<td>Banana shape</td>
<td>P</td>
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<tr>
<td>7</td>
<td>Bhatia et al 1968</td>
<td>31.0x2</td>
<td>1.34</td>
<td>P</td>
<td>13 - 18</td>
<td>6 - 9</td>
<td>--</td>
<td>1.93</td>
<td>1.2</td>
<td>Ab</td>
<td>P</td>
<td>-</td>
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<tr>
<td>8</td>
<td>Levine and Ivens 1970</td>
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<td>1.32</td>
<td>P</td>
<td>10 - 17</td>
<td>6.6 - 8.9</td>
<td>--</td>
<td>1.93</td>
<td>1.2</td>
<td>Ab</td>
<td>P</td>
<td>-</td>
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<tr>
<td>9</td>
<td>Pellerdy 1974</td>
<td>32.5x2</td>
<td>1.38</td>
<td>P</td>
<td>-</td>
<td>-</td>
<td>Ab</td>
<td>P</td>
<td>-</td>
<td>-</td>
<td>-</td>
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</tr>
<tr>
<td>10</td>
<td>Present author</td>
<td>31.0x2</td>
<td>1.26</td>
<td>P</td>
<td>-</td>
<td>-</td>
<td>Ab</td>
<td>P</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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</tbody>
</table>

5. Results and Discussion

This species was first described by Bruce 1921 in united state. Later described by several workers as Christensen 1941, Levine and Ivens 1967. Kennedy and Kralka 1987, worked on eimeria in Alberta, Canada. Lin et al.1993 worked in China.


In India various workers reported this species from different parts of India like Gill 1960, Patnaik1963, Patnaik and Pande 1965 and Bhatia et.al 1968.

Present author compared the species with earlier workers is shown in above table. After observation it is seen that approximately all the oocyst are similar including the present species except slight morphometric differences.

In Levine the oocysts are slightly larger than present one. V.D.Jadhav observed small polar granule which is not observed here. Sporocystic residium is absent in Plateau State which is seen in the present species though some minor variations are seen in the earlier species and the present species.
Micropyle is noted by all the workers including present author except Bhatia et al 1968, Levine and Ivens 1970, Pellerdy 1974.

Sporocystic residium is in all the earlier species except Nigeria research report which is present in present species. Oocystic residium absence in all species including present one except M.A.Tylor, R.L Coop and R.L.Wall.

Sporulation time is approximately similar in all including present species. It is concluded that the present species is *Eimeria Canadensis* as most of the characters are similar and redescribed here by present author.

6. Conclusion

Present author compared the present species with the species *Eimeria Canadensis* described by earlier workers as in above comparative chart. It is concluded that though there are minor morphometric differences the species is *Eimeria Canadensis* and redescribed here by present author.

7. Acknowledgment

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