

## Study of *Eimeria brunetti* (Levine 1942) in Broiler Chicken from Aurangabad District of Maharashtra State India

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### ABSTRACT

The paper presents the results of the studies on the coccidian parasites of the genus *Eimeria* occurring in Broiler chicken, (*Gallus gallus*) in Aurangabad district of Marathwada region. The investigation showed extensive prevalence of coccidia in broiler chicken in this area. Broiler chicken shows variations in prevalence of coccidian infection throughout the year. The study involved survey, fecal examination, and identification of coccidial species based on their morphology, predilection site in the intestine and sporulation time. During the present study ten species of *Eimeria* are found in Broiler chicken. Seven species are redescribed and three are new species.

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## INTRODUCTION

Coccidiosis is the major problem in poultry worldwide. In our country, it causes serious problem and causing huge economic loss to poultry industry, especially in the production of Broiler chicken. Study of species composition in protozoa is addition to science<sup>1</sup>.

India's food basket is changing rapidly in favour of high-value food products, including animal products. Between 1993-1994 and 1999-2000, per capita consumption increased by 26% for milk and 29.7% for meat. The increase was most rapid for the consumption of poultry products; 82% for poultry meat and 50% for eggs. The expanding demand for livestock products is creating an opportunity for producers to enhance their income. Nevertheless, there is an apprehension in the sector, because the global trade in livestock products is highly distorted. Some developed countries provide huge support to livestock and poultry production, which

adversely affects export prospects and poses a threat to domestic production. In the context of poultry, India is not a major player in global trade, either as an exporter or importer.<sup>41</sup>

The poultry sector is growing at a much faster rate than any other element of the crop and livestock sector. Within the poultry sector, broiler production is growing faster than egg production. About 66.7% of the total output (in value form) from poultry is realized from the poultry meat sector and only 33.3% from egg production.<sup>40,42</sup>

The protozoa are unicellular animals and the smallest of all animals. Most of them can only be seen under the microscope. They do breathe, move, and reproduce like multicellular animals. Some protozoans are harmful to man or other animals as they can cause serious diseases. In subkingdom protozoa coccidia is included in phylum Apicomplexa. The phylum

Apicomplexa was established to include protozoans that possess a certain combination of structures collectively known as the apical complex which is distinguishable by electron microscopy.<sup>1,2,9,10</sup>

Avian coccidiosis, an intestinal disease caused by protozoan parasites of the genus *Eimeria*, occurs worldwide. It is considered to be one of the most economically important diseases of domestic poultry<sup>1</sup>. For many years, prophylactic use of anticoccidial feed additives has been the primary means of controlling Coccidiosis in the broiler industry and has played a major role in the growth of this industry, which now can produce about 7.6 billion chickens annually<sup>9</sup>. However, development of anti coccidial resistance has threatened the economic stability of the broiler industry. Work on Coccidiosis is carried out by number of researchers i.e. Tyzzer, E.E. (1932), Chakravarthy, M. and Kar. A.B. (1944), Ray D.K, Shivmani, G.A.Oomen, and Bhaskaran, R. (1952), Dubey J.P. And Pande B.P. (1963), Sharma N.N. (1964), Edger S.A. and C.T. Seibold (1964), Mandal A.K. (1966), Krishmurthy, R. and Bhosale, V.M. (1976), Krishnamurthy and Kshirsagar, H.S. (1976), McDougald L.R. et.al. (1997), Ahamad Parvez, Sharma G.D. And Ahamad, P. (2000), Safari M. Kinung'hi, Getachew Tilahun, Hafez M. Hafez, Moges Woldemeskale, Moses Kyule, Matthias Grainer and Maximilian P.O. Baumann (2004), Getachew Gari, Getachew Tilahun and Ph. Dorchie (2008). My study covers survey and species identification of coccidia i.e. various species of genus *Eimeria* from chicken.

## MATERIAL AND METHODS

The material for the study of coccidia of Broiler chicken was obtained from various slaughter houses as well as from different fields in Aurangabad district (M.S.). The different parts of the intestine of slaughtered chicken were examined and proceeded within 4-5 hours after collection. The samples were examined for the presence of oocyst. Oocysts are separated from fecal material by sieving and centrifugation at 3000 rpm for 10 min. The oocysts collected were spread out in shallow Petri dish in 2.5%

potassium dichromate solution for sporulation.<sup>1,2,9,10</sup>

## DISCUSSION AND RESULTS

During a period of two years i.e. from June 2006 to May 2008, total number of 2524 samples was examined. 734 of these were positive for coccidial infection, the percentage of prevalence being about 29.08%. During the present study ten species of *Eimeria* are found in Broiler chicken. Seven species are redescribed and three are new species. The commonest was *Eimeria tenella*, *Eimeria necatrix*, *Eimeria brunetti*, *Eimeria acervulina*, *Eimeria maxima*, *Eimeria praecox*, *Eimeria mitis*, *Eimeria nikamae*, *Eimeria tarabaie*, and *Eimeria shivpuri*.

*Eimeria brunetti* was the fourth found 62 out of 734 positive samples representing 8.44% of the positive and 2.45% of the total samples examined.

### Description of the oocyst

The oocysts of *Eimeria brunetti* (Levine 1942) are spherical to oval without micropyle and micropylar cap. The wall of the oocyst is single layered, 1.0 µm thick, yellowish to brown in colour. The unsporulated oocyst shows spherical sporoblast filling one third portion of the oocyst. The sporulated oocyst shows the presence of prominent polar granule at the anterior end close to the oocyst wall. Oocystic residuum is absent. The sporocysts are elongated in shape, measure about 8.16-13.2 µm in length and 5.1-6.2 µm in width. Posterior end of the sporocyst is rounded, broad, anterior end is narrow, and on its tip prominent stieda body is present. Sporocystic residuum is absent. The sporozoites are long elongated having retractile bodies at one end.

The dimensions of the sporulated oocysts are as follows:

(All measurements are in microns.)

Particulars	Cyst from broiler chicken
Length of the oocyst	20.1 - 29.9 (24.9)
Width of the oocyst	18.0 - 24.3 (19.9)
Length width ratio	1.1 - 1.3 (1.2)
Length of the sporocyst	8.16 - 13.26 (10.7)
Width of the sporocyst	5.1 - 6.2 (5.8)
Length width ratio of the sporocyst	1.6 - 2.1 (1.8)

### Sporulation time

The sporulation time of the oocysts was 18-24 hours.

### Prevalence

The species was found in 02.45% of the 2524 broiler chicken examined from Aurangabad region (M.S.).

### COMMENTS

This species was first described by Levine (1942) in U.S.A. It was subsequently recorded by various workers in the different parts of the world. Like Boles and Becker (1954), Edger (1955), Pellerdy (1960), Davies (1963), N.N. Sharma (1964) in University of Georgia, Ahens. L.R.McDougald L.Fuller, and Juan Solis (1986), Long and Johnson (1988) and John R. Batra (1997) in Canada. L.R. McDougald L.Fuller, and R. Mattiello (1997) made a survey of coccidia on 43 poultry farms in Argentina, eight *Eimeria* species were recorded by them, *Eimeria brunetti* was present in that group. R. Mattiello, J.D.Boviez and McDougal L.R (2000) show *Eimeria brunetti* and *Eimeria necatrix* in chicken of Argentina. In India various workers studied coccidia of chicken like Ray (1945), describe a species of *Wanyonella* from the gut of the domestic fowl. Gill (1960), Mandal (1966), Bhosale (1977), Tankhiwale *et. al.* (1982) in Bombay, Rai *et.al.*(1989) in Andaman, Panda *et.al.*(1996) in Orrisa.

Comparisons of the dimensions of the oocysts described here with those of earlier workers are shown in table no.1. The description

of the sporulated oocyst given here agrees in general with those of earlier workers. There is however minor variations in the morphometrics.

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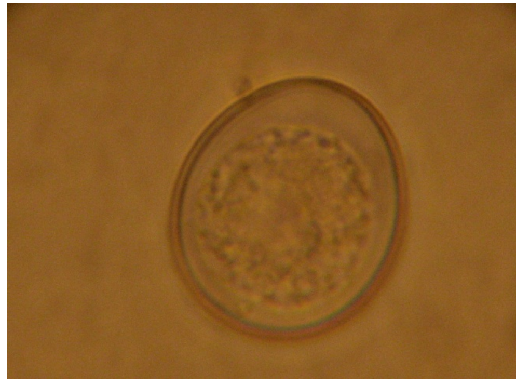
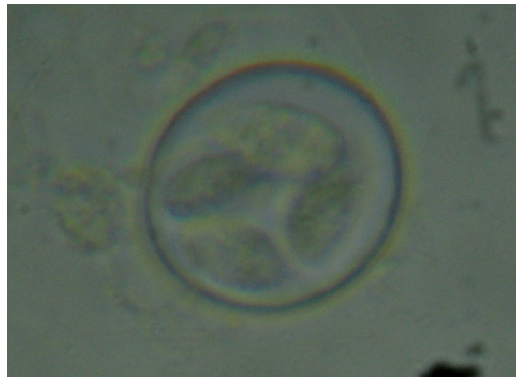
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**Table 1:** Showing the comparative dimensions of *Eimeria brunetti* (based on various authors).

Sr. No.	Authors	Length of oocyst	Width of oocyst	Average
1	Levine (1942)	18-24	21-30	22 x 27
2	Edger(1955)	20.7-30.3	18.1-24.0-2	26.8 x 21.7
3	Beckers et.al.(1955	13.8-33.7	12.4-28.3	23.4 x 19.7
4	Research report (1973) Univ .of Georgia	20.7-30.3	18.1-24.2	24.6 x 18.8
5	Present author	20.1-29.9	18.0-24.3	24.9 x19.9

**Fig. 1:** Unsporulated oocyst of *Eimeria brunetti***Fig. 2:** Sporulated oocyst of *Eimeria brunetti*