Original Research Article

New species of genus *Eimeria(Eimeria tarabaie)* in broiler chicken (*Gallus gallusdomesticus*) from Aurangabad (M.S.) India

Abstract:

The objective of this study was first to investigate the prevalence of poultry Coccidiosis and to identify the coccidial species occurring in the study area on local strain .The study involved survey, fecal examination, and identification of coccidial species based on their morphology, predilection site in the intestine and sporulation time.Chicken is more susceptible to *Eimeria tenella, Eimeria necatrix, Eimeria brunetti, Eimeria mitis, Eimeria acervulina, Eimeria praecox, Eimeria maxima.* During our investigation three new species i.e. *Eimeria nikamae, Eimeria tarabaie, Eimeria shivpuri*, were recorded in Broiler chicken from Aurangabad district of Maharashtra.

Key words: - Poultry, Coccidiosis, *Eimeria Sp.*

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.

Avian Coccidiosis, an intestinal disease caused by protozoanparasites of the genus *Eimeria*, occurs worldwide. It is consideredto be one of the most economically important diseases of domesticpoultry. For many years, prophylactic use of anticoccidialfeedadditives has been the primary means of controlling Coccidiosis in the broiler industry and has played a major role in the growthof this industry, which now can produce about 7.6 billion chickensannually. However, development of anticoccidial resistance hasthreatened the economic stability of the broiler industry. Coccidiosis is believed to be a commonest depreciator or even a potential killer of our poultry. So medical point of view their study is very important. 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.andBhosale, V.M. (1976), Krishnamurthy and Kshirsagar, H.S. (1976),

McDougald L.R. et.al. (1997), AhamadParvez, Sharma G.D. and Ahamad, P. (2000), Safari M. Kinung'hi1, GetachewTilahun , Hafez M. Hafez , MogesWoldemeskel , MosesKyule , Matthias Grainer and MaximillianP.O. Baumann (2004), Getachew Gari, Getachew Tilahun and Ph. Dorchies (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 proceded 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.

ResultsandDiscussion

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 areredescribed 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 tarabaie **(n.sp.)**was the second most important new species found 14 out of 734 positive samples, representing 1.90% of the positive samples and 00.55% of the total samples examined

Description of the oocysts:-

The oocysts are cylindrical in shape, oocysts both the ends are equal and rounded covered by double layered wall. The outer wall is thick and brown in colour whereas inner layer is thin and bluish to brown in colour. Wall thickness is about 0.9um. Micropyle and micropylar cap is absent. The unsporulated oocyst shows oval sub spherical sporoblast filling central portion of the oocyst. The sporulated oocyst shows the presence of prominent rounded polar granule at the anterior end close to the oocyst wall. No oocystic residuum is seen. The sporocysts are completely rounded and placed in the middle of the oocyst, measure about 8-10 um in length and

8-10 um in width. Steida body is absent. Sporocystic residuum is present. Sporozoites are small bean shaped and having very small refractive granules.

The dimensions of the sporulated oocysts are as follows:-

(All measurements are in microns.)

Table 1.**The dimensions of the sporulated oocysts**

Particulars	**Cyst from broiler chicken**
Length of the oocyst	22.5-27.1 (24.1)
Width of the oocyst	18.1-19.3 (18.8)
Length width ratio	1.2 -1.3 (1.1)
Length of the sporocyst	10.0-10.0 (10)
Width of the sporocyst	10.0-10.0 (10)
Length width ratio of the sporocyst	1.0-1.0 (1.0)

Sporulation time:-

The sporulation time of the oocysts was 14 -18 hours.

Prevalence:-

The species was found in 00.55% of the 2524 broiler chicken examined from Aurangabad region (M.S.).

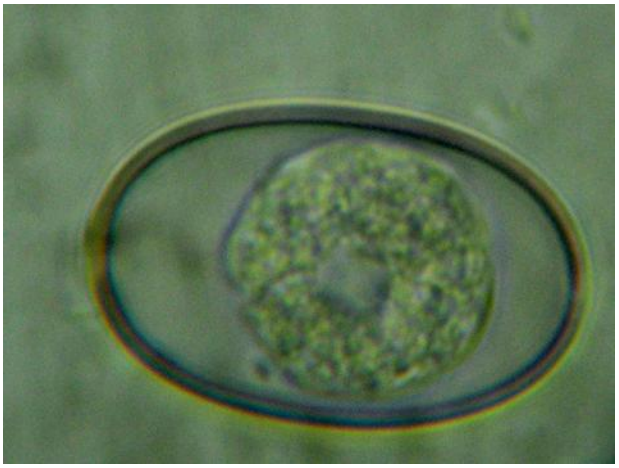

Fig 1: unsporulated oocyst of Eimeria***tarabaie*****(n.sp.)**

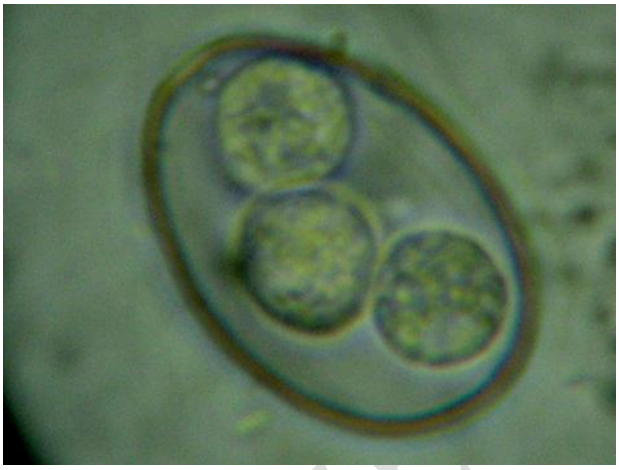

Fig 2: Sporulated oocyst of ***tarabaie (*****n.sp.)**

Comments

Different Eimerian species are described from Gallus domesticus in India as well as in various parts of the world. Eight species of *Eimeria* are described from the broiler chicken along with one new species are as follows-

Eimeria tenellaRailliet and Lucet 1891, ***Eimeria necatrix***Johnson, 1930, ***Eimeria brunette*** Levine 1942, ***Eimeria acervulina***Tyzzer 1929, ***Eimeria praecox***Johnson 1930, ***Eimeria maxima***Tyzzer 1929, ***Eimeria mitis***Tyzzer 1929 and ***Eimeria nikamae* (n. sp.)**by present author.

The present species is clearly marked off from all the eight species above mentioned for the shape of the oocyst as well as for the shape and arrangement of the sporocyst. Shape and size of oocyst of these species resemblances with the oocyst of *Eimeriaacervulina*, but oocysts of present species are narrower than that of *Eimeria acervulina*. The unsporulated oocyst shows centrally placed spherical to sub spherical sporoblast which is not seen in previously recorded species. In sporulated oocyst sporocysts are placed vertically one above another in the middle of the oocyst. Sporocysts are completely rounded and without stieda body. This feature is altogether different from the other previously recorded species by author except new species *Eimeria nikamae.*

Though the shape and size of sporocysts of *Eimeria nikamae* and present species are same but the shape of the oocyst are altogether different from each other. The shape of oocysts in *Eimeria*

nikamae is broad, oval with rounded base and narrow top where as in present species oocyst is cylindrical with equally rounded ends.

References:-

1. **Tyzzer, E.E. (1932):-**. Criteria and methods in the investigation of avian coccidiosis. Science.75 (1943): 324-328.
2. **EnaA.Allen (1934):-** *Eimeria angusta*sp.Nov. and*Eimeriabonasae* sp. Nov. from Grouse with a key to the species of Eimeria in birds. Vol. LIII. No. I; 1-5.
3. **Chakravarthy, M. and Kar. A.B. (1944):-** Studies on the coccidia of Indian bird. IInd observations on several species of the coccidia of the sub families cyclosporinae and eimeriinae. proc. Ind. Acta.Sci. 20 (sec.B.); 102-104.
4. **Ray D.K, Shivmani, G.A.Oomen, and Bhaskaran, R. (1952)**:- A study on the coccidia of some Himalayan birds.
5. **Levine N. D. (1953):-** A review of the coccidia from the avian order Galliformes ,Anseriformes and Charadriiformes with description of three new species Am. Midl. Nat. 49; 696-719.
6. **David S.F.M. (1956):-** Intestinal coccidiosis in chicken caused by Eimeria necatrix vet. Rec. 853- 857.
7. **Burns, W.C. (1959):-** The lethal effect of *Eimeria tenella* extracts on rabbits. J. Parisitol. 45: 38-46.
8. **Dubey J.P. And Pande B.P. (1963):-** On a coccidian schizonts in the Indian domestic duck (*Anaspalyrchynchosdomesticus*) J.Parasit 749-770.
9. **Sharma N.N. (1964):-** Response of fowl (Gallus domesticate) to parental Administration of seven coccidial species. J. Parasitol 50 (4); 509-517
10. **Edger S.A. and C.T.Seibold (1964):-** A new Coccidium of chickens *Eimeria mivati* sp. N. (protozoa; Eimeriidas) with details of its life history. J. parasitol, 50,193-204.
11. **Ray H. N. (1965):-** On a new Coccidium*Wenyonellagallinae* n. sp. from the gut of the domestic fowl. *Gallus gallusdomesticsLinn.*Curr. Sci. 14; 275.
12. **Vetterling, J.M and D.J.Doran. (1966):-**Schizogony and gametogony in the life cycle of poultry coccidium, *Eimeria acervulina(Tyzzer,* 1929). J. Parasitol. 52(6): 1150-1157.

13. **Mandal A.K. (1966):-** Studies on some aspects of avian coccidia [protozoa –sporozoa], zool. Soc. Calcutta.19; 23-29.
14. **Hein, H**. **(1968)**:-The pathogenic effects of *Eimeria acervulina* in young chicks. *Expl.Parasit.*,22: 1-11.
15. **Mandal A.K. (1970):-** Studies on some aspect of avian coccidia [protozoa; sporozoa] part 4th .occurrence and distribution of coccidian parasite in Indian birds. Rec. Zool. Surv. India. 63 (1-4).
16. **Itagaki, K; M. Tsubokura and M. Taira (1972):-** Basic biological studieson the avian coccidium. Development of *Eimeríatenella,E. brunetti* and *E. acervulina* in chicks embryos Japanese J. Vet. Sci. 34: 143-149
17. .**Joyner, L. P. (1974):-** The specific characteristics of Eimeria with special reference to the coccidia of the Fowl .Avian pathol. 3, 145-157.
18. **Ruff M. D.and Reid W.M. (1975):-**coccidiosis and intestinal pH in chicken Avium Dis, 9,343-348.
19. **Mandal A.K. (1975):-** Fifty years program in the taxonomy of coccidia (protozoa; sporozoa) from India. Rec. Zool. Surv. India, 68; 341-353.
20. **Wayne I. Anderson. Et.al. (1976):-** Demonstration of Eimeria tenella in bursa of fabricius of chickens. Avian Disease 20(4); 752-755.
21. **Ryley, J.F., R. Meade, J. Hazelhurt and T.E. Robinson (1976):-** Methods in coccidiosis research: separation of *Oocysts* from faeces. Parasitol. 73: 311-26.
22. **Krishmurthy, R.andBhosale, V.M. (1976):-** A preliminary report on a incidence of coccidia in bird of Mathura state .Symp.Mod. Trends in zool. Res, Calcutta, 62 (Abstract).
23. **Krishnamurthy and Kshirsagar, H.S. (1976):-** Incidence of coccidia in the Goat of the Marathwada region of Maharashtra state .Marathwada Univ. J.Sci. 15; 153-156.
24. **Ruff M.D. et.al. (1981):-** Effect of aging on survival and pathogenesity of *Eimeria acervulina* and *Eimeria tenella*, Avian Disease Vol.25, No.3.
25. **Pablo S.Reyna et.al. (1982):- S**urvival of coccidia in poultry litter and reservoirs of infection. Avian Disease 27(2) 464-473.
26. **Davis, P.J., M.E.J. Barrât, M. Morgan, S.H. Parry, LR. Mec Donald, L.P. Joyner and P.L. Long. (1985):-** Immune response of chickens to oral immunization by trickle

infection with *Eimeria.* Research in Avian coccidiosis. Proc. Georgia Coccidiosis Conf. 18-20 November: 618-633.

27. **Al-Attar M.A. and Farnando M.A. (1987):-** Transport of Eimeria necatrix sporozoites in the chicken; effect of irritant injected intraperitonially. J. Parasit, 73(3) 494-502.
28. **Vincent McDonald and M.Elaine Rose (1987):-** *Eimeria tenella* and *Eimeria necatrix*; A third generation of schizogony is an obligatory part of the developmental cycle. J.parasit, 73(3); 617-622.
29. **Shaker, S.A. (1997):-** Taxonomical study of prevalent spp. of *Eimeria* in broiler chicks and comparison of immunocox (imported vaccine) and locally prepared vaccine against coccidiosis. M.Sc. (Hons.) Thesis, University of Agriculture, Faisalabad-Pakistan.
30. **McDougald L.R. et.al. (1997)**:- A survey of coccidia on 43 poultry farms in Argentina, Avian disease 41; 923-929.
31. **Getachew Gari1, Getachew Tilahun2 and Ph. Dorchies3 (2008**):- Study on Poultry Coccidiosis in Tiyo District, Arsi Zone, Ethiopia. International Journal of Poultry Science 7 (3): 251-256.