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Prevalence of caecal coccidiosis in backyard poultry

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Abstract

A study was conducted to investigate the occurrence of caecal coccidiosis in backyard chickens over a period of one year, samples were collected from in and around Jagtial District, Telangana State. Out of 428 backyard poultry, 113 (26%) cases were diagnosed with caecal coccidiosis. Diagnosis of caecal coccidiosis was done based on clinical signs, faecal examination, gross pathological lesions, and histopathological findings. Faecal samples collected from the caeca were examined by the direct smear method and representative caecal tissues were preserved in 10% neutral buffered formalin for routine histopathological processing with hematoxylin and eosin staining.

Clinically, affected birds showed bloody diarrhoea, pale comb and conjunctiva, anorexia, and depression. Gross lesions included enlarged, dark red, distended caeca with petechial and extensive haemorrhages and bloody contents. In some cases necrosis of the caecal wall with caseous material were observed. Microscopic examination revealed congestion, haemorrhages, mucosal erosion and severe destruction of the caecal mucosa with infiltration of inflammatory cells. Histopathological examination also revealed various developmental stages of coccidia. Based on characteristic lesions, the infection was identified as coccidiosis caused by *Eimeria tenella*.

Keywords: Caecal coccidiosis, *Eimeria tenella*, backyard chickens, histopathology, haemorrhages, faecal examination

Introduction

Backyard poultry farming is most popular in rural and resource poor areas of India, which plays an important role in rural livelihoods by providing a source of income, nutrition, food security, boosts up women and unemployed youth, and reduces the gap between demand and supply of poultry eggs and meat (Rajkumar *et al.*, 2021) ^[8]. One of the major constraints for productivity in backyard system is parasitic diseases. Due to poor sanitation, overcrowding, often causing immunosuppression and limited access to veterinary care which causes a high mortality rate and low production performance of desi birds. (Economic impact of chicken diseases and other causes of morbidity or mortality in backyard farms in low-income and middle-income countries: a systematic review and meta-analysis, 2024)

Among these parasitic diseases, Coccidiosis is caused by species of intracellular protozoan parasites belonging to the genus *Eimeria* (Phylum Apicomplexa) (Shirley, 1995) ^[9]. The major concern is caecal coccidiosis, caused by *Eimeria tenella*, which is highly pathogenic in backyard poultry. This species inhabits the ceca (rarely adjacent intestinal tissues), causing a severe disease characterized by severe haemorrhagic typhlitis resulting from extensive destruction of the caecal epithelium during the intracellular developmental stages of the parasite, with weight loss, emaciation, accompanied with high morbidity and mortality.

The life cycle of *Eimeria tenella* is direct and includes both asexual and sexual stages within the intestinal epithelial cells of the host. Infected birds shed unsporulated oocysts in their faeces, which sporulate under suitable environmental conditions such as warmth, moisture, and oxygen. Transmission occurs through ingestion of sporulated oocysts present in contaminated litter, feed, water, or soil in backyard poultry systems. Caecal coccidiosis in backyard poultry commonly affects young growing birds, particularly chicks between 3 to 8 weeks of age, as they have not yet developed adequate immunity. However, birds up to 12-16 weeks of age may also be affected under conditions of heavy environmental contamination, stress, poor nutrition, or inadequate management practices. Adult birds generally develop partial immunity, but can act as carriers and serve as a source of infection to susceptible younger birds. (McDougald, (2008) ^[6].

The parasite primarily infects the caeca of chickens, causing severe haemorrhagic enteritis. The disease is endemic in most of the temperate and subtropical regions where ecological and management conditions are favourable for sporulation of oocyst and development of the causative agent (Obasi *et al.*, 2006) [7].

The present study was undertaken to investigate the prevalence and pathological changes associated with caecal coccidiosis in backyard poultry.

Materials and Methods

In this present study, necropsies were performed on backyard chickens at the Department of Veterinary Pathology, College of Veterinary Science, Korutla, which were procured from in and around Jagtial District of Telangana State. A total of 428 birds were presented including local breeds, Vanasree, Aseel and Rajasri, of varying ages and of either sex. The diagnosis of coccidiosis is based on clinical signs, coprology, morphological and histopathological analysis. Prior to the necropsy, the clinical history of the birds were noted. A detailed postmortem examination was conducted. The Faecal samples from the caecum are subjected to the direct smear method, were adding a small quantity of faeces on a clean glass microscope slide, mixed with a few drops of water, mixed thoroughly and covered with a coverslip and examined under microscope. Gross lesions were recorded and representative caecal samples were collected in 10% neutral buffered formalin for histopathological examination. Routine histopathological technique was followed and sectioned at 5 µm thickness, and stained with hematoxylin and eosin (Luna, 1968) [5].

Results and Discussion

Caecal coccidiosis was diagnosed in 113 birds out of 428 backyard chickens. Clinically, the affected birds exhibited mucoid bloody diarrhoea, loss in weight gain, decreased feed and water intake, listlessness, pale combs & conjunctiva. On Gross examination, the carcasses were emaciated and dehydrated with pale breast muscles and in some carcasses soiling of feathers at the vent with bloody droppings were noticed.

The gross lesions were seen typically on the Caeca with dark red appearance, distended and ballooned (Fig. 1). On cut section of the caeca, bloody mass was noticed with severe haemorrhages on the caecal mucosa (Fig. 2). In some carcasses, petechiae were observed from serosa. Similar types of lesions were reported by M. Lakshmi Namratha *et al.* (2019) [4], Chandravathi, T *et al.* (2024) [1]. In some affected carcasses, the caecal contents were haemorrhagic and caseous with necrosis of mucosa were noticed. Direct Faecal smear examination revealed unsporulated, ovoid coccidial oocysts (Fig. 3).

Histopathological examination of the caeca revealed severe desquamation of enterocytes and destruction of the caecal architecture. Extensive mucosal erosion, villous atrophy and oedema. Multiple developmental stages of coccidia, including schizonts and oocysts with degeneration and necrosis were observed within the mucosa and submucosa (Fig. 4). Marked haemorrhages were present in the lumen, villi tips, and mucosa, accompanied by severe vascular congestion and intense infiltration of mononuclear cells, eosinophils, and plasma cells. In severe cases, complete mucosal erosion exposed the basement membrane, the

findings were in accordance with Yadala Ravi Kumar *et al.* (2019) [3]. The infection was identified as *Eimeria tenella* due to its typical localization in the caeca and the characteristic lesion pattern.

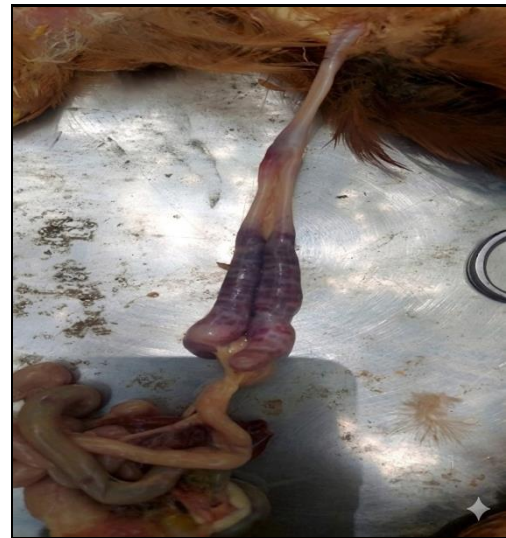


Fig 1: Distended and ballooned Caeca with unclotted blood.

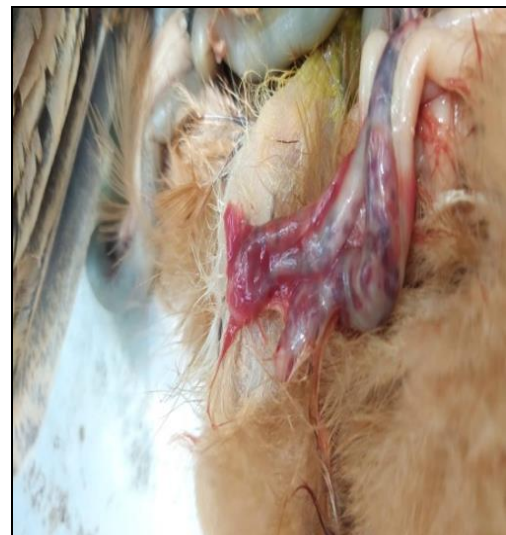


Fig 2: Cut section of the caeca revealed unclotted bloody mass.

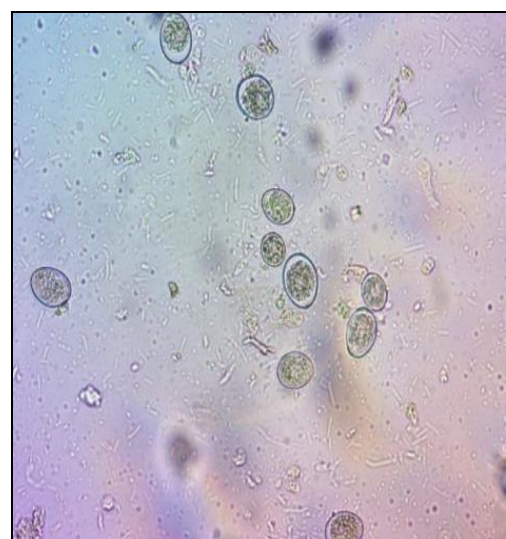


Fig 3: Direct Faecal smear examination revealed unsporulated, ovoid coccidial oocysts (40x).

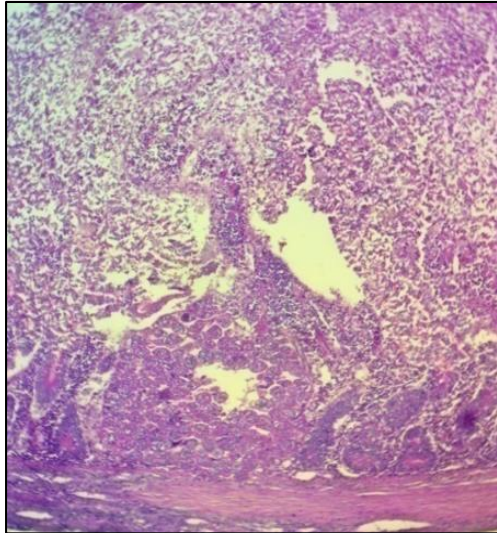


Fig 4: Microscopic picture of caeca revealed multiple developmental stages of coccidia, including schizonts and oocysts within the damaged mucosa and submucosa (H & E, 10x).

Conclusion

Based on detailed faecal, gross and histopathological study, the present paper described the occurrence of caecal coccidiosis in 113 backyard poultry (26%) was due to *E. tenella*.

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