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Short Communication

CONCURRENT INFECTION OF INTESTINAL COCCIDIOSIS AND *ASCARIDIA GALLI* IN NATIVE ASEEL CHICKENS (*GALLUS DOMESTICUS*) FROM VILLUPURAM DISTRICT, TAMIL NADU, INDIA

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ABSTRACT: Disease investigation was made in a native chicken farm with 150 numbers of 12 weeks old Aseel chickens kept in Iruvelpattu village, Villupuram district of Tamil Nadu. Clinical signs like dullness, inappetance, brownish diarrhoea in few birds and mortality of 5 birds within a span of 3 days were reported (3.33%). Necropsy examination of dead birds revealed that emaciated carcass, soiling of vent with reddish droppings, swelling of small intestine with haemorrhages and also duodenum with cylindrical worms. Examination of small intestinal contents and mucosal scrapings confirmed numerous unsporulated oocysts of *Eimeria* sp. and eggs of *Ascaridia galli*. The adult roundworms were identified as *Ascaridia galli*. Examination of droppings from live birds also confirmed of *Eimeria* (23.33%) and *Ascaridia galli* eggs (26.66%). Based on the lesions produced in mid-small intestine, oocysts morphometry and sporulation time involved, it was identified as *Eimeria necatrix*. The present study reports for concurrent parasitic infections of *Eimeria necatrix* and *Ascaridia galli* and importance of specific treatment and deworming for endoparasites in native chickens.

Key words: Intestinal coccidiosis, *Eimeria necatrix*, *Ascaridia galli*, Aseel, Villupuram, Tamil Nadu.

Coccidiosis is an important intestinal protozoan disease, caused by *Eimeria* sp. in growing birds and characterized by enteritis, drooping wings, weakness, emaciation, weight loss and blood-tinged diarrhea. Intestinal coccidiosis is mainly caused by *Eimeria necatrix*, *E. acervulina*, and *E. maxima* whereas *E. tenella* and *E. brunetti* are responsible for caecal and rectal coccidiosis, respectively (Soulsby 1982).

Eimeria tenella and *E. necatrix* are considered to be the most pathogenic and important species in poultry. Lesions by *E. tenella* are mostly restricted to caecum, whereas *E. necatrix* and *E. maxima* produce marked lesions in the midgut of small intestine and *E. acervulina* mainly affects the anterior part of the small intestine (Soulsby 1982). Speciation of *Eimeria* can be done by nature and location of lesions caused during their multiplication phase, since different species tend to develop in different parts of the intestine in birds (Long *et al*. 1976).

Helminthic infections are also considered to be amongst the significant constraints in poultry industry especially in humid tropical climatic conditions (Deshpande *et al*. 2001). Further, domestic or backyard chickens owing to their scavenging habits, usually seek food in the superficial layers of the soil and drains that usually have variety of insects and earthworms serving as intermediate hosts for helminth parasites, thereby making them potential candidates to get infected (Biggaard *et al*. 1997). In this regard, *Ascaridia galli*, a common gastro-intestinal nematode has been recorded both in free-range backyard poultry and as well as in broilers and layers kept in intensive deep litter systems.

The present study reports a concurrent infection of *Eimeria necatrix* and *Ascaridia galli* in native Aseel chickens from Villupuram district of Tamil Nadu.

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The study

The present investigation was carried out in a native chicken farm containing 150 Aseel birds of 3 months of age maintained in semi-intensive system at Iruvelpattu village, Villupuram district of Tamil Nadu during October, 2018. The history included dullness, inappetance, brownish diarrhoea in few birds and death of five birds within three days time. The carcasses were presented for postmortem examination at Veterinary University Training and Research Centre, Villupuram, Tamil Nadu Veterinary and Animal Sciences University. Necropsy examination of carcasses was carried out as per standard protocol and findings were reported. The round worms were recovered during necropsy, collected in 70% ethyl alcohol and identified as per standard taxonomical keys after clearing with lactophenol solution for 10 minutes (Soulsby 1982).

Further, the intestinal haemorrhagic contents were also collected and were kept in 2.5% potassium dichromate solution in a petridish for sporulation of coccidian oocysts with aeration method as described by Soulsby (1982). Postmortem lesions were also recorded in all the birds presented for necropsy. Random faecal swabs were also collected from the ailing birds and examined microscopically for the presence of endoparasitic infections, if any.

In the present study, necropsy findings revealed emaciated carcasses, with reddish droppings soiling the vent region. The small intestine revealed cylindrical roundworms measuring about 3-4 cm in length along with ballooning of the mid portion of small intestine containing haemorrhagic contents and haemorrhagic mucosa (Fig. 1 and Fig. 2). The worms were identified as *Ascaridia galli*. Morphology of anterior end of the worm revealed one dorsal lip and two subcentral lips and an esophagus without a posterior bulb (Fig. 3). Male worm's posterior end had sub-equal spicules, pre-cloacal circular chitinous sucker and papillae (Fig. 4). Posterior half of the female worms showed eggs in uterus (Fig. 5) and the tapered end with a cloacal opening as described by Soulsby (1982). Microscopic examination of the intestinal contents revealed oval shaped eggs with thick, smooth shell, measured 74 µm x 50 µm and were confirmed as the eggs of *Ascaridia galli* (Fig. 6).

These findings are in concordance with the reports of Katoch *et al.* (2012) who found that *Ascaridia galli* (29.6%) was the most prevalent helminths followed by *Heterakis gallinarum* (24.0%) and *Raillietina* sp. (19.2%) in the backyard chickens from Jammu, India. Further, Gopal *et al.* (2015) also reported *Ascaridia galli* from backyard birds from Navsari, Gujarat, India.

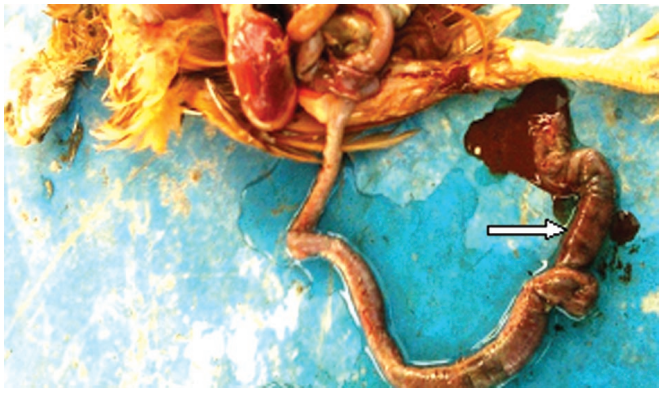

Fig. 1. Post mortem findings - Intestinal Coccidiosis in chicken.

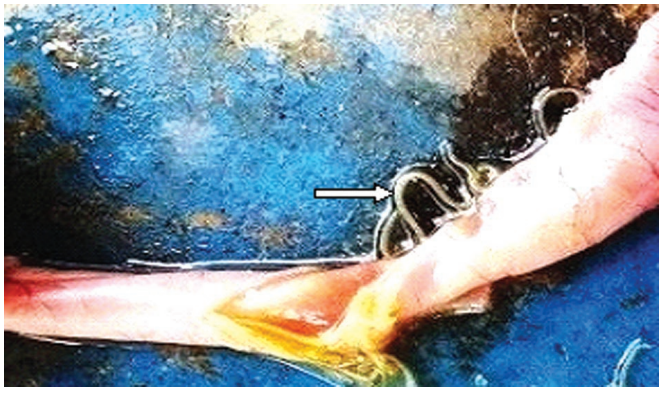

Fig. 2. Post mortem findings - *Ascaridia galli* (arrow) in the small intestine of chicken.

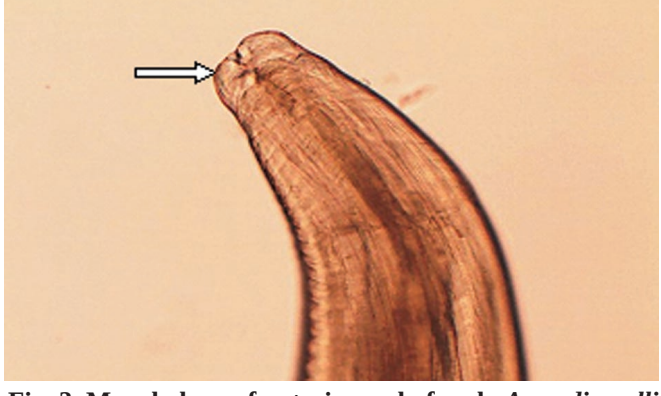

Fig. 3. Morphology of anterior end of male *Ascardia galli* showing one dorsal and two sub-ventral lips.

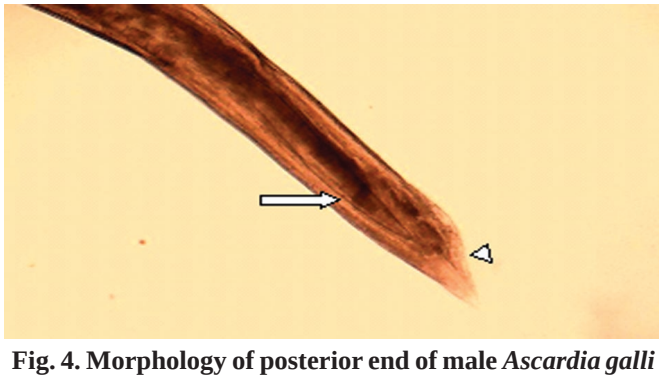

Fig. 4. Morphology of posterior end of male *Ascardia galli* with spicules (arrow) and cloacal papillae (arrowhead).

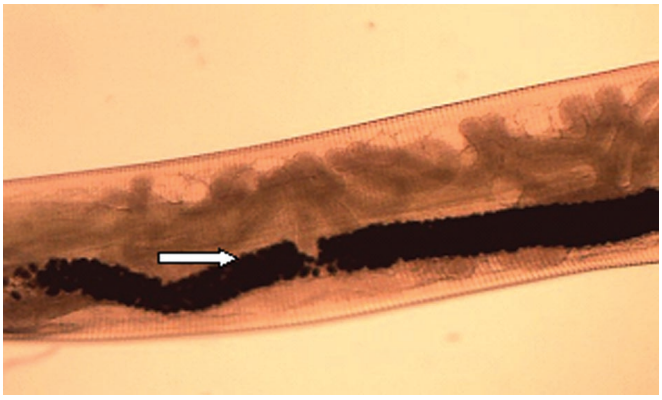

Fig. 5. Morphology of posterior half of female *Ascardia galli* with eggs inside uterus (arrow).

Fig. 6. Egg of *Ascardia galli* from intestinal contents of chicken (X400).

The small intestinal scrapings and carcasses contents upon examination confirmed the presence of unsporulated oocysts of coccidian parasites with ovoid shape and smooth wall (Fig. 7 and Fig. 8) while sporulation confirmed these to be *Eimeria* sp. The oocysts were ovoid shaped with smooth wall and measured size of 16 µm x 14 µm, micropyle was absent and the sporulation time was 48 hours. Based on enlargement and lesions in jejunum portion of small intestine, haemorrhagic intestinal contents and micrometry measurements of oocysts, it was suggestive to be a case of intestinal coccidiosis caused by *Eimeria necatrix* as described by Soulsby (1982). The distended small intestine of dead birds revealed white and red focal lesions on the serosal layer particularly in the jejunum along with necrosis and

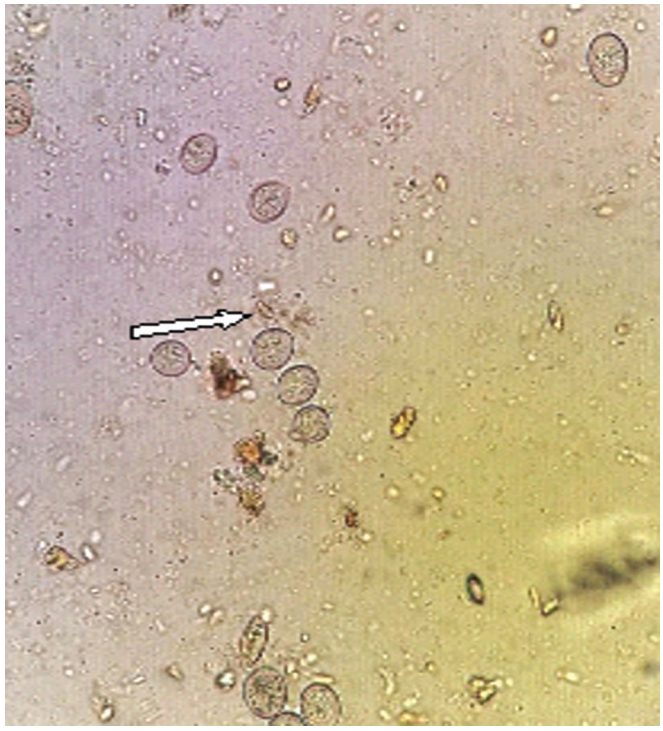

Fig. 7. Unsporulated oocysts of *Eimeria necatrix* from intestinal scrapings of chicken (X400).

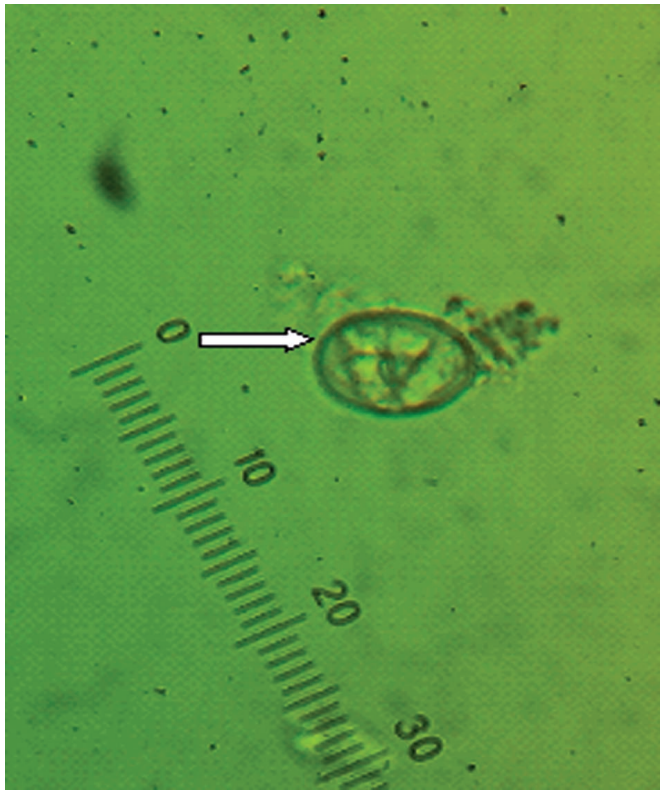

Fig. 8. Sporulated oocyst of *Eimeria necatrix* with 4 sporocysts inside (X400).

sloughing of intestinal mucosa that occurs mainly due to *E. necatrix* infection and is also in line with the observations made by David (2000) and Saravanajayam *et al.* (2016).

In the present report a mortality rate of 3.33% was recorded and the prevalence of *Ascaridia galli* and unsporulated oocysts of *Eimeria necatrix* was 26.66% and 23.33%, respectively. Annapurna *et al*. (2016) reported that 39.87 % prevalence of *Eimeria* sp. and 14.79 % prevalence of round worms including *Ascaridia galli*, *Heterakis gallinarum* and *Capillaria* sp. in desi-birds from Andra Pradesh. Also, high morbidity and moderate mortality (7.5%) due to intestinal coccidiosis caused by *Eimeria necatrix* in 12 weeks old desi-chickens maintained in deep litter system at Perambalur district of Tamil Nadu has been reported by Saravanajayam *et al.* (2016). Compared to present findings, a higher mortality of 10.0% in 7 weeks old Kairali desi-chickens due to *Eimeria necatrix* infection has been reported from Ramnathapuram district of Tamil Nadu by Vijayalingam *et al.* (2019). These variations in mortality might be due to housing management of a greater number of birds in a farm, climate in the area, age and nutritional status of the birds.

The poultry farmers were advised treatment for coccidiosis with sulphadimidine @ 0.2% in drinking water for 3 days and deworming with mebendazole @ 30 mg/kg body weight to reduce the mortality. Mineral and vitamin supplementations were also advised to be given in the feed for a better response.

Deep litter system of rearing of poultry reported more of coccidian infections compared to birds maintained in cage system of housing. Generally rainy season, humidity and temperature inside the farm are more conducive for sporulation and spread of coccidian oocysts in the litter floor itself. Similarly, semi-intensive system and backyard poultry rearing also make the birds highly susceptible to parasitic infection through the litter droppings and availability of infective stages of parasites on the ground.

Conclusion

The present study reports a concurrent infection of *Eimeria necatrix* and *Ascaridia galli* in the native Aseel birds maintained in semi-intensive system. Hence, it may be concluded that anticoccidials and deworming is essential in chickens reared under semi-intensive system. The occurrence of both helminthiasis and intestinal coccidiosis resulted in mortality of Aseel birds in the farm.

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