Short Communication

MIXED INCIDENCE OF GASTRO-INTESTINAL PARASITOSIS IN A SINGLE SMALL RUMINANTS FLOCK

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ABSTRACT

A small ruminant flock of 19 Non-descript Goat and 9 Ramnad White Sheep were investigated for the complaint of anorexia, voiding of diarrhoeic watery faeces and sudden death of two lambs on previous day of presentation. Faecal samples were collected from the flock and subjected for routine parasitological examination. Microscopic examination of the faecal samples revealed mild to severe infection of Eimeria spp., Amphistome, Haemonchus contortus, Moniezia expansa and Trichuris spp. Mixed infection with 4 parasitic stages was observed in 6 (21.42%) animals, mixed infection with 3 parasitic stages in 8 (28.57%) animals, mixed infection with 2 parasitic stages in 12 (42.85%) animals were found. Eimeria spp. oocysts in faecal samples were further confirmed after sporulation using 2.5% potassium dichromate solution. Haemonchus contortus larvae were identified from faecal samples by culture using the jar method. Morphometry of oocysts, parasite eggs and larvae were also carried. Incidence of single parasite species infection was not recorded in this flock.

Keywords: : Amphistome, *Eimeria spp*., goat, mixed parasitosis, sheep.

Received : 27.05.2025 Revised : 03.02.2026 Accepted : 13.02.2026

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INTRODUCTION

Gastrointestinal parasitism remains a critical constraint to small ruminant production globally, with a pronounced impact in tropical and subtropical regions of the world. These infections compromise animal health, reduce productivity and inflict substantial economic losses on rural livestock-dependent economies. Among the various parasites, *Haemonchus contortus* (a hematophagous nematode), *Trichuris*

spp. (whipworms), *Eimeria spp.* (protozoan coccidia) and amphistomes (rumen flukes) are frequently encountered in mixed infections, especially under traditional grazing systems and in small holder flocks (Tyasi *et al.*, 2015).The mixed parasitic burden is exacerbated in small ruminants due to factors such as poor nutritional status, communal grazing, lack of strategic deworming and environmental conditions favourable to the development of parasitic stages (De and Sanyal, 2009). India, with its extensive sheep and goat population, provides a conducive habitat for the propagation and persistence of these parasites across diverse agro-climatic zones. Studies in Punjab, Maharashtra, Rajasthan and Himachal Pradesh have reported concurrent infections with Haemonchus, Trichuris, amphistomes and coccidia underscoring their ubiquitous presence in Indian flocks (Kalwaghe, 2020). The population dynamics of these parasites are further influenced by climatic factors. Warm and humid environment facilitate the development of free-living larval stages and sporulation of protozoan oocysts, which is why peak prevalence are commonly observed during monsoon and post-monsoon seasons (Kuchai *et al*., 2011). Additionally, widespread and often indiscriminate use of anthelmintics has led to increasing reports of drug resistance, particularly against *H. contortus*, necessitating more integrated and evidence-based parasite management strategies (De and Sanyal, 2009). The epidemiology of these parasites is influenced by host, environmental and management factors. Seasonal dynamics, grazing behaviour and regional parasitic load patterns shape infection rates and severity. For instance, monsoon and post-monsoon seasons are typically associated with higher parasite burdens due to increased moisture facilitating larval development and oocyst sporulation (Singh, *et al.,* 2017). This study investigates the co-occurrence and incidence of *Eimeria spp*., amphistomes, *Trichuris sp*., Moniezia expansa and Haemonchus contortus in a single small ruminant flock.

MATERIALS AND METHODS

A small ruminant flock containing twenty-eight animals (19 non-descript goat and 9 Ramnad White sheep) of 3 months to 1.5 yrs were seen exhibiting clinical signs of anorexia, diarrhoeic and watery faeces and was investigated following the sudden death of two lambs. A history of irregular and inadequate deworming practices was observed in the flock. Faecal samples of 9 sheep and 19 goats were collected separately in 70 per cent ethanol for parasitological analysis. Faecal samples positive for endoparasites were subjected to quantitative analysis (Soulsby, 1982) using McMaster's counting chamber for evaluating oocysts per gram of faeces (OPG).Faecal samples positive for coccidial oocysts were suspended with 2.5% potassium dichromate solution in Petridish and filtered through a 1 mm sieve to remove the coarse debris. The contents were kept under aerated condition in room temperature for 2 to 4 days to facilitate the sporulation of oocysts. A drop of content was examined under microscope after 2 days for confirmation of sporulation (Venkateswara Rao *et al*., 2015). Faecal culture was performed using the Jar method, in which the samples were incubated at

room temperature in dark conditions for a period of 7 days to allow the development of strongyle larva from eggs and its identification.Blood samples were collected aseptically from the jugular vein of affected animals for haemato-biochemical analysis. The analyses were conducted following standard laboratory protocols as described by Coles (1986).

RESULT AND DISCUSSION

The faecal analysis of affected animals revealed a mixed parasitic infection comprising eggs of amphistome, strongyle, *Trichuris sp., Moniezia expansa* and unsporulated oocysts of *Eimeria spp.* Amphistome eggs were oval to ellipsoidal shaped, large with distinct operculum and measuring approx. 140–180 µm in length and 70–100 µm in width (Fig. 1). Trichuris spp. eggs were oval-shaped with characteristic bipolar plugs and measured 50–56 µm by 22–24 µm (Fig. 2). The eggs of Moniezia expansa were triangular with pyriform apparatus, measuring around 55–75 µm in diameter (Fig. 3). Strongyle eggs were characterized by oval shaped, thin-shelled with segmented yolk, measuring 60–80 µm by 35–45 µm (Fig. 4). The unsporulated oocysts of Eimeria spp. were ovoid in shape and ranged between 18–30 µm in length and 15–25 µm in width (Fig .5).

The sporulation of positive faecal sample revealed sporulated oocysts of Eimeria species on the fourth day. Morphometric examination of the oocysts revealed the presence of ellipsoidal, brownish tinged oocysts *Eimeria intricata* measuring 54 × 35 µm size (Fig. 6), ovoid shape oocysts *Eimeria ovina* measuring 30 × 18 µm size with polar cap (Fig. 7) from sheep and ellipsoidal oocysts *Eimeria arloingi* measuring 27 × 20 µm size with micropyle and distinct polar cap (Fig. 8) from goats, in accordance with established identification keys. In addition, faecal culture using the jar method led to the identification of third-stage strongyle larvae (L3) as *Haemonchus contortus.* Haemato-biochemical analysis of affected animals indicated anaemia, evidenced by significantly reduced haemoglobin (5.2–7.1 g/dL), low packed cell volume (17–22%) and decreased total RBC counts (4.5–7.0 × 10^6/µL). Biochemical findings revealed hypoproteinemia (total serum protein 4.2–5.6 g/dL) with concurrent hypoalbuminemia (2.0–2.8 g/dL), suggestive of protein-losing enteropathy likely associated with parasitic gastrointestinal damage. This data clearly indicates that polyparasitism was the dominant pattern within the flock. Notably, all infected animals harboured two or more gastrointestinal endoparasites, with no instance of single-parasite infection observed. The most frequently encountered combination was Eimeria spp. and strongyle-type eggs, affecting 42.85 percent of the animals, suggesting a widespread environmental contamination and presence of these parasites. Additionally, 28.57 percent of the animals were co-infected with Eimeria spp., amphistome eggs and strongyle-type eggs reflecting a complex parasitic burden.

The current findings confirm a high level of polyparasitism in small ruminants,

with concurrent infection by *Eimeria spp.*, Haemonchus contortus, strongyle-type nematodes, *Trichuris sp*., amphistomes and *Moniezia spp*. The absence of mono-infections and the predominance of complex parasitic combinations, especially *Eimeria spp*. and strongyles (42.85%) indicate extensive environmental contamination and ineffective deworming strategies in the management system. Paramphistomosis is a parasitic disease that affects both domestic and wild ruminants, caused by trematode worms of the family Paramphistomidae. This infection poses a significant threat to the livestock sector by leading to substantial economic losses due to decreased productivity, including reduced weight gain, poor feed conversion and lower milk or meat yields (Soulsby, 1982) According to Hossain *et al*. (2015), the highest prevalence of amphistome infections in small ruminants was recorded in Bangladesh. Similarly, in Andhra Pradesh, India, a prevalence rate of approximately 21.5% was reported (Srinivasarao *et al.*, 2024), indicating that amphistomosis remains a major health concern for ruminant populations in tropical and subtropical regions. *Moniezia expansa* is a common cestode parasite in sheep and goats, residing in the small intestine and interfering with nutrient absorption. This often leads to stunted growth, poor weight gain and digestive disturbances. In Andhra Pradesh, a prevalence of *Moniezia spp*. was recorded at 5 per cent (Srinivasarao *et al.,* 2024), while in Bangladesh it was 2.27 per cent (Bhowmik *et al.*, 2020). Transmission occurs via infected oribatid mites present in the pasture. On the other hand, *Trichuris sp.* which affect the caecum and colon, cause chronic colitis, diarrhoea, anaemia and decreased feed efficiency. Prevalence of *Trichuris sp.* infection in Andhra Pradesh was noted at 1.9 per cent (Srinivasarao *et al.*, 2024) and in Bangladesh, it was 0.91 per cent (Bhowmik *et al*., 2020).

The identification of *Eimeria oocysts*, *Eimeria intricata* (54 × 35µm), *E. ovina* (30 × 18 µm), and *E. arloingi* (27 × 20 µm) aligns with previous Indian reports of *Eimeria* infections as significant contributors to enteric disease in small ruminants. A study in Tamil Nadu reported *Eimeria* prevalence ranging from 38–45 per cent in kids and lambs, especially in over crowded and humid housing conditions (Velusamy *et al.,* 2015; Srinivasarao *et al.,* 2024). Specifically, *Haemonchuscontortus* is known for its high pathogenicity, rapid reproduction and drug resistance, making it the most prevalent and economically important nematode in small ruminants of India (Tiwari *et al.,* 2017). The prevalence of *haemonchosis* in a given region is determined by a complex interaction of factors involving the host, the parasite itself, and environmental influences (Singh *et al.*, 2014). *Haemonchus* species are hematophagous parasites known to cause anaemia and decreased productivity, and in cases of heavy infection, may even lead to mortality. It has been observed that *Haemonchus contortus* possesses a high reproductive capacity, enabling it to quickly become the dominant gastrointestinal parasite when pasture conditions support the development and survival of its free-living larval stages (Soulsby, 1982). This study found a significant incidence of coccidiosis in small ruminants, presumably due to the

management practices, particularly during the rainy season when animals are kept in a confined area to avoid damage to crops (Velusamy *et al.*, 2015). As a result, these animals are squeezed in pens that are not cleaned routinely. These variables, together with excessive humidity during the rainy season, increase the risk of parasite diseases.

Based on the findings, a targeted therapeutic protocol was implemented, which included a combination of Rafoxanide and Levamisole @ 1 ml/3 kg body weight orally on the initial day for effective anthelmintic coverage. For control of coccidiosis, the supportive therapy included injection Sulfathiazole and Trimethoprim @ 25 mg/kg body weight intramuscularly, injection of Vitamin B_1, B_6, B_{12} @ 1–2 ml per animal intramuscularly for 5 days and Liv-52 tonic @ 2–5 ml twice daily orally for 10 days to aid liver function and uneventful recovery.

Fig.1. Ova of Amphistome (x400)

CONCLUSION

The study highlights the complex transmission dynamics of gastrointestinal parasitism in small ruminants, where mixed infections are more prevalent than isolated ones. Factors such as poor deworming practices, contaminated grazing environments and inadequate nutritional and health management contribute significantly to the persistence and spread of parasitic burdens within flocks. Effective control requires a combination of strategic deworming, improved pasture hygiene, regular monitoring and supportive nutritional management.

ACKNOWLEDGEMENT

The authors are thankful to the Dean, Veterinary College and Research Institute (VC & RI), Orathanadu for facilities rendered to carry out this study

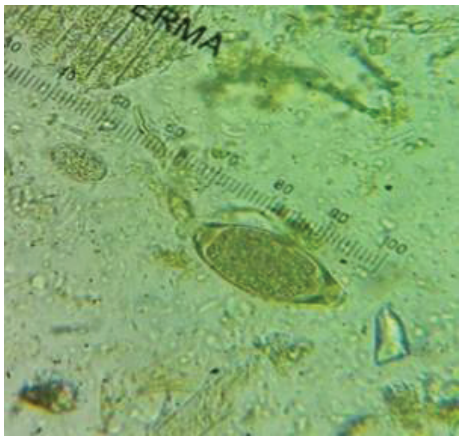

Fig.2. Ova of *Trichuris sp.* (x400)

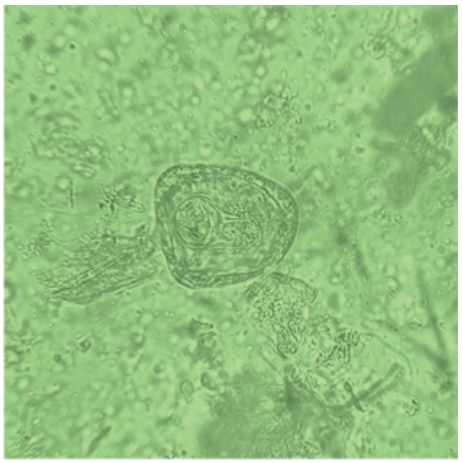

Fig. 3. Ova of *Moniezia expansa* (x400)

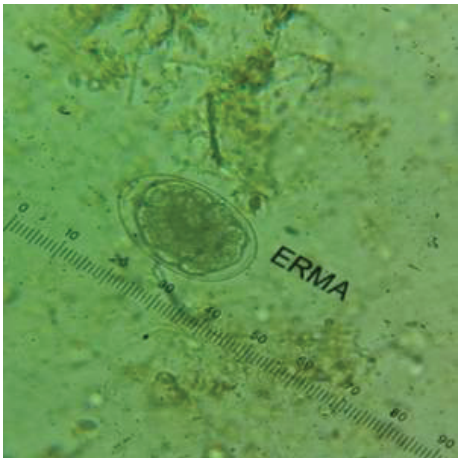

Fig. 4. Ova of Strongyle spp (x400)

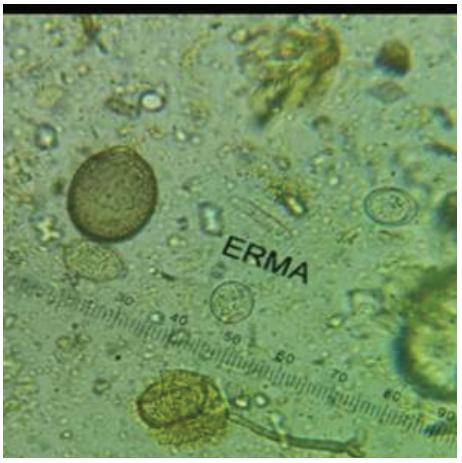

Fig.5. Unsporulated oocysts of *Eimeria spp*

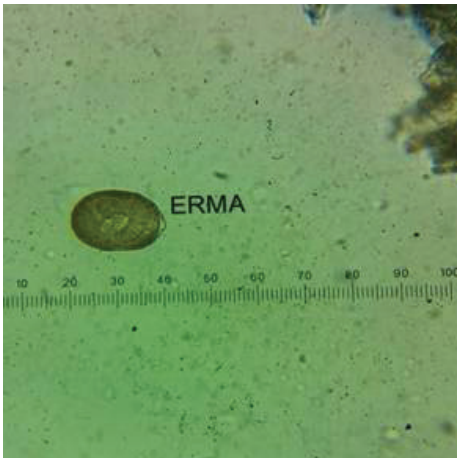

Fig.6.Sporulated oocyst of *Eimeria intricata* (x400)

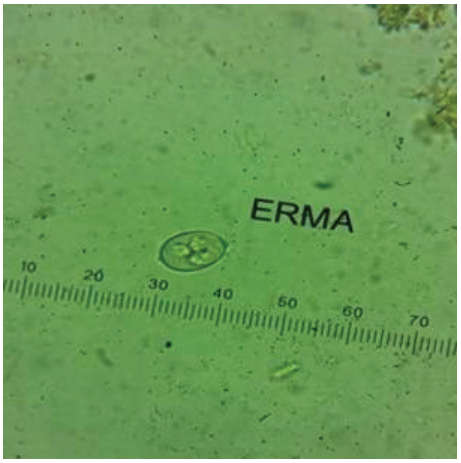

Fig.7.Sporulated oocyst of *Eimeria ovina* (x400)

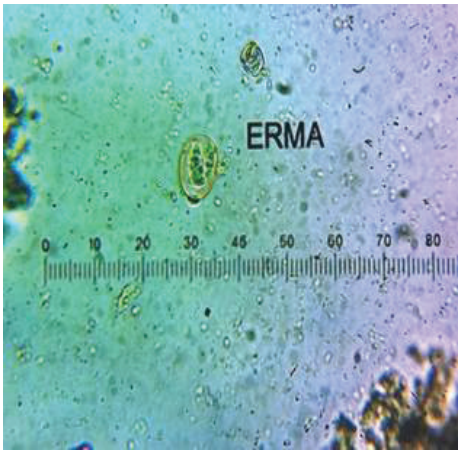

Fig.8. Sporulated oocyst of *Eimeria arloingi* (x400)

Fig.9. Larva (L3) of *Haemonchus contortus* with kinked tail

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