Short Communication

CONCURRENT INFECTION OF *MONIEZIA EXPANSA* AND *HAEMONCHUS CONTORTUS* IN GOATS AND ITS THERAPEUTIC MANAGEMENT

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ABSTRACT

Goats are highly susceptible to endoparasitic infections due to free grazing habits. The present study was reported for concurrent infection of Moniezia expansa and Haemonchus contortus in two goats from a flock of 40 goats in Orathanadu, Thanjavur. History included anorexia, foetid diarrhoea and jowl edema in goats. On clinical examination, pyrexia, pale conjunctival mucous membrane, pasty diarrhoeic faeces, bottle jaw and abdominal thudding were noticed. Coproscopy revealed Moniezia expansa eggs and strongyle eggs and faecal culture revealed Haemonchus contortus larvae. Uneventful recovery was noticed in goats after treating with praziquantel and fenbendazole for 3 days with supportive therapy.

Keywords: Goats, *Haemonchus contortus*, *Moniezia expansa,*

Received : 30.12.2023 Revised : 21.02.2024 Accepted : 16.09.2024

INTRODUCTION

Goat farming is one of the most profitable animal husbandry in rural areas which is also known as moving banks for the farmers since it provides consistent income round the year. Endoparasites adversely affect the goats and act as a severe threat to goat farming. Goats are easily susceptible to intestinal parasites since extensively used in free grazing of pasture (Soulsby, 1982). Pathogenic cestode and nematode infections diminish wool and meat production in small ruminants across the continents (Arsenopoulos *et al*., 2021). The production potential of sheep and goats as well as the financial stability of the marginal farmers will be enhanced by prevention and control initiatives against

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parasites in endemic areas (Velusamy *et al.*, 2015).

Helminth parasites affected animals will typically exhibit sub-mandibular oedema, anaemia, poor weight gain, inappetence and diarrhoea (Underwood *et al*., 2015). Strongyle nematodes are considered as one of the extremely pathogenic and economically significant parasites affecting small ruminants (Jurasek *et al*., 2010). Endoparasitic infection is primarily by faeco-oral route and has also been observed in goats from delta region (Jayalakshmi *et al.*, 2022). Concurrent helminthic infection has to be dealt with great concern and attention towards deworming in small ruminants (Saminathan *et al*., 2015; Alam *et al*., 2020). The present study is discussed about the mixed helminthic infection of *Moniezia expansa* and *Haemonchus contortus* in goats and their successful management.

MATERIALS AND METHODS

Case history

A year old, two non-descript goats, weighing 11-12 kg from a flock of 40 goats were presented to Small Ruminant Clinics, Veterinary Clinical Complex, Veterinary College and Research Institute, Orathanadu, TANUVAS, Thanjavur during November' 2022 with the history of anorexia, foetid diarrhoea and jowl oedema since 4 days. There was no history of deworming in animals as reported by the goat flock owner. Clinical examination of animals was carried out for further diagnosis.

Coprological examination

Dung samples were collected directly from the rectum of goats. Macroscopic examination showed a few grey to yellow cestode segments measuring 0.5 cm in size. Dung samples were processed with standard methods of faecal examination as per Soulsby (1982). Concentration methods (floatation and sedimentation) were followed for the qualitative examination of faecal samples for parasitic helminths eggs/ coccidian oocysts. Identification of helminths eggs was based on the standard taxonomical keys given by Soulsby (1982). Dung samples were also kept for faecal cultures by jar method to develop the larvae from eggs in a dark place at room temperature for a week. Identification of strongyle larva was based on morphological keys by Van Wyk *et al.* (2004) and Singh *et al*. (2016).

Haematological analysis

Approximately 4 ml of blood samples were collected from the jugular vein of each goat and from that 2 ml was transferred to a sterile tube containing ethylene diamine tetra-acetic acid (1mg/ml of blood) for haematological parameters and the rest was transferred to vacutainer for serum separation. Centrifugation was carried at 1200 rpm for 3 min. for serum separation and was transferred to 1.5 ml sterile tubes and stored at -20°C. Haemoglobin, total erythrocyte count, total leukocyte count and differential leukocyte counts were recorded for the samples from both the animals as described by Radostits *et al.* (2007). Peripheral blood smears were

also examined by Romanowsky's staining (Giemsa's stain) method for identification of any haemo-parasites.

Serum biochemical analysis

Serum obtained was utilized for estimation of biochemical parameters using semi-automated biochemical analyzer (Biosystem, Barcelona, Spain). Biochemical parameters like glucose, total protein, albumin, globulin, alanine transaminase (ALT), potassium, sodium and calcium were recorded (Varley, 1975).

RESULTS AND DISCUSSION

Endoparasitic infections in these goats resulted in their lower body weight. Clinical examination of goats revealed pale conjunctival mucous membrane, pyrexia of 40°C bottle jaw condition (Fig.1a & 1b), pasty diarrhoea voided by animals and soiled perineal region. Abdominal thudding was recorded in both the animals on auscultation method. Macroscopic examination of dung samples revealed 0.5 cm size gravid segments of *Moniezia expansa* which was identified based on the morphological characteristics of eggs present inside the segments. *M. expansa* eggs were triangular in shape measuring 62 µm in diameter, possessing pyriform apparatus with hexacanth embryo inside (Soulsby, 1982). Recently Nagarajan *et al.* (2022) also identified the *Moniezia expansa* worms in sheep flocks from Mannavanur, Palani hills, Tamil Nadu by adult tapeworm's morphological and molecular analysis.

In this study, Coprological examination of both the goat's dung samples revealed strongyle eggs (Fig.2) and *Moniezia expansa* eggs (Fig.3). Jar method of faecal culture revealed L3 larval stages with kinking of tail sheath characteristic to *Haemonchus contortus* (Fig. 4). All the larval stages obtained from the faecal culture were of *Haemonchus contortus*. The prevalence rate of endoparasites was high in goats during the summer months when there was deficiency of fodder production and animal starts its grazing nearby pond region where the parasitic intermediate hosts like snails and grass mites were present at their normal habitat because of the moisture and availability of grasses. *Moniezia expansa* infection is mildly pathogenic in adult animals and highly pathogenic in young animals. In this study, both the goats showed pasty diarrhoea due to the parasitic infections.

Gravid segments of *Moniezia* looked like cooked rice grain appearance in dung samples (Soulsby, 1982). In case of strongyle infections, the animals showed diarrhoea and emaciation. Haematology revealed anaemia as given in Table.1 (Haemoglobin as 5.1 - 6.6 g/dl, total erythrocyte count as 4.4 to 4.6 million/µl) as reported by Soulsby, (1982) and Kelkele *et al.* (2012). Peripheral blood smear examination revealed no haemo-parasites. Serum biochemistry revealed low glucose level (35 - 40 mg/dl), hypoproteinemia (5.6 - 5.9 g/dl) and electrolytes in normal range which were in relation with previous reports by Kelkele *et al.* (2012), Tehrani *et al*. (2012) and Alam *et al*. (2020).

Table 1. Haematological and serum biochemical values for the goats

Haematological parameters				Biochemical parameters			
Parameters	**Resul** (Goat 1)	**Result** (Goat 2)	**Reference value** (Radostits *et al.*, 2007)	**Parameters**	**Result** (Goat 1)	**Result** (Goat 2)	**Reference value** (Radostits *et al.*, 2007)
Haemoglobin (g/dl)	5.1	6.6	8.0-12.0	Glucose (mg/dl)	35	40	50-75
Total erythrocyte count (10^6/µl)	4.6	4.4	8.0-18.0	Total protein (g/dl)	5.6	5.9	6.4-7.0
Total leukocyte count (10^3/µl)	7.2	6.8	4.0-13.0	Albumin (g/dl)	3.2	2.9	2.7-3.9
Neutrophils %	31	42	30-48	Globulin (g/dl)	2.7	2.7	2.78-4.16
Lymphocytes %	24	26	50-70	ALT (U/l)	6.3	5.9	6.0-19.0
Monocytes %	30	21	1-4	Potassium (mmol/L)	5.7	5.0	3.5-6.7
Eosinophils %	15	10	3-8	Sodium (mmol/L)	149.5	142.4	142-155
Basophils %	0	1	0-2	Calcium (mg/dl)	9.6	8.8	8.9-11.7

Fig. 1(a) & 1(b). Bottle jaw condition in goats presented from the flock

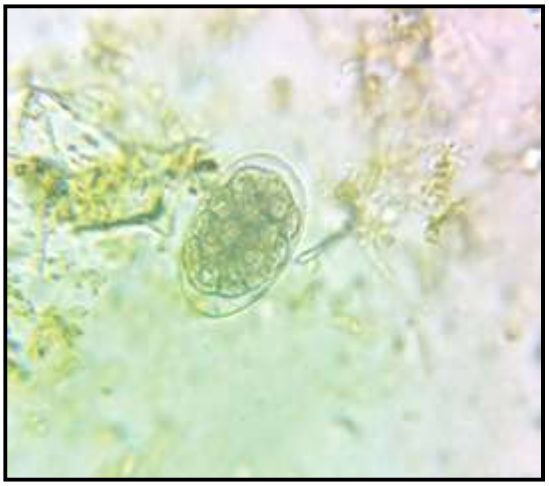

Fig. 2. Strongyle egg in goat faeces (x400)

Fig. 4. *Haemonchus contortus* larva from faecal culture (x400)

Fig. 3. Moniezia expansa egg in goat faeces (x400)

The goats were confirmed as affected with mixed infection of both cestode and nematodes. They were treated with praziquantel at a dose of 3.5mg/kg b.wt. orally and fenbendazole (15 mg/kg b.wt.) for subsequent 3 days and also supported with fluid therapy and supportive B complex injections along with antibiotic to prevent any secondary bacterial infections. On re-evaluation of the goats after a week, there was no parasitic eggs found in the dung samples and there was reduced oedema on the mandibular region and progressive recovery of the animals were evident. Similarly the other goats in the flock were also considered for deworming with fenbendazole.

CONFLICT OF INTEREST

The authors do not have any conflict of interest for this article.

ACKNOWLEDGEMENT

The authors are thankful to the Dean, Veterinary College and Research Institute, Orathanadu, TANUVAS, Thanjavur for the facilities provided to carry out this study.

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