CASE REPORT
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GASTROINTESTINAL AND HAEMOPROTOZOAN PARASITIC INFECTION IN GOAT UNIT OF LIVESTOCK FARM COMPLEX PALAMPUR, HIMACHAL PRADESH- A CASE REPORT

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ABSTRACT

The present study was conducted to assess the prevalence of gastrointestinal and haemoprotozoan parasitic infection of goat. A total of 23 faecal samples were collected and examined by direct smear and floatation technique. The sedimentation and floatation examination of the faecal samples revealed the presence of strongyles, *Trichuris, Moniezia*, amphistome *egg* and coccidian oocysts in fifteen animals. Overall 23 samples were screened for the presence of haemoprotozoa by Giemsa stain out of which one animal were found positive for anaplasmosis and one for theileriosis. The significant improvement was observed in the health status of the herd after one month showing that appropriate treatment and management is effective to control gastrointestinal parasitism in small ruminants and screening is important for early diagnosis of haemoprotozoan infection and control.

Keywords: Goat; Intestinal parasites; Haemoprotozoan parasites; Anaplasmosis; Theileriosis

INTRODUCTION

Goats are contributing significantly to the economy of India in terms of meat, wool, fibre, hides, etc. and they can sustain under low input resources and harsh environmental conditions. Small ruminants are highly exposed to variety of parasitic infections including gastro- intestinal (GI) parasitism and haemoparasitic infections like anaplasmosis, theileriosis and babesiosis (Maske *et al*. 1990). The parasites are a major constraint for livestock production and are responsible for acute infections with a rapid onset and high mortality levels and chronic infections, which are commonly subclinical and may lead to insidious and important economic losses by reducing growth, body weight gain and milk yield (Panigrahi *et*

al., 2014; Maharana *et al*., 2016). Various gastrointestinal parasites like coccidian, strongyles and amphistomes *spp.* have been reported in tropical and temperate climatic conditions such as India, Bangladesh, South Africa, Sri Lanka, Italy, and Mongolia, with a prevalence rate ranging from 20 to 96% (Sharma *et al*., 2009; Gwaze *et al.,* 2009; Hassan *et al.,* 2011). Trematode (fluke) and cestode (tapeworm) also contribute to detrimental worm burdens in animals (Rahmann and Seip, 2006). In order for an anthelmintic strategy to be successful, in-depth knowledge of pathophysiology and epidemiology of the parasite is required. The grazing animals get constantly exposed to parasites and are thus being reinfected. The epidemiology of GI parasites in livestock varies depending on the prevailing climatic conditions and managemental practices followed locally (Krishnamurthy and D'souza, 2014).

Haemoprotozoan infections are very common in tropical and subtropical regions of world and cause major economic losses to the livestock industry (Velusamy *et al*., 2014) and mainly transmitted by ixodid tick, and these ticks are not transmitting the diseases to animals but also indirectly causes anaemia, hide damage and tick paralysis (Salih *et al.*, 2015; Jayalakshmi *et al*., 2018). Haemoparasitaemic animals are anaemic, emaciated and there is a substantial economic impact due to lower weight gain, productivity losses and poor reproductive performance (Matsumoto *et al.,* 2006).

CASE HISTORY AND OBSERVATION

The unexpected mortality of one Gaddi breed buck with theileriosis and similar symptoms like pyrexia in few animals, anorexia, reduced feed intake, emaciation, enlarged superficial lymph nodes, pale and icteric conjuctival mucus membrane, sudden and reduced growth performance of other goats, prompted authors to conduct detailed investigation of the parasitological burden with haematological parameters of goats in Gaddi goat units of maintained by Department of Livestock Farm Complex, CSKHPKV Palampur.

The present study in the goat unit comprised of 23 animals aged between 6 months to 3 years of both sexes. The animals were reared under semi-intensive feeding management and were left for 6–7 h for grazing on natural pastures. They were also fed ad lib with seasonally available fodders and concentrate mixtures.

Coprological studies

The faecal samples were collected per-rectally from all the animals (n = 23) of the herd in polythene bags (with individual identification number) and then transferred

to the Department of Veterinary Parasitology, Dr. G. C. Negi College of Veterinary and Animal Sciences, C S K Himachal Pradesh Krishi Vishvavidayalaya, Palampur for coprological examination for presence of parasitic egg by direct smear examination, floatation technique, sedimentation method as discussed by Soulsby (1982). The samples found positive for parasitic strongyle eggs were subjected to quantitative technique (McMaster egg counting technique) to get the EPG (eggs per gram of feces) (Soulsby 1982).

Examination of blood sample

The blood samples (n=23) were taken twice in sterile vacutainer tubes with heparin (Becton Drive Franklin Lakes, NJ, USA**)** for haematological analysis, pre and post (30 days) treatment for comparative analysis. The haematological analysis of the whole blood of all the animals including haemoglobin level (Hb), total erythrocyte count (TEC), total leukocyte count (TLC) and Mean Corpuscular value was carried out on haematology autoanalyzer, Mindray, China. The peripheral blood smears were stained with Giemsa stain for 25–30 min after methanol fixation for a minute. The stained blood smears were screened for haemoprotozoa under oil immersion microscope.

Collection of ticks

The ticks were collected from the goats. Permanent mounts were prepared for morphological characterisation (Walker *et al.,* 2003).

Statistical analysis: Statistical analysis of the data was by Student‘t’ test as per Snedecor and Cochran (1994) with the SPSS (1998).

TREATMENT AND DISCUSSION

Chemotherapeutic management

Clinically (EPG $\geq$ 2000 strongyle eggs) and sub clinically infected (EPG 200-800 strongyle eggs) were administered drug Fentas-Plus (combination of 1.5% fenbendazole and 0.5% praziquantel; INTAS Pharmaceutical Ltd; @ 5 mg/

Table 1. Haematological parameters (Mean ± SE)

Parameter	Pre treatment	Post treatment
Hb%	7.27±0.23	9.27±0.47
TLC* 10^9 / L	11.33±0.41	12.97±0.55
MCV%	17.93±0.77	16.86±0.65
TEC 10^{12}/ L	10.21^a ±0.62	13.55^b ±0.58

[a, b] Values with different superscripts in a row differ significantly (P<0.05)

kg for fenbendazole and 15 mg/kg body weight for Praziquantal) 1 tablet per 30 kg body weight of the animal and Tolzan Plus-L VET (Combination of Levamisole Hydrochloride (7.5 mg/kg body weight) 2.5% w/v and 3.4% Oxyclozanide (15 mg/kg body weight; MSD Animal Health, India) @ 3ml per 10 Kg of body weight group. Quantitative evaluation i.e. eggs per gram (EPG) of feces was determined by using McMaster technique (Soulsby, 1982) at 0 day and 21 day post treatment. A second dose of the anthelmintic was repeated after 14 days of first treatment. All affected animals were also treated with amprolium @ dose rate of 1g/30 kg body weight bid for 5 days.

The animals positive for anaplasmosis were treated with Inj. Oxytetracycline @ 20 mg/kg body weight in 500 ml normal saline I/V, Meloxicam @ 0.5 mg/kg b. wt. I/M and Belamyl @ 3 ml I/M were administered for five consecutive days along with supportive fluid therapy and haematinics. *Theileria* positive case-was treated with Inj. Buparvaquone @ 2.5 mg/kg b. wt. IM along with supportive therapy and haematinics.

Goats were showing inappetence, dullness with their head down past 3-4 days. Ten animals were having their hind quarter soiled with diarrheic faeces, whereas the consistency of the faecal matter of the rest of animals was normal. The conjunctival mucous membrane of the 13 animals was pale, whereas the mucous membrane of the rest of the animals was slight pink to salmon pink. Some animals (n=3) were showing fever, clinical examination revealed rectal temperature 103.9 and 105.2 ^{0}F, heart rate 105 beats/min. respiration rate 40/min. pale mucosa membrane, enlarged pre-scapular lymph nodes and infestation with ticks.

The sedimentation and floatation examinations of the faecal samples revealed the presence of mixed infection with strongyles*, Trichuris, Moniezia*, amphistome eggs and coccidian oocysts in fifteen animals. The mixed infection was managed successfully by using the combination of drugs and exhibited maximum fecal egg count reduction at day 21 post-treatment i.e. mean egg per gram of faeces (EPG) less than 200.

The blood samples from the same animals (n = 23) were also screened for the presence of haemoprotozoa by Giemsa stain, out of which one for *Theileria spp* (Fig. 1) and two animals were found positive for *Anaplasma spp,* these animals are not harbouring any GI parasites (Fig.2). The haematological values were adversely affected in haemoprotozoan positive cases and unaffected animals all parameters in the normal range. The average haemoglobin concentrations reduced to 7.27/dl, total

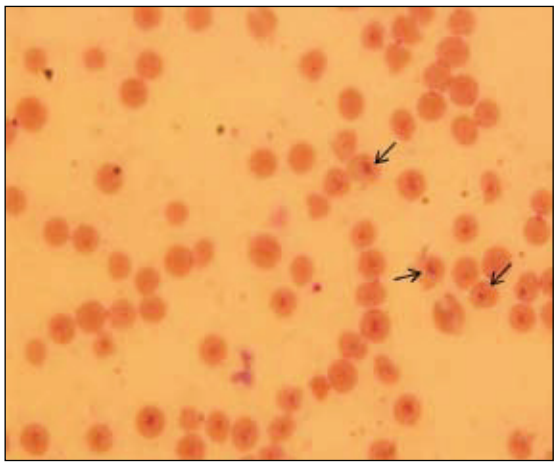

Fig.1 Microscopic image of *Theileria spp.* infection in goats

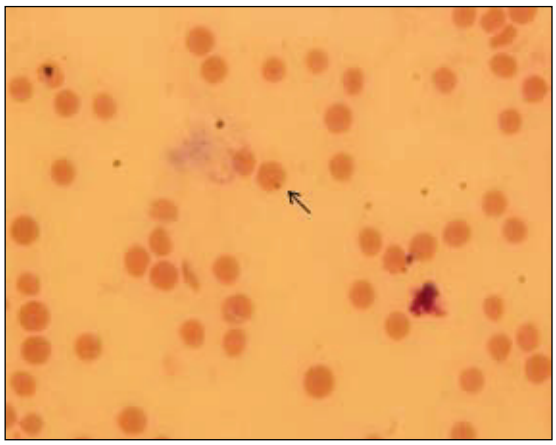

Fig.2 Microscopic image of *Anaplasma spp.* infection in goats

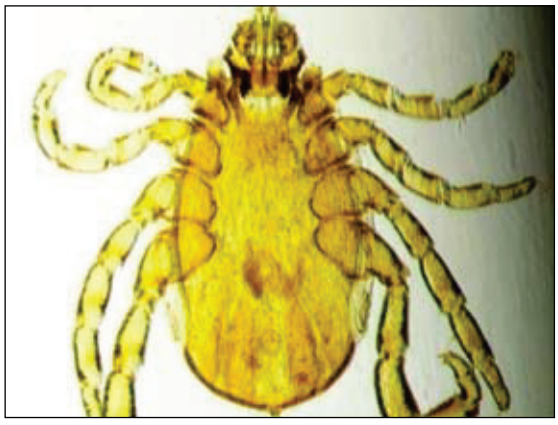

Fig .3 Microscopic image of *Rhipicephalus (Boophilus) microplus*

leucocyte counts (TLC) to $11.33*10^9$ / L, Mean Corpuscular value to 17.93% and total erythrocyte counts to $10.21*10^{12}$/ L (Table 1). On morphological characterization *Rhipicephalus (Boophilus) microplus* was the tick species identified (Fig. 3.).

In the present study, GI parasites along with theileriosis in one and anaplasmosis in two goats with alteration in haematological and physiological parameters burden was encountered while parasitological evaluation of the faecal samples and the clinico-physical observations of the animals. The high prevalence of GI parasites in small ruminants observed in this study could be as a result of the existing grazing system adopted by farm where no systematic grazing pattern is followed and there was no pasture rotation or resting. The dullness, weakness and emaciation of the animals observed in the present study could be attributed to hypoglycemia, hypoproteinemia in the infected individuals and loss in body muscles during severe GI parasitic infection (Ahmed *et al.,* 2015; Liu *et al.,* 2007; Kar *et al.,* 2007). Among the intestinal parasites observed in this study, coccidian infections were predominant in the goats. This result is in conformity with the findings from Velusamy *et al.* 2015 and *Yadav et al.* 2006. The faecal egg counts corresponded with the pattern of

rainfall, environmental conditions for the development, survival and translocation of pre-parasitic stages (Charlier *et al*., 2014). Therefore, there is a gradual build-up of adult worm populations in grazing animals so that higher prevalence of helminths is recorded. Hence goat becomes infected by GI parasitism because of the infected stages in the pasture. In the present study animals were provided with the effective anthelmintic and anticoccidial medications to manage the parasitic infection.

The haematological values were adversely affected in haemoprotozoans positive cases. Similarly Muraleedharan *et al*. (2005) and Harish *et al*. (2006) reported low levels of haemoglobin and total erythrocyte counts in animals infected with *Theileria annulata*. *Theileria* infected goats had significant haematological alterations including the mean TEC, haemoglobin and MCHC values and mean platelet count were significantly decreased (Nagaraj *et al*., 2019). It has been demonstrated that the decrease in RBC, PCV, and haemoglobin level observed in *Theileria* infected animals might be due to erythrophagocytosis in lymph nodes, spleen, and other organs of monocyte-macrophage system. Immune mediated haemolysis and oxidative damage to erythrocytes are also the possible mechanisms contributing to anemia induced by this infection (Nazifi *et al*., 2011; Latimer *et al.,* 2003 and Stockham and Scott, 2002). However, animals showed improvement in haematology and after one month of the treatment, post treatment Hb levels, TLC, packed cell volume and numerical increase ($P \geq 0.05$) and TEC level was significantly ($P \leq 0.05$) increased indicative of effective treatments in haemoprotozoans positive cases (Table. 1).

CONCLUSION

It is evident from the present study that by appropriate and timely treatment and management is effective to control gastrointestinal parasitism in small ruminants. The variation in haematology in groups signified that alteration in these parameters could prove a valuable indicator of health indices of the infected individuals especially in case of haemoprotozoans. Screening is important for early diagnosis and effective treatment measures to prevent economic losses in small ruminants.

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