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Jagvir Singh
Department of Veterinary
Medicine, Dr. G.C Negi College of
Veterinary and Animal Sciences,
CSKHPKV, Holta, Palampur,
Himachal Pradesh, India

Des Raj Wadhwa
Department of Veterinary
Medicine, Dr. G.C Negi College of
Veterinary and Animal Sciences,
CSKHPKV, Holta, Palampur,
Himachal Pradesh, India

Ankur Sharma
Department of Veterinary
Medicine, Dr. G.C Negi College of
Veterinary and Animal Sciences,
CSKHPKV, Holta, Palampur,
Himachal Pradesh, India

Ajay Katoch
Department of Veterinary
Medicine, Dr. G.C Negi College of
Veterinary and Animal Sciences,
CSKHPKV, Holta, Palampur,
Himachal Pradesh, India

Vinay HB
Department of veterinary
Medicine, Dr. G.C Negi College of
Veterinary and Animal Sciences,
CSKHPKV, Holta, Palampur,
Himachal Pradesh, India

Corresponding Author:
Jagvir Singh
Department of Veterinary
Medicine, Dr. G.C Negi College of
Veterinary and Animal Sciences,
CSKHPKV, Holta, Palampur,
Himachal Pradesh, India

Insight into hematobiochemical profiling and gastrointestinal parasite prevalence among migratory Gaddi sheep in Himachal Pradesh

Jagvir Singh, Des Raj Wadhwa, Ankur Sharma, Ajay Katoch and Vinay HB

Abstract

Study conducted on migratory Sheep in mid-hills around Palampur revealed high prevalence of gastrointestinal parasitism (Strongyle, Trichuris and Monezia) with mean EPG value of 1470 ± 92.08 in 30 sheep out of the total 40 included in this study. Flotation method of faecal examination revealed greater incidence of GIT parasitism. There was significant reduction in Hb and PCV in infected goats as compared to healthy goats. Mean values of Calcium, Phosphorus, Albumin, Globulin, Total protein, Iron, Magnesium and Glucose were also found to be significantly decreased statistically in infected group.

Keywords: Sheep, gastro-intestinal parasitism, migratory, haemato-biochemical

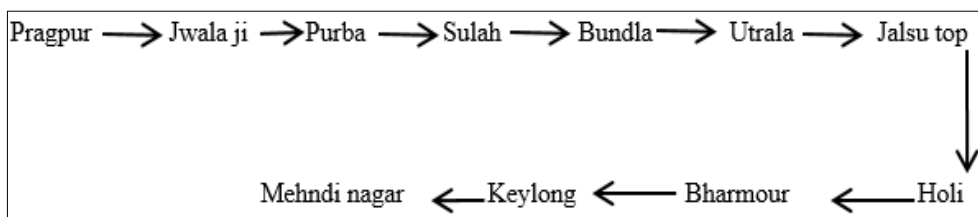
1. Introduction

Sheep rearing in India has a long-standing history and remains an important agricultural practice in various regions. With a diverse climate and rich grazing lands, the country offers favourable conditions for sheep farming. From wool production to meat and milk, this sector contributes significantly to the agricultural economy while providing livelihood opportunities to farmers. In the picturesque state of Himachal Pradesh, migratory sheep herding is a unique tradition that has been passed down through generations. Every year, shepherds guide their flocks of sheep across treacherous mountain trails in search of fresh pastures. This centuries-old practice not only sustains the livelihood of local communities but also preserves the delicate balance between nature and agriculture.

However, migratory sheep herding in Himachal Pradesh is not without challenges. One such challenge is the risk of gastrointestinal (GI) parasitism, which can severely impact the health and productivity of the sheep. The prolonged exposure to different grazing areas makes the sheep susceptible to various parasites, which can cause weight loss, anaemia, and even death. Because of their migratory habits, which allow parasites to flourish and cause significant losses, migratory sheep are more susceptible to parasites than other species. Therefore, present investigation was planned to study the effect of gastrointestinal (GIT) parasitism on haematological and biochemical profile in migratory goats.

2. Materials and Methods

The study was conducted on a total of 40 Gaddi sheep, aged above 2 years, out of the total 150 goats from the migratory flock belonging to Suresh Kumar V.P.O Gugga Saloh Teh. Palampur, Distt. Palampur temporarily stationed at Nearby Thakurdwara {Distt. Kangra}. (Approx 4000 above mean sea level). Migratory tract of the flock is given below



2.1 Collection and analysis of faecal and blood samples

Faecal samples from migratory sheep flock were collected and screened for the presence of eggs of the gastrointestinal parasites. Five grams of faecal sample was collected directly from the rectum of each sheep in a clean polythene bag (Plate 1). The faecal samples were analysed by Direct Smear Method and Floatation Technique for detecting eggs of GIT Parasites. The samples found positive for eggs were further subjected to assessment of Eggs per gram (EPG), as per procedure advocated by Gupta and Singla (2012) [4].



Plate 1: Collection of faecal samples

About 2 mL of blood was collected from the jugular vein in sterile vials containing EDTA for complete blood count (CBC). Another 5 mL blood was collected in heparinized syringe for plasma separation. Plasma was separated by

centrifugation at 3000 rpm for 10 minutes and these plasma samples were preserved at -20 °C in a deep freezer for further biochemical and mineral estimations.

2.2 Evaluation of haemato-biochemical parameters

The haematological parameters were studied using an Auto-Haematology Analyser BC-2800 Vet (Manufactured by Mindray Medical International Limited, Shenzhen-China; Marketed by Fresenius Medical Care Private Limited, New Delhi). Parameters assessed were Haemoglobin (Hb) (g%), Packed cell volume (PCV) (%), Total erythrocyte count (TEC) ($\times 10^{12}/L$), Total leucocyte count (TLC) ($\times 10^9/L$), Mean corpuscular volume (MCV) (fL), Mean corpuscular haemoglobin (MCH) (pg) and mean corpuscular haemoglobin concentration (MCHC) (%). Biochemical parameters studied were glucose (mg%), total serum protein (TSP) (g/dL), albumin (g/dL), globulin (g/dL), Calcium (mg/dL), Phosphorus (mg/dL), Iron ($\mu g/mL$) and Magnesium (mg/dL) using commercial reagent kits, based on spectrophotometric methods, through semi-automatic biochemical analyser Microlab 300 Clinical Chemistry Analyser (by Merck Limited, Mumbai). The results were compared with values obtained from healthy control. Data collected, was analysed statistically employing “t test” InStat software. Ten apparently healthy sheep were selected as healthy group from the same flock. Only those sheep were selected as healthy control in which EPG value was less than 500.

3. Result and Discussion

30 sheep were found positive for gastrointestinal parasitism constituted the infected group in present study. All of them had EPG above 1200. Prevalence of GIT parasites was found to be 93.33% (28/30) on direct smear examination and 100% on floatation method (Table 1) (Velusamy *et al* 2015) [7].

Table 1: Observation on faecal examination in infected group

Total samples in infected group	% Incidence on direct smear method	% Incidence on flotation method	Types of parasites found	Mean EPG
30	93.33% (28/30)	100% (30/30)	Strongyle, Trichuris and Monezia	1470±92.08

Different types of eggs found were Strongyle, Trichuris and Monezia (Plate 2). Mean EPG value was found to be 1470±92.08 as compared to 425±30.50 of healthy control.

There was significant reduction in all the haematological parameters as compared to healthy sheep (Zaki *et al.* 2003 and Purohit *et al.* 2003) (Table 2) [8, 6].

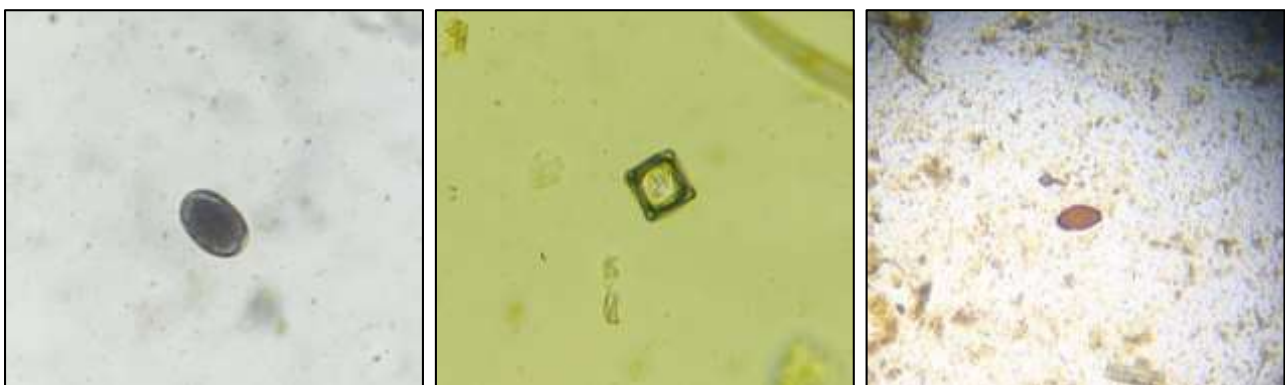


Plate 2: Different Eggs found

Table 2: Haematological profile of sheep infected with gastrointestinal parasitism and apparently healthy goats.

Sr. No	Parameters	Infected Sheep (n=30)	Healthy Sheep (n=10)
		Mean±SE	Mean±SE
1	TLC (10 ⁹ /L)	13.98±0.86***	12.11±1.030
2	TEC (10 ¹² /L)	12.64±0.32***	16.63±0.25
3	Hb (g/dL)	7.13±0.45***	9.18±0.25
4	PCV (%)	23.40±0.71***	31.68±0.81
5	Mean Corpuscular Volume (fL)	26.46±0.37***	21.19±0.45
6	Mean Corpuscular Haemoglobin (pg)	5.68±0.18***	4.93±0.04
7	Mean Corpuscular Haemoglobin Concentration (g/dL)	31.52±1.09***	29.90±0.28

*Significant at 5% level ($p<0.05$) **Significant at 1% level ($p<0.01$) ***Significant at 0.1% level ($p<0.001$)

The reduction in PCV, Hb and Total Erythrocyte may be due to acute loss of blood by sucking activity and haemorrhages caused by various parasites (Bhat *et al.* 2004 and Amulya *et al.* 2014) [2, 1]. The gastro-intestinal nematodes and cestodes infection has been reported to affect the normal digestion and assimilation in small intestine (Lakra *et al.* 2007) [5]. Mean values of Calcium, Phosphorus, Albumin, Globulin, total protein, iron, Magnesium and Glucose were found to be significantly decreased statistically in infected group when compared to healthy group while the other biochemical parameters did not differ significantly (Dhanlakshmi *et al.* 2002) (Table 3) [3].

Table 3: Biochemical profile of Sheep infected with gastrointestinal parasitism and apparently healthy goats.

Sr. No	Parameters	Infected Sheep (n=30)	Healthy Sheep (n=10)
		Mean±SE	Mean±SE
1	Calcium (mg/dL)	8.06±0.16***	8.92±0.41
2	Phosphorus (mg/dL)	3.83±0.24**	4.13±0.28
3	Albumin (g/dL)	3.31±0.25***	4.15±0.23
4	Globulin(g/dL)	3.15±0.16***	3.75±0.20
5	Total Protein (g %)	6.46±0.41***	7.90±0.43
6	Iron (µg/mL)	1.96±0.26***	2.63±0.23
7	Magnesium (mg/dL)	1.74±0.08***	3.25±0.04
8	Glucose (mg %)	50.80±1.70**	53.31±1.90

*Significant at 5% level ($p<0.05$) **Significant at 1% level ($p<0.01$) ***Significant at 0.1% level ($p<0.001$)

4. Conclusions

Present study concluded that prevalence of GIT parasitism in migratory flock of sheep was high when assessed at mid-hills altitude with various haematological and biochemical parameters below the normal range as compared to healthy animals. Considering the high parasitic load during migration regular deworming of the migratory goats is advised to keep them healthy and in good body condition.

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