

## Impact of Nematode Parasites on Hematological Parameters of Goats

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### ABSTRACT

The aim of present study was to compare the prevalence of various nematode infections and their impact on hematological parameters of goats in South Kashmir. Hematological estimations and faecal egg counts of 180 local goats sampled from different districts of South Kashmir during December 2011-October 2012 was carried out. Out of these, 110(61.11%) were found infected, which in decreasing order are the species of *Haemonchus*, *Ostertagia*, *Nematodirus*, *Trichuris*, *Bunostomum*, *Trichostrongylus*. Infection rate in younger animals was higher than adults and was maximum in summer and lowest in winter. Out of 180 samples taken, 42 were taken for hematological analysis which showed prevalence of mixed infection. These were found highly infected, having mixed infection. The hematological study of nematode infected goats showed a significant decrease in red blood cell (RBC) count, hemoglobin (Hb) concentration, percentage of packed cell volume (PCV%). Moreover, white blood cell (WBC), lymphocytes and neutrophil counts were significantly increased in infected goats.

**Keywords:** Hematological parameters, prevalence, nematodes, goat.

## INTRODUCTION

Goat also known as “poor man's cow” is generally reared for meat, milk and wool purposes. About 20 specific goat breeds are known to exist in India (Acharya, 1988). Kashmir is primarily an agricultural state and animal rearing is one of the major sources of earning of farming community and goat farming is an important source of livelihood for small and marginal farmers and landless village dwelling community, as it plays an important role in providing food, fibre, manure etc. Goats play an important role in the economy of J&K state. These are generally reared by poor and backward classes like nomads, Gujjars, Bakerwals etc., who take them to various grasslands, pastures for purpose of grazing. During this process the goats are infected by a large number of parasites.

Gastro-intestinal parasitism represents a severe health problem in small ruminant production system, especially in sheep and goats and its consequences can be extensive ranging from reduced productivity to mortality (Skykes, 1994). It may also cause body composition changes and rendering the affected animals more susceptible to concurrent infections (Dominguez-Torano *et al.*, 2000). Helminthiasis is one of the most important animal diseases worldwide, inflicting heavy production losses in grazing animals. The disease is especially prevalent in developing countries (Dhar *et al.*, 1982) mainly as a result of poor management practices and inadequate control measures. Gastro-intestinal nematodiasis is a major threat and a primary constraint to sheep productivity, it endangers animal welfare worldwide (Tariq *et al.*, 2008). The prevalence of GIN in tropical and sub-tropical areas has adversely affected the production potential of sheep and goats, leading to countless deaths and insidious economic losses in livestock sector (Al-Quaisy *et al.*, 1987). They cause significant economic losses worldwide due to their feeding behaviour being haematophagous like *Haemonchus contortus* and *Ostertagia ostertagi* suck 0.05ml blood/worm/day (Soulsby, 1986).

Blood is an important and reliable medium for assessing the health status of individual animals (Oduye, 1976). Hence the present work was aimed at to investigate the prevalence of nematode parasites and to correlate them with the Hematological studies of goats of south Kashmir.

### **MATERIAL AND METHODS**

Fresh faecal samples were collected from rectum of goats. Samples were collected in suitable plastic bags and carefully labeled with animal identification, age, sex, and date of collection. Samples were preserved at 4°C until analysed. Will's floatation technique was used for qualitative analysis of the faecal samples and Mc Master egg counting technique for quantitative analysis (Soulsby, 1986).

Blood samples were collected from the external jugular vein of goats in EDTA containing vials. Total erythrocyte, leukocyte and platelet counts were made using an improvised Neubauer's haemocytometer. The percentages of neutrophils, eosinophils, basophils, monocytes and lymphocytes were determined from differential counts of leukocytes on fixed and stained whole blood films and these data were converted to total cell counts for each cell type. Packed cell volume (PCV) was determined using the microhematocrit method, and hemoglobin (Hb) concentration was measured by the cyanmethemoglobin method. Statistical analysis was carried out by SPSS 16.5 (2011) software. Results are expressed as means  $\pm$  SEM (standard error of the mean). Prevalence was calculated by the percentage of infected animals.

### **RESULTS**

#### **Prevalence analysis:**

Out of 180 faecal samples of goats examined, 110(61.11%) were found infected. The most commonly nematode parasites found were *Haemonchus* sp. (62%), *Ostertagia* sp. (44%), *Nematodirus* sp. (40%), *Trichostrongylus* sp. (38%), *Bunostomum* sp. (35%), *Trichostrongylus* sp. (30%). Age wise prevalence of nematode parasites in goats is presented in table1. The highest infection (83.33%) was found in age-group <1 year,

least prevalence (31.57%) was found in older age groups. Seasonal prevalence of nematode infection in goats was found maximum during summer (80.95%) and lowest (27.77%) in winter (Table 2). The prevalence rate increases gradually from spring to summer 62.06% - 80.95% respectively.

**Table 1. Age wise distribution of Nematode infection in goats**

Age group(Years)	No. Examined	Positive (%)
< 1	48	40(83.33)
1-2	52	36(69.23)
2-3	42	22(52.38)
>3	38	12(31.57)
Total	180	110(61.11)

**Table 2. Seasonal Prevalence of Nematode infection in goats**

Seasons	No.Examined	Positive (%)
Winter	36	10(27.77)
Spring	58	36(62.06)
Summer	42	34(80.95)
Autumn	44	30(68.18)

### Hematological analysis

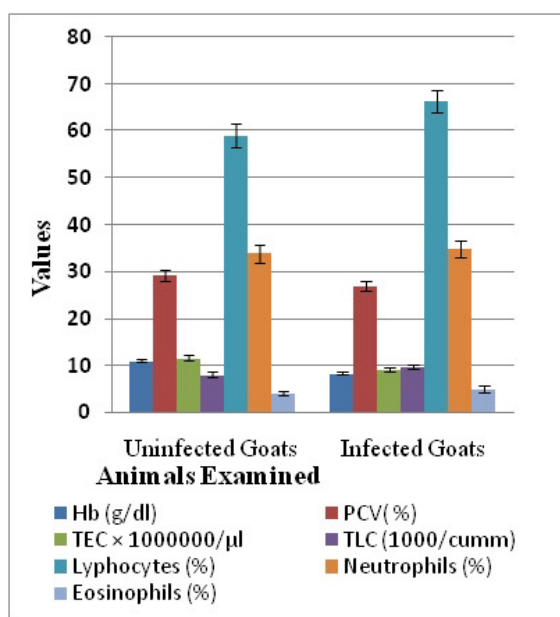
42 blood samples were taken for hematological analysis. Results showed reduction in RBC counts, Hb concentration and PCV in infected animals which can be attributed to the loss of blood by sucking activity of parasites mainly because of *Haemonchus* sp. and *Ostertagia* sp. Similar results were determined by (Soulsby, 1986). Moreover the present study showed the mean total WBCs, lymphocytes, neutrophil and eosinophil counts were significantly higher in infected animals (Table 3). Eguale and

Abie (2003) detected the similar results. Hemoglobin concentration decreased markedly in infected goats i.e

11.11 g/dl - 8.44 g/dl. Lymphocyte number significantly increased in infected goats from 59.11% - 66.27%. Infected goats were found anemic.

**Table 3. Hematological parameters of uninfected and infected goats**

Components	Uninfected values (Mean±SEM)	Infected values (Mean±SEM)
Hb (g/dl)	11.11±0.30	8.44±0.41
PCV (%)	29.22±1.14	27.05±1.12
TEC (10 <sup>6</sup> /cumm)	11.66±0.63	9.11±0.42
TLC(10 <sup>3</sup> /cumm)	8.11±0.52	9.77±0.54
Lymphocytes (%)	59.11±2.57	66.27±2.43
Neutrophils (%)	33.94±1.91	34.88±1.85
Eosinophils (%)	4.16±0.53	5.05±0.62



**Fig1. Hematological parameters of infected and uninfected Goats**

## **DISCUSSION**

The occurrence of nematodiasis in an area is influenced by a multifactorial system, involving mainly the particular host, parasite and their environment. *Haemonchus contortus* and *Ostertagia Ostertagi* being common blood feeders that cause anaemia and reduced productivity and can lead to death in heavily infected animals. It has been estimated that each worm sucks about 0.05 ml of blood per day by ingestion or seepage from lesions (Urquhart *et. al*,2000).

The present study indicates that the nematodiasis is a frequent process and one of the major parasitic problems of the small ruminants. These findings are consistent with those of Tariq *et al.* (2008); Lone *et al.* (2011); Dhar *et al.* (1982); Makhdoomi *et al.* (1995); Agyei, (1991); Nginyi *et al.* (2001); Shahadat *et al.* (2003); Lateef *et al.* (2005); Nwosu *et al.* (2007).

During present study nematode infection was known to cause significant changes in hematological parameters like Hb%, PCV and RBC count and result in anemia in infected animals. Similar results has been determined by Siham *et al.* (1997); Sharma *et al.* (2000); Taleb *et al.* (2007); Abel-Nabi *et al.* (2002). Thus the nematode infection causes the significant impact on the blood physiology of goats. The present study will be helpful in finding the physiological and health status of goats. It will also be useful in early diagnosis of nematode infection in goats and a treatment schedule could be designed to avoid more infection and animal losses on the farm level and in turn economical losses. Thus there is an urgent need to carry out research on applied aspects leading towards control strategies of parasites. Regular deworming and improvement of husbandry practices is suggested.

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