

Research Article



Coprological Examination of Small Ruminants to Detect Helmenthiasis Reared at Alpine Pastures of Livestock Experiment Station (Les) Jaba During Spring Season

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Abstract | This study was conducted on the Experimental animals of Livestock Experiment Station (LES) Jaba which was established in 1954-55 comprising of 579 Acres of land in collaboration with Australian government. Most of the area of the LES comprised of hilly terrain, where 1195 mm rainfall observed throughout the year. The animals of the LES Jaba are sent for grazing on the pasture with naturally grown at evening stall feeding is also practiced. It was observed from the data obtained that in sheep mixed infections were very common (30.4%) followed by *Strongylus* (21.6%), *Eimeria* spp. (15.5%) and *Haemonchus* (2.5%). Likewise, mixed infections were also high but slightly lower in goats (25.5%) as compared to sheep breeds followed by *Haemonchus* (17.9%), *Strongylus* (16.9%) and *Eimeria* (10.2%). The effect of Species of animals on occurrence of Gastrointestinal Parasites in Small ruminant was found highly significant (p-value<0.001). Mixed infections were more pronounced in Kaghani sheep (33.5%) followed by Rambouillet (31.3%), Angora (28%), Beetal (23.5%) and Ramghani (21.1%). It was found that mixed infections were more pronounced (32.4%) in females as compared to males (16.9%). The *Strongylus* was higher (20%) followed by *Eimeria* (12.3%) and *Haemonchus* (8.2%). It is evident from the results obtained in current study that *Strongylus*, *Eimeria* & mixed infections were more prevalent in sheep breeds (21.6%, 30.6% and 15.5% respectively) as compared to goats (16.9%, 25.5% and 10.2% respectively). The study showed that Ramghani breed was more susceptible to *Strongylus* (24.3%) followed by Rambouillet (23.4%), Kaghani (20%), Angora (17.9%) and Beetal (16%). *Eimeria* spp were highest (26%) amongst Ramghani breed of sheep. *Haemonchus* was very high in Beetal goats as compared to other animals. Females were more susceptible to *Strongylus* infestation (20%) as compared to males (19.8%).

Keywords | Helmenthiasis, Coprology, Alpine pastures, Spring

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INTRODUCTION

The importance of small ruminants (Sheep and Goats) in the economy of the poor farmers is evidenced by their economic traits. According to 2009-2010 Economic Survey, Sheep and Goat share 33.3 % in the total meat and 2.3 % in the total milk and 1-1.5 % in the total wool production

in the Pakistan. 40,000 million ton wool/year is produced from which 15-16 billion foreign exchange/year is cashed. 47.3 million ton skin is produced annually with 2000 million RPS foreign exchange per year. There are twenty eight breeds of sheep and twenty five breeds of goats in Pakistan. According to 2009-2010 economic survey of Pakistan the total population of the sheep in Pakistan was 27.8 million

and ranked at 9th position on the basis of sheep population in the Globe while, the total population of Goats was 60 million and ranked at 3rd position in the World. The population of Goats in Khyberpakhtunkhwa is 18 millions and that of sheep is 13 million (Livestock Census, 2006) which increasing at the rate of 3 percent for goats and 2.5 percent for sheep per annum. Parasitic infection in the Gastro-intestinal tract is a serious threat to small ruminant production systems worldwide. Single or mixed infections with *Eimeria* and GI nematodes had been reported in sheep & goat production systems worldwide which are posing great economic losses both in terms of production and mortality (Sharma et al., 2009). It causes considerable economic loss to the goat industry in terms of mortality, decreased productivity, stunted growth, loss of body weight and treatment cost (Gwaze et al., 2009; Akhter et al., 2011; Sohail et al., 2017; Hassan et al., 2011).

Livestock Experiment Station (LES) Jaba was established in 1954-55 with collaboration of Australian government. The objective of this station is to promote & improve indigenous sheep breeds of Malakand, Hazara, Kashmir & northern areas. Later on, Ramboulet sheeps were imported from America which are famous for its fine wool and meat production.

The station currently contains sheep breeds viz; kaghani, Ramghani (Kaghani x Ramboulet) and Ramboulet, while goat breeds reared are Angora and Beetal. The animals are reared at the farm during the cold weather but are moved for grazing to alpine pastures from March to September. This time is also suitable for flourishing of various gastro-intestinal worms due to favorable temperature and humidity which affects the grazing animals.

A high prevalence of GI nematodes and coccidial oocysts were reported in countries with tropical and temperate regions such as India, Bangladesh, South Africa, Sri Lanka, Italy and Mongolia with the prevalence rate ranging from 20–96% (Faizal and Rajapakse, 2001; Sharkhuu, 2001; Gwaze et al., 2009; Sharma et al., 2009; Di Cerbo et al., 2010; Hassan et al., 2011).

Therefore, present study was devised to obtain figures for prevalent gastrointestinal parasites to plan useful strategies for deworming.

MATERIALS AND METHODS

STUDY ANIMALS

The study was carried out on animals reared at Livestock Experiment Station Jaba, Mansehra.

SAMPLE COLLECTION

The faecal samples were collected in clean polythene bags, properly labeled and were shifted to Veterinary Research & Disease investigation center Abbottabad in ice container for detailed lab analyses.

QUALITATIVE AND QUANTITATIVE PARASITOLOGICAL EXAMINATIONS

Qualitative and quantitative parasitological examinations was performed by fecal floatation technique following standard procedures by using saturated solution of Sugar for the presence of parasite eggs/oocysts (Zajac and Conboy, 2006). The parasite eggs/oocysts were examined and identified by microscopy based on the morphology and size of the eggs/oocysts up to the parasite genus level. For quantitative analysis, the modified McMaster technique was used to estimate eggs/oocysts per gram of feces (EPG/OPG).

STATISTICAL ANALYSIS

Chi-square test was used to analyze the significant difference among the proportions, whereas P-value <0.05 was regarded as significant.

RESULTS

The results obtained after statistical analyses are presented in Table 1. The variables included were specie, breed, age & sex.

ANIMAL WISE PREVALENCE

It was found from the data obtained that in sheep mixed infections were very common (30.4%) followed by *Strongylus* (21.6%), *Eimeria spp.* (15.5%) and *Haemonchus* (2.5%). Mixed infections were high in sheep breeds (slightly lower in goats (25.5%)) followed by *Haemonchus* (17.9%), *Strongylus* (16.9%) and *Eimeria* (10.2%). The effect of Species of animals on occurrence of Gastrointestinal Parasites in Small ruminant was found highly significant (p-value<0.001).

BREED WISE PREVALENCE

Mixed infections were more pronounced in Kaghani sheep (33.5%) followed by Rambouillet (31.3%), Angora (28%), Beetal (23.5%) and Ramghani (21.1%). Ramghani sheep has a higher prevalence of coccidiosis (26%) followed by *Strongylus* infection (23.4%), mixed (21.1%) and *Haemonchus* (0.8%). In Beetal and Angora goats mixed infections were higher (25.5%) followed by *Haemonchus*, *Strongylus* and *Eimeria*.

Kaghani sheep has a pronounced mixed infection (33.5%), followed by *Strongylus* (20%), coccidian (12.6%). Rambouillet sheep have a high incidence of mixed infections

Table 1: Effect of various factors on worm load in small ruminants

| Variables | Category | Prevalence (%) | | | | Total | χ^2 value | P value |
|-----------|-------------|----------------|------------|------------|-------|-------|----------------|---------|
| | | Eimeria | Strongylus | Haemonchus | Mixed | | | |
| Specie | Sheep | 15.5 | 21.6 | 2.3 | 30.4 | 195 | 71.2 | 0.000 |
| | Goat | 10.2 | 16.9 | 17.9 | 25.5 | 105 | | |
| Breed | Rambouillet | 13 | 23.4 | - | 31.3 | 38 | 95.5 | 0.000 |
| | Kaghani | 12.6 | 20 | 3.7 | 33.5 | 117 | | |
| | Ramghani | 26 | 24.3 | 0.8 | 21.1 | 41 | | |
| | Beetal | 10.3 | 16 | 20.1 | 23.5 | 58 | | |
| | Angora | 10 | 17.9 | 15.1 | 28 | 46 | | |
| Sex | Female | 12.3 | 20 | 8.2 | 32.4 | 230 | 26.2 | 0.000 |
| | Male | 17.9 | 19.8 | 6.1 | 16.9 | 70 | | |
| Age | <1yr | 22.4 | 20.7 | 2.1 | 16.9 | 75 | 41.4 | 0.000 |
| | 1-3yr | 12.4 | 18.2 | 8.5 | 34.3 | 85 | | |
| | >3yr | 10.5 | 21.1 | 9.7 | 29.6 | 140 | | |

followed by *Strongylus* and *Coccidia* (p-value<0.001). The effect of breed of animals on prevalence of GI parasites in small ruminants was found highly significant (p-value<0.001).

SEX WISE PREVALENCE

Sex of animal was also an important factor which affected significantly the results of current study. It was found that mixed infections were higher as (32.4%) in females as compared to males (16.9%). The *Strongylus* was higher (20%) followed by *Eimeria* (12.3%) and *Haemonchus* (8.2%). Similarly, *Strongylus* was highest among the GI parasites in males followed by *Eimeria*, mixed and *Haemonchus* (P-value 0.001). The effect of sex on worm infestation was also highly significant (P-value 0.001).

AGE WISE PREVALENCE

Eimeria spp. were very common in young age group (22.4%)(less than one year) followed by *Strongylus* (20.7%), mixed (16.9%) and *Haemonchus* (2.1%). However, in middle age group (1-3yr) mixed infections were more pronounced (34.3%) followed by *Strongylus* (18.2%), *Eimeria* (12.4%) and *Haemonchus* (8.5%). The adult group (>3yr) was highly affected by mixed infections (26.4%) followed by *Strongylus*, *Eimeria* and *Haemonchus*. The effect of age was also highly significant i.e. (P-value <0.000).

DISCUSSION

It is evident from the results obtained in current study that *Strongylus*, *Eimeria* & mixed infections were more prevalent in sheep breeds (21.6%, 30.6% and 15.5% respectively) as compared to goats (16.9%, 25.5% and 10.2% respectively). The results shown that Ramghani breed was more susceptible to *Strongylus* (24.3%) followed by Rambouillet (23.4%), Kaghani (20%), Angora (17.9%) and Beetal

(16%), further *Eimeria* spp were noted highest (26%) amongst Ramghani breed of sheep. *Haemonchus* was very high in Beetal goats as compared to other animals and it was further noted that females were more susceptible to *Strongylus* spp. infestation (20%) as compared to males (19.8%). Adult animals of age more than three year were affected more with *Strongylus* (21.1%) followed by young stock of less than one year age (20.7%) and the animals of middle age group (1-3 year) were found less susceptible compared to other age groups. The mixed infections (*Cooperia* spp, *Trichuris* spp, *Nematodirus*, *Moniezia expansa*, *Fasciola hepatica*, *TrichoStrongylus*, *Oesophagostomum*) were high amongst all the groups of animals.

The results of the current study shows that gastrointestinal worms that were found in sheep and goats have also been reported earlier (Asnji and Williams, 1987; Gupta et al., 1987; Guimaraes and Walter, 1987; Njau, 1987; Uriarte and Valderrabno, 1989; Pal and Qayyum, 1993). Mixed infection was very common in both sheep and goat viz. 30.4% and 25.5% respectively. This may be due to mixed grazing pattern of all species and age groups at the pastures.

Haemonchus was higher in goats (17.2%) as compared to sheep breed (2.7%) which is against the results of (Riche et al., 1973; Suh et al., 1980; Javed et al., 1992) which suggested that haemonchosis is higher in sheep due to their grazing pattern. However, this variation may be due to breed of goat in this study i.e. Beetal and Angora which are not native of this region. *Haemonchus* is an important and common nematode parasite and requires special attention for its control. It has been suggested that *Haemonchus* can acquire resistance faster than other gastrointestinal nematodes, like *TrichoStrongylus*, because of its high biotic potential (Torres-Acosta et al., 2003).

Strongylus was higher in sheep (21.6%) as compared to goat (16.9%) while prevalence of *Haemonchus* was higher in goats (17%) relative to sheep breeds (2.3%).

The results of the current study show that *Haemonchus*, *TrichoStrongylus*, *Eimeria Cooperia spp*, *Trichuris spp*, *Nematodirus*, *Moniezia expansa*, *Fasciola hepatica* and *TrichoStrongylus*, *Oesophagostomum* were present in the flocks reared at alpine pastures of LES Jaba. It has been reported that Coccidia and other gastrointestinal nematodes as mixed or single infections are the major parasitic diseases of sheep and goats in tropical and temperate climates (Faizal and Rajapakse, 2001).

CONCLUSION AND RECOMMENDATIONS

A higher incidence of gastrointestinal worms was observed in the animals of LES jaba which is considered due to favorable conditions for worms during grazing season at alpine pastures.

In the light of current study, it is recommended proper rotational grazing pattern should be followed to minimize the worm load. Moreover, regular lab analysis of faecal samples is desired to devise a strategic deworming schedule as per specie of endo-parasites observed.

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CONFLICT OF INTEREST

There is no conflict of interest among the authors.

NOVELTY STATEMENT

There was no documented record related to prevalent helminths in small ruminants at LES. The results of this study can provide baseline data for devising the strategy for the control of helminthiasis in LES.

AUTHOR'S CONTRIBUTION

MS and ZA designed the study. MS and ZA executed the sample collection and analyses. SSAS Analysed the data. H, YA and MM contributed in Paper writeup.

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