



## Research Article

# Study on Prevalence of Gastro Intestinal Helminths of Large and Small Ruminants in District Haripur

Ishtiaq Ahmed<sup>1\*</sup>, Hamid Ullah<sup>2</sup>, Zubair Ali<sup>2</sup>, Muhammad Sohail<sup>2</sup>, Yasir Amin<sup>2</sup> and Afrasyab<sup>1</sup>

<sup>1</sup>Veterinary Research and Disease Investigation Laboratory Haripur, Khyber Pakhtunkhwa Pakistan; <sup>2</sup>Veterinary Research and Disease Investigation Centre Abbottabad, Khyber Pakhtunkhwa Pakistan.

**Abstract** | A wide variety of gastro-intestinal (GI) helminthes have been associated with morbidity and mortality in large and small ruminants. Substantial parasitic load in these animals is characterized by symptoms like diarrhea, poor weight gain, rough body coat, gastro intestinal disturbance like lack of appetite, reduced milk production, alopecia and bottle jaw. The study on prevalence of gastrointestinal helminths parasite of large and small ruminants was conducted in and around district Haripur. Faecal samples (n=633) were randomly collected and were examined for the presence of helminths parasites, in which 463 (73.0%) were found positive for the eggs of different GIT helminths. Seven species of parasites including: *Eimeria Spp*, *Ascaris spp.*, *Strongyloid spp.*, *Fasciola spp.* *Trichuris spp.* *Monezia spp.* and *Schistoma bovis*. as well as mixed species were identified as per their intensity. It was noted that prevalence was highest in goat (80%) followed by buffalo (74%), cattle (71.27%) and sheep (68.08%). The *Eimeria spp.* was highest (35.27%) followed Buffalo (28.35%) and *trichuris spp.* 16.41%. Similarly, *Ascaris spp.* was higher in buffalo (56.71%) followed by cattle (12.1%). *Eimeria spp.* was highest in Goats (26.41%) followed by sheep (18.75%). The *ascaris spp.* was higher in goats (13.2 %) followed by sheep (5%), While, *Fasciola spp.* was higher (15.60%) in sheep than goats (4.70%). Therefore, it is recommended that proper managemental practices, strategic anthelmintic protocols as per regular faecal examination and awareness of farmers regarding husbandry practices may be implemented in the study area to boost the economy of the farmers.

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\***Correspondence** | Ishtiaq Ahmed, Veterinary Research and Disease Investigation Laboratory Haripur, Khyber Pakhtunkhwa Pakistan; **Email:** ishtiaq1079@gmail.com

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## Introduction

Livestock plays a fundamental role in the improvement of social and economic status of the poor rural folks in Pakistan. In Pakistan, livestock farming is mainly categorized in the following

categories that is, very small scale to at domestic level to medium and large commercial farms. These all have different managemental practices and production levels. From the last hundred years, livestock has proved itself, the best source of providing quality protein through milk and meat and thus it is a

potential source of food security and generation of income. The byproducts of animals in the form of hides, bones and dung are also indirectly a source in uplifting the economy through their related industries and improving crop production in agricultural practices, respectively. According to economic survey of Pakistan for year 2021, a total contribution of agricultural sector was 60.1 % in GDP while 11.8 % from livestock sector has been reported.

The population of cattle and Buffaloes was estimated at 51.5 and 42.4 million heads, respectively. Both of these are major milk producing species of domestic ruminants, producing about 61,720 million tons of milk (Memon *et al.*, 2021).

There is very poor awareness of the livestock farmers located in rural areas about regular deworming practices of their domesticated animals. Subsequently other managerial practices like poor housing, energy, protein as well as mineral deficient nutrition, contaminated and soiled water are mainly affecting health of these animals. There is heavy infestation of both endo and ectoparasitism found in these animals (Dagnachew *et al.*, 2011). These different types of parasites cause morbidity and mortality, reduced milk and meat production (Dagnachew *et al.*, 2011; Di-Cerbo *et al.*, 2010). Parasitic infestation exerts negative impact on the health status, meat and milk production, increased treatment and production cost, hence, badly affected economic status of livestock farming (Fazlullah, 2016).

Helminths and protozoal species are mainly responsible for endoparasitism in small and large domestic ruminants (Asif *et al.*, 2008). *Eimeria* spp. is a protozoa belonging to the phylum Apicomplexa, family Eimeriidae that parasitize poultry, equines and ruminants, it causes ovine and bovine coccidiosis as well (Asif *et al.*, 2008). Helminthes are parasites that cause parasitic gastroenteritis in sheep and cattles. The most significant genera of the order strongylida of nematodes is found particularly in tropical zones of the globe (Dagnachew *et al.*, 2011). *Trichuris* sp., *Bunostomum* sp. and *Cooperia* sp. of nematodes have also been reported in cattle (Khan *et al.*, 2013). *Fasciola hepatica* is a trematode parasite affecting sheep, goat and cattle. This parasite needs an intermediate host for transmission to its final host.

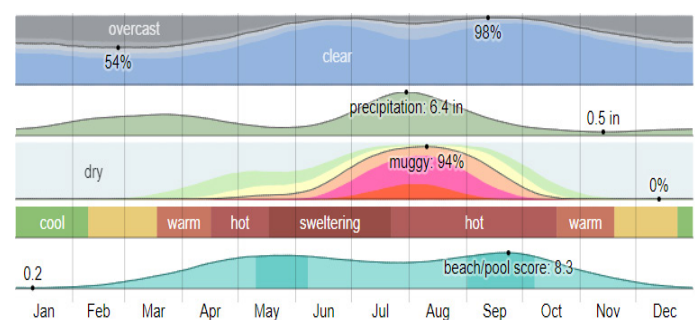
About 80% of young cattles have been reported

by various researchers to be affected by nematode infestation (Asif *et al.*, 2008). The incidence of endoparasitism in cattle population reported from various countries of the globe viz; Taiwan 7.9% (Fazlullah, 2016), Columbia 50.5% (Galan, 2005), Pakistan 89.74% (Hassan *et al.*, 2011), Sri Lanka 11.56% (Gadahi *et al.*, 2009), and Ghana 95.5% (Gupta *et al.*, 2006). Similar findings for buffaloes and cattle population of India has been reported by various researchers (Jones and Raymond, 2001). Haripur is a vast district of Khyber Pakhtunkhwa province located at Hazara division with versatile livestock population. No research investigations for endoparasitism in large and small ruminants have been carried out so far. Keeping in view the above facts, current study was carried out for determination of various species of endoparasites affecting small and large ruminant population of District Haripur.

## Materials and Methods

### Study area

The present research investigation was performed at district Haripur that lies in Hazara division of Khyber Pakhtunkhwa province and its geographical coordinates are 33°58'50'North, 72°56'1' East. In Haripur, summer season is long, sweltering, muggy, wet and clear while, the winters are cold and short with mild cloudy. Over the course of the year, the temperature typically varies from 40°F to 100°F and is rarely below 35°F or above 107°F ([www.weatherspark.com](http://www.weatherspark.com)).



**Figure 1:** Atmospheric pattern of district Haripur over the study year.

### Collection and examination of fecal samples

In district Haripur, 18 different dairy farms were selected. Approximately 5-10 grams fresh fecal samples were collected randomly from the 35 percent animal population present in these farms using previously labeled polyethylene bags. Total collected samples were (n=633). Samples were refrigerated

and processed at Veterinary Research and Disease Investigation Laboratory Haripur. Qualitative testing of the samples was performed by general microscopic examination using different parasitological techniques.

The qualitative examination of faecal sample was done by direct microscopy using sedimentation and flotation techniques. Identification of the endoparasites was done by examination of the morphological characters of eggs and oocysts under two different magnifications of 10x and 40x.

## Results and Discussion

The present research investigation was done to understand the prevalence of different species of helminths in large and small ruminants of district Haripur, Khyber PakhtunKwha province of Pakistan. Faecal samples were randomly collected and processed in parasitology section, Veterinary Research Disease Investigation Laboratory Haripur.

### Overall prevalence

A total 463 out of 633 faecal samples were found positive for different species of animals hence, overall was noted as 73 percent (Table 1).

**Table 1:** The overall prevalence for large and small ruminants.

No. of animals	Positive	Negative	Percentage
633	463	170	73.14%

**Table 2:** The specie wise prevalence of endoparasitic infestation.

Specie	Total samples	+ive samples	-ive samples	Overall prevalence (%)
Cattle	362	258	104	71.27
Buffalo	91	67	24	74.00
Goat	133	106	27	80.00
Sheep	47	32	15	68.08
Total	633	463	170	73.14

**Table 3:** Prevalence of various species of parasites in large and small ruminants.

Specie of animal	Prevalence (%)							
	Eimeria spp.	Strongyle spp.	Asc spp.	Fasciola spp.	Trichuris spp.	Monezia spp.	Schistoma bovis	Mixed
Cattle	35.27	2.71	12.10	5.30	3.87	3.80	8.91	13.00
Buffalo	28.35	10.30	56.71	8.90	16.41	1.50	2.98	19.00
Goat	26.41	10.40	13.20	4.70	5.66	7.50	1.00	5.60
Sheep	18.75	9.30	5.00	15.60	9.37	12.50	6.25	8.10

The infestation of endoparasites in different species of small and large ruminants was observed in current study and presented in Table 2. It was observed that prevalence was highest in goat (80%) followed by buffalo (74%), cattle (71.27%) and sheep (68.08%).

The detail of various species of endoparasites was observed in large and small ruminants reared in district Haripur are presented in Table 3. It was noted that *Eimeria* spp. was found 35.27%, 28.35%, *Strongyle* spp. 2.71%, 10.30 %, *Ascarious* spp. 12.10%, 56.71%, *Fasciola* spp., 5.30%, 8.90%, *Trichuris* spp., 3.87 %, 16.41% *Monezia* spp. 3.80%, 1.50% *Schistoma bovis* 8.91%, 2.98% while mixed species was noted as 13.00% and 19.00 % in cattle and buffalo respectively. The *Eimeria* spp. was highest (35.27%) followed by Buffalo (28.35%) and *trichuris* spp. 16.41%. Similarly, *Ascaris* spp. was higher in buffalo (56.71%) followed by cattle (12.1%).

In small ruminants, *Eimeria* spp. 26.41%, 18.75%, *Strongyle* spp. 10.40%, 9.40%, *Ascarious* spp. 13.20%, 5.00%, *Fasciola* spp., 4.70%, 15.60%, *Trichuris* spp., 5.66%, 9.37%, *Monezia* spp. 7.50%, 12.50%, *Schistoma bovis* 1.00%, 6.25%, respectively for goat and sheep. It was noted that *Eimeria* spp. was highest in Goats (26.41%) followed by sheep (18.75%). The *ascaris* spp. was also higher in goats (13.2 %) followed by sheep (5%), While, *Fasciola* spp. was found higher (15.60%) in sheep than goats (4.70%). Mixed infestation in sheep was higher (8.10%) followed by goat (5.60%).

The prevalence of endoparasites with respect to age in large ruminants is elaborated in Table 4. It was noticed that the prevalence was higher in cattle above 3 year of age (83.00%) followed by 1-3 years (77.70%) and lowest in animals below 1 year of age (54.00%). Likewise, the prevalence in buffalo was higher above 3 years of age (86.00%), followed by age group 1-3 years (80.00%) and was lowest below 1 year of age (61.29%).



**Table 4:** Effect of age on prevalence of parasitism in large ruminants.

Specie	Age groups	Total samples	+ive samples (No's)	Prevalence (%)
Cattle	<1yr	125	68	54.00
	1-3yr	130	101	77.70
	>3yr	107	89	83.00
Buffalo	<1yr	31	19	61.29
	1-3yr	30	24	80.00
	>3yr	30	24	86.00

**Table 5:** Effect of age on prevalence of parasitism in small ruminants.

Specie	Age Groups	Total samples	+ive samples (No's)	Prevalence (%)
Goat	< 6 months	30	19	63.33
	6 months -2 years	40	32	80.00
	>2 years	63	55	87.30
Sheep	< 6 months	15	8	53.33
	6 months- 2 years	10	8	80.00
	>2 years	22	16	73.00

The prevalence of endoparasites in small ruminants (goat and sheep) is described in the Table 5. It was observed that the endoparasites infestation was higher in older goats above 2 years of age (87.30%) followed by intermediate age group viz; 6 months to 2 years of age (80.00%) and lowest in younger animals below 6 months of age (63.33%). While, the infestation of endoparasites was higher in sheep of intermediate age group (80.00%) followed by adult age group more than 2 years (73.00%) and lowest in lambs with age below 6 months (53.33%).

This research was conducted to study the presence of helminthic parasites in the animal population in district Haripur, Khyber Pakhtunkhwa, Pakistan. These helminthic parasites are excessively present in the gastrointestinal region of animals and infection was almost 73% in small and large ruminants. High infestation of the endoparasites may be triggered by many contributory managemental factors like, rearing practices, feeding, watering resources, housing, general health care including deworming etc. The farmers of the study area are mainly dependent upon the natural grazing of their animals and common water pond for rain water reserve. There is no supplementation of any

concentrate to animal feedings. As the animals grown up, there is high demand of energy and protein for the vital body processes and survival. However, lean animals have to search more for grazing. The grazing is more intensive, putting animals under more stress of feeding. Soil and water contamination by the animal feces supports the entry and proliferation of the endoparasites makes the animal to be victim. There is less awareness about regular deworming practices of their livestock. The above factors have been reflected by many other researchers like (Khan *et al.*, 2021; Rafi *et al.*, 2021). Poor housing, overcrowding and drainage from the animal barns make the situation worse. Feeding management and watering under this condition is also very problematic and contaminations of the feed with the ova of the parasites make the entry of the parasite into animal digestive system.

Similarly, the climatic conditions are more favorable for the development of endoparasites. Since the climatic conditions of the District Haripur remains warm starting from summer to November. The warm and humid conditions favor the survival of the endoparasitism. Their ova or eggs of the parasites remain viable in the soil and adhered with the grasses present on the grazing area, hence they are ingested by the livestock during grazing. In Haripur, the summers are long, sweltering, muggy, wet, and clear and the winters are short, cold, and partly cloudy. Over the course of the year, the temperature typically varies from 40°F to 100°F and is rarely below 35°F or above 107°F ([www.weatherspark.com](http://www.weatherspark.com)).

Gahahi *et al.* (2009), reported 63.50% of parasitic infestation in small and large ruminants from Islamabad Pakistan which is comparative to the present study viz; 73.14%. Similarly, Aliyu *et al.* (2020) reported the 82.2% of prevalence in ruminants which is supportive to the current study. The subsequent results of (Asif *et al.*, 2008) also reported that in the Rawalpindi region, this number is reported to be almost 63.70%. The difference in these findings varies region wise depending on the farm management, the climatic situation of a particular area, and the geographical location of a particular region.

Several helminthic parasites are reported in these regions; mostly present species are *Eimeria* spp., *Ascaris*, *Strongyloid*, *Fasciola* spp., *Trichuris* spp., *Monezia* spp., and *Schistosoma bovis*, the bloodsucker parasite. The higher prevalence of these parasites is

due to feeding styles like feeding on upper bushes to grazing on grasses, along with the use of these bushes, herbs, shrubs, and trees for specific mechanized crop production schemes by rain fed mechanism. So, increasing prevalence of ova and larvae in the pasture was also confirmed as researched by (Rahman and Ali, 2001).

The effect of age has significant effect on prevalence of endoparasites in small and large ruminants. In current study, the prevalence in cattle and buffalo observed in three age groups viz; <1yr, 1-3yr and >3yr. It was noticed that the prevalence was higher in cattle above 3 year of age (83.00%) followed by 1-3 years (77.70%) and lowest in animals below 1 year of age (54.00%). Likewise, the prevalence in buffalo was higher above 3 years of age (86.00%), followed by age group 1-3 years (80.00%) and was lowest below 1 year of age (61.29%). Khan *et al.* (2017) reported that the occurrence of endoparasites is higher in adult animals when compared to young animal which is supportive to the findings of current study. It was observed that the endoparasites infestation was higher in older goats above 2 years of age (87.30%) followed by intermediate age group viz; 6 months to 2 years of age (80.00%) and lowest in younger animals below 6 months of age (63.33%). While, the infestation of endoparasites was higher in sheep of intermediate age group (80.00%) followed by adult age group more than 2 years (73.00%) and lowest in lambs with age below 6 months (53.33%). Bikila *et al.* (2013) and Raza *et al.* (2014) reported the prevalence of endoparasites in goat and sheep and the results of their studies are in line with the current study. Similarly, Aliyu *et al.* (2020) and Singh *et al.* (2017), reported that the prevalence of endoparasites was higher in more than 6 months age groups which support results of the current study. Moreover, (Urquhart *et al.*, 1996; Sohail *et al.*, 2017) also recorded infection prevalence worldwide. All of these studies are in line with the results of present study however, little difference may exist which might be due to the geographical and environmental differences of every region.

There are no best treatment practices to treat such parasitic infestation in this region. Mostly farmers are illiterate and quake practice exists at its peak. Although extension staff is responsible for the treatment of such animals. However, support of the diagnostic laboratories is not properly availed

and only symptomatic treatment is given. Similarly, repetition of single antiparasitic drug that might be non-specific for the parasite affecting the animal and improper dosage for long time is creating the drug resistance issues in this region.

## Conclusions and Recommendations

In current study it was concluded that occurrence of gastrointestinal parasites was higher in Goats followed by buffalo and cattle. Moreover, it was also observed that the animals above 6 months of age were more prone to be affected by endoparasites than younger animals.

It is recommended that proper managerial practices, strategic anthelmintic protocols as per regular faecal examination and training of farmers regarding husbandry practices should be implemented in the study area to boost the economy of the farmers.

## Acknowledgement

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## Novelty Statement

It is first study in the area reflecting helminths infestation in three domesticated ruminant species i.e. bovine, ovine and caprine. It is sensitization for farmer's community and a guideline for future investigations for parasitic control measures for these farmers.

## Author's Contribution

**Ishtiaq Ahmed:** Principal investigator who conducted the whole study.

**Hamid Ullah:** Project incharge.

**Zubair Ali:** Sample collection.

**Muhammad Sohail:** Sample analysis.

**Yasir Amin:** Provision of laboratory staff for general lab work.

**Afrasyab:** Data entry.

## Conflict of interest

The authors have declared no conflict of interest.

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