

# EPIDEMIOLOGY OF HELMINTH PARASITES IN SMALL RUMINANTS OF LADAKH, INDIA

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**ABSTRACT:** A study was conducted to determine the prevalence and various risk factors associated with helminth parasitism in small ruminants of Ladakh (India) during 2007-2008. A total of 581 small ruminants including 313 sheep and 268 goats were considered during the study. The gastrointestinal tracts including heart and lungs of the host animals were collected from different slaughtered houses and were subjected for the presence of larvae and adult helminth parasites using standard parasitological methods (Boomker et al, 1968). The study reveals overall prevalence as (69.70%) with (68.37%) and (71.26%) in sheep and goats respectively. A significant difference was observed in prevalence of helminth parasites with respect to season, wherein higher prevalence (76.50%) was observed during the wet season as compared to dry season 58.13%. Similarly an association was observed between sex and age of the host with prevalence of helminth infections. Females and young animals of either of the host species were more infected than their counter partners. Likewise an association was observed between prevalence and agro-ecology of the study area where in higher values (76.50%) were recorded for comparatively lowland (Kargil) areas as compared to highland (Leh) areas (58.13%). Hence, it was concluded that species of the animal, season, sex, age, and agro-ecology are important risk factors associated with helminth parasitism in this area.

**Keywords:** Sheep, goats, helminth parasite, prevalence, ladakh

## INTRODUCTION

Helminth parasite infections of ruminants are a major problem throughout the world. These are responsible for a number of economic losses in a variety of ways as: losses through lower fertility, reduced work capacity, involuntary culling, a reduction in food intake, lower weight gains, milk and meat production, treatment costs and mortality in heavily parasitized animals (Carmichael, 1972, Akerejola et al., 1979). Despite of immense progress made to control parasitosis people of Ladakh continue to incur significant losses due to insufficient availability of information and aid regarding with helminthosis. Ruminants are one of the important sources of livelihood in Ladakh and constitute the backbone of economy. Therefore taking care of these animals for better production is one of the important goals. It is known that a prerequisite for the development and implementation of sustainable parasite management programs is to have a taxonomic and epidemiological knowledge of the parasites present in a specific area. The sustainability of helminth control practices also relies on the prevention of resistance and preservation of anthelmintic effectiveness, as well as effective utilization of the locally available food resources. Keeping the same in view the present study was taken into consideration in order to find out various helminth parasites infesting the ruminants of Ladakh and various associated risk factors for an effective management.

## MATERIAL AND METHODS

Different slaughter houses of the study area were surveyed randomly and a total of 581 gastrointestinal tracts together with heart and lungs of sheep and goats were collected. The GI tracts were separated anatomically, then each organ was opened separately for examination of parasites and its contents and mucosa were washed in water to remove all parasites. The contents of the abomasum and small intestine were washed through a 90 mesh sieve and of the large intestine through a 250 mesh sieve for the collection of mature and immature parasites. The bile ducts of liver were opened and visible parasites were removed and placed in normal saline. The total content of

the large intestine was examined in large Petri dishes by the naked eye as well as under microscope. The trachea and bronchi were opened, scrutinized for visible parasites and rinsed in running water over a sieve with 90mm mesh size. The entire lungs were washed and then cut into about 10 mm cubes, for the collection of microscopic parasites. Every nematode recovered from the contents was cleaned with physiologic saline and fixed in hot 70% alcohol. The nematodes were then cleared in lactophenol while as the trematodes and cestodes were fixed in Carnoys fixative and preserved in 70% alcohol. The parasites thus collected were identified on the basis of various morphological and morphometric characters.

## RESULTS

Of the 581 small ruminants, examined 405 (69.70%) were found infected with one or more helminth parasite species. The prevalence of these parasites were (68.37%) and (71.26%) in sheep and goats respectively Table 1. The parasites collected during the present study were *Trichuris ovis*, *Haemonchus contortus*, *Dictyocalus filaria*, *Chabertia ovina* *Fasciola hepatica*, *Dicrocoelium dendriticum*, *Moniezia expansa* and *Stilesia globipunctata*. However no acanthocephalan was encountered during the study. There were statistically significant differences in prevalence of parasites with respect to season; it was observed that the infection rate was higher in wet season (76.50) than in the dry season (58.13) in both the host species Table 2. The study also indicated higher prevalence in females (76.28%) and young ones (72.91%) as compared to males (63.05%) and adults (67.44%) in sheep and goats respectively Table 3 and 4. Similarly an association was found between the prevalence and agro-ecology of the study area wherein the prevalence was higher in low land areas (76.50%) as compared to high altitudes (58.13%, Table 5). The study further revealed that health status of the animals has a minor effect on the prevalence of helminth infections where in it was observed that the animals which were healthy had less infection as compared to those which were comparatively weak (Table 6).

Species	N.E	N.P	%
Sheep	313	214	68.37%
Goats	268	191	71.26%
Total	581	405	69.70%

Season	N.E	N.P	%
Dry	280	186	58.13
Wet	301	225	76.50
Total	581	405	69.70

Sex	N.E	N.P	%
Male	295	186	63.05
Female	286	219	76.28
Total	581	405	69.70

Age	N.E	N.P	%
Young	240	175	72.91
Adult	341	230	67.44
Total	581	405	69.70

Locality	N.E	N.P	%
Lowland	366	280	76.50
High-altitude	215	125	58.13
Total	581	405	69.70

Health status	N.E	N.P	%
Good	371	225	68.73
Poor	210	150	71.42
Total	581	405	69.70

## DISCUSSION

This study revealed that the helminth infection in ruminants occur throughout the Ladakh. It also disclosed that regardless of the environmental conditions, species, age and the sex of the host, the animals of this region are infected with a variety of the helminth parasites. The various parasites recovered during the present study have also been reported from the other two regions of the same state (J&K), as well as from different parts of the world having the almost same geographical locations and environmental conditions (Bali, 1976; Chishti, 1986; Mazyad et al., 2002; Sissay et al., 2006). The higher prevalence in goats as compared to sheep is in agreement with reports of Fikru et al., 2006. This could be due to slow or less development of immunity in goats to gastrointestinal parasites compared with the situation in the sheep, the later faced prolonged challenge over generations, but in goats, the less availability of sufficient browsing area and expansion of crop agriculture forced them to graze with the other species that had good resistance. In addition goats in Ladakh are managed under extensive pastoralism in which large number of animals is kept together. This could increase the degree of pasture contamination leading to higher prevalence rate. The higher prevalence of nematodes than trematodes and cestodes is in contest with many reports all over the world, (Fikru et al., 2006; Sissay et al., 2007). The study further revealed that sex of animals show an association with the prevalence of the parasites, the higher prevalence in females than their counter partners may be due to some physiological peculiarities of the female animals, which usually constitute stress factors thus, reducing their immunity to infections, also the females happen to be lactating which leads to weakness/malnutrition. Similar to my results are the reports as reported by (Blood and Radostits, 2000). The significantly higher prevalence in wet season than that of the dry season is in consent with many reports around the world, (Tembely et al., 1997; Moyo et al., 1996; Fritche et al., 1993; Githigia et al., 2005). This could be due to the existence of a direct relationship between prevalence with rainfall, humidity and temperature. The presence of sufficient rainfall and moisture during wet season favored the survival of infective larvae in pasture and higher probability of uptake of the infective larvae leading to higher prevalence rate Sissay et al., 2007. Similarly the higher prevalence recorded in younger animals as compared to the adult ones is in agreement with most literatures (Dunn, 1978; Shah-Fischer and Say, 1989; Kiyuu, 2003; Nwosu et al., 1996, Nganga et al., 2004) from different corners of the world. This could be due to the fact that younger animals are more susceptible to infections than adults. Adult animals may acquire immunity to parasites through frequent challenge and expel the ingested parasites before they establish infection; (Dunn, 1978; Shah-Fischer and Say, 1989). The reason for higher prevalence in lowland (Kargil), as compared to high altitude (Leh) could be that these agro-ecological zones are characterized by a hot humid environmental situation that is favorable for the survival of intermediate and infective stages of most of the parasites (Teklye, 1991; Fikru et al., 2006). The possible reason for slightly higher prevalence in weak animals of both the host species could be that these animals usually have a comparatively weak immune system which does not fight with the infections to the same extent as that of a healthy animal's immune system (Kuchai et al., 2008).

## CONCLUSION

The present study show that it is beyond the doubt that the sheep and goats of Ladakh are infested by a large number of helminth parasites which could be responsible for economic losses in a variety of ways, therefore efforts should be made to control helminthiasis which requires a detailed knowledge of these parasites and it is believed that the present study will provide some help for the same. The study also show that season, sex, age and geographical location appear to be the major limiting factors for the prevalence of helminth parasites.

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## REFERENCES

- Akerejola OO, Schillhorn Van Veen TW and Njoku CO (1979). Ovine and Caprine diseases in Nigeria: a review of economic losses. *Bulletin Animal Health Production Africa*, 27: 65-70.
- Bali HS (1976). A survey of helminth parasites of sheep (*Ovis aris*) in Jammu and Kashmir. *Journal of Animal Health and Production*, 4: 25-32.
- Blood DC and Radostits OM (2000). *Veterinary Medicine*, 7<sup>th</sup> ed., Balliere Tindall London.
- Boomker J, Horak IG and Ramsay KA (1989). Helminth and arthropod parasites of indigenous goats in the Northern Transvaal. *Onderstepoort Journal of Veterinary Research*, 61: 13-20.
- Carmichael IH (1972). Helminthiasis in domestic and wild ruminants in Botswana- preliminary investigations. *Tropical Animal Health Production*, 4: 175-181.
- Chishti MZ (1986). Epidemiology of Helminth infection in sheep of Kashmir. *Proceedings of IInd Asian Congress on Parasitology*, Lucknow, India 35.
- Dunn AM (1978). *Veterinary Helminthoogy*, 2nd edition London: William Heinemann Medical Books.

- Fikru R, Teshale S, Reta D and Yosef K (2006). Epidemiology of gastrointestinal parasites of ruminants in Western Oromia, Ethiopia. *International Journal of Applied Research in Veterinary Medicines*, 4(1): 51-57.
- Fritche T, Kaufmann J and Pfister K (1993). Parasite spectrum and seasonal epidemiology of gastrointestinal nematodes of small ruminants in Gambia. *Veterinary Parasitology*, 49: 271-283.
- Githigia SM, Thamsborg SM, Maingi N and Munyua WK (2005). The epidemiology of gastrointestinal nematodes in Goats in the low potential areas of Thika District, Kenya. *Bulletin of Animal Health Production, Africa*, 53(1): 5-12.
- Kiyyu JD, Kassuku AA, Kyvsgaard NC and Willingham AL (2003). Gastrointestinal nematodes in indigenous zebu cattle under pastoral and nomadic management systems in the lower plain of Southern highlands of Tanzania. *Veterinary Research Communication*, 27(5): 371-380.
- Kuchai JA, Chishti MZ, Fayaz A, Tak H and Shabir A (2008). Fecal examination of Pashmina goats of Ladakh for helminth infections, 4<sup>th</sup> Jammu and Kashmir Science Congress.
- Moyo DZ, Bwangamoi O, Hendrikx WM and Eysker M (1996). The epidemiology of gastrointestinal nematode infections in communal cattle and commercial beef cattle on the highveld of Zimbabwe. *Veterinary Parasitology*, 67(1-2): 105-120.
- Mazyad SAM and El-Nemr HI (2000). The endoparasites of sheep and goats, and shepherd in North Sinai governorate, Egypt. *Journal of Egyptian Society of Parasitology*, 32(1): 119-126.
- Nganga CJ Maingi N Munyua WK and Kanyari PW (2004). Epidemiology of helminth infection in ruminants of semi-arid area of Kenya. *Ondestepool Journal of Veterinary Research*, 71(3): 219-226.
- Nwosu CO Ogunrinade AF and Fagbemi BO (1996). Prevalence and seasonal changes in the gastrointestinal helminths of Nigerian goats. *Journal of Helminthology*, 70(6): 329-333.
- Shah-Fischer M and Say R (1989). *Manual of Tropical Veterinary Parasitology*, CAB International; The Technical Center for Agricultural and Rural Co-operation (CTA).
- Sissay MM Uggla A and Waller PJ (2006). Epidemiology and seasonal dynamics of gastro-intestinal nematode infections of sheep in a semi-arid region of eastern Ethiopia. *Veterinary Parasitology*, 143: 311-321.
- Sissay MM, Uggla A and Waller PJ (2007). Prevalence and seasonal incidence of helminth parasite infections of ruminants in eastern Ethiopia. *Tropical Animal Health Production*, 22: 125-130.
- Teklye B (1991). Epidemiology of endoparasites of ruminants in sub-Saharan Africa. *Proceedings of Fourth National Livestock Improvement Conference*. Addis Ababa, Ethiopia, 13(15): 7-11.
- Tembely S, Lahlou-Kassi K, Rege JE, Sovani S, Diedkiou ML and Baker RL (1997). The epidemiology of nematode infections in sheep in a cool tropical environment. *Veterinary Parasitology*, 70(1-3): 129-141.