Original Article

A Survey on Caprine Nematodiasis in Ladakh

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ABSTRACT

The present study was conducted for the time period of one year on goats of Ladakh (J&K) with the aim to find out the various nematode parasites infesting goats of this region and their prevalence with regard to season, sex, age, body condition, and agro-ecology. A total of 268 gastro intestinal tracts along with heart and lungs of the host animal of either sex and of different age groups belonging to different areas of the study area were collected randomly and were examined for nematode parasites. Out of these 116 (43.28%) were found infected with single or multiple parasite species. The study reveals the presence of four species of nematodes viz; Trichuris ovis, Haemonchus contortus, Dictyocaulus filaria and Chabertia ovina. It was also observed that among these T. ovis (48.03%) was most dominant followed by H. contortus (41.02%), D. filaria (37.05%) and C. ovina (22.35%) respectively. A significant difference was observed in prevalence of nematode parasites with respect to season, wherein higher prevalence (50.00%) was observed during the rainy season as compared to the dry season 35.93%. Similarly an association was observed between sex and age of the host with prevalence of nematode infections. It was also observed that females were more infected (46.15%) as compared to males (40.57%). Likewise young animals were more infected (45.83%) than the adult ones (41.21%). Similarly an association was observed between prevalence and agro-ecology of the study area where in higher values (45.45%) were recorded for comparatively lowland (Kargil) areas as compared to highland (Leh) areas (40.08%). The study also shown slight relationship between body condition and prevalence wherein the intensity of infection was higher (47.22%) in weak animals as compare to healthy ones (40.62%).Hence, it was concluded that season, sex, age, agro-ecology and body condition are some of the important risk factors associated with nematode parasitism in this area.
Keywords: Goats, Nematode parasites, Prevalence, Ladakh

INTRODUCTION

Goats play an important role in the economy throughout the world and satisfy a number of needs of mankind in different ways, a large section of people is directly or indirectly dependent on them so is the case with the people of Ladakh where rearing of domestic animals including goats is one of the most important activity for ensuring livelihood for these resource poor people. However, unfortunately the production of these animals is being reduced by a number of factors and one among them has been recognized as parasitism. Economic losses are caused by helminth parasites in a variety of ways: they cause 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, and Akerejola et al., 1979). It is estimated that more than 300 species of helminths parasitize livestock in India (Singh and Srivastava, 1977) and new species are being frequently discovered and added to this already swollen list. Gastrointestinal nematodes have been recognized as a major factor limiting goat production throughout the World. After a century of research into their biology and control, nematode parasites continue to be an important constraint on goat production. Modern anthelmintics, together with an understanding of the epidemiology of parasitism, the immune response and nutritional requirements of goats, currently enable satisfactory management of the problem. However, the increasing incidence of resistance by the parasites to available anthelmintics is challenging task for producers to maintain high levels of productivity in the goats industry. Novel developments for the management of nematode parasites such as vaccines, biological anthelmintics, genetic markers and selective breeding of goats may, in the future, provide additional or alternative means of parasite control. However, such alternative control methods are likely to be more dependent on a sound understanding of the species, lifecycle and population dynamics of the parasites involved and the epidemiology of disease they cause than current methods that rely heavily on broad-spectrum anthelmintics.

MATERIALS AND METHODS

Different parts of the study area were surveyed and a total of 268 gastrointestinal tracts together with heart and lungs of slaughtered goats were collected randomly for parasitological investigation following standard methods of Boomker *et al*. (1989). The GI tracts were separated anatomically, then each organ was opened separately 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. Abomasum and small intestines were opened and examined by the naked eye for parasitic nodules put into a digestion solution (Pepsin 5 g, HCl 7ml, distilled water 1000 ml) and incubated at 37^0 C for 2 hours. The fluids were washed by the same way to get a collection of 100 nematodes from each organ. The total content of large intestine was examined in Petri dishes under a light microscope. The contents of the large intestine were also examined on a stereomicroscope for larval nematodes. The lungs and trachea were processed for parasite collection. 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 10mm cubes and placed in plastic jar with normal saline for further processing (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 and identified on the basis of various morphological and morphometric characters (Yamaguti, 1959).

RESULTS

The results of the present study show that nematode infection in goats of Ladakh is of common occurrence as is the case with the goats from other parts of the world but with comparatively low diversity as only four species have been recovered during the present study viz; *Trichuris ovis, Haemonchus contortus, Dictyocaulus filaria* and *Chabertia ovina* of which *T. ovis* was the most prevalent 48.03% followed by *H. contortus,* 41.02% *D. filarial* 37.05% *and C. ovina* 22.35% respectively Table 1.1. Of the 268 goats investigated, 116 (43.28%) were found to be infected with one or more parasite species. Most of the cases were reported with a multiple type infection it was also observed that the prevalence of *Dictyocaulus filaria* was increasing with a decrease in temperature. There was a significant difference in prevalence of parasites with respect to season, where in the prevalence was higher in rainy season (50.00%) than in the dry season (35.93%) Table 1.2. Similarly the prevalence was higher in females (46.15%) and adult animals (41.21%), as compared to males (40.57%) and young ones (45.83%) Table 1.3 and 1.4. Also the study show an association between the prevalence and agro-ecology of the study area wherein the infection rate was higher in comparatively lowland areas (Kargil), (57.35%) as compared to high-altitude (Leh), (42.64%) Table 1.5. Furthermore an association was observed in prevalence of parasite and body condition of the host as the weak animals were found more infected (47.22%) as compared to the healthy ones (40.62%) Table 1.6.

Table1.1. Prevalence on the basis of parasite species						
Host	No. Examined	No. Positive	*T. ovis*	*H. contortus*	*D. filaria*	*C. ovina*
Goats	268	(43.28%)	48.03%	41.02%	37.05%	22.35%

Table1.2. Prevalence on the basis of Season					
Host	No. Examined	Wet Season	% age	Dry Season	%age
Goats	268	70/140	50.00%	46/128	35.93%

Table1.3. Prevalence on the basis of Sex of the host					
Host	Total No. Examined	Males	%age	Females	%age
Goats	268	56/138	40.57	60/130	46.15

Table1.4. Prevalence on the basis of Age of the host					
Host	Total No Examined	Young	%age	Adult	%age
Goats	268	55/120	45.83	61/148	41.21

Table1.5. Prevalence on the basis of Agro-ecology					
Host	Total No Examined	Total No. Positive	Kargil (Lowland)	%age	Leh (high-altitude)	%age
Goats	268	116	65/143	45.45	51/125	40.08

Table1.6. Prevalence on the basis of body conditions of the host					
Host	Total No Examined	Total No. Positive	Healthy	%age	Weak	%age
Goats	268	116	65/160	40.62	51/108	47.22

DISCUSSION

This study showed that the overall prevalence of nematode parasites in goats of Ladakh to be (43.03%). It also disclosed that regardless the season, age, sex, and locality; the animals are infected with a variety of nematode parasites of which *Trichuris ovis* was the most abundant. However the presence of comparatively less species diversity could be due to the environmental conditions of the study area as it is the world's cold desert and the temperature falls below -30

degree calicoes during winter another possible reason for the same could be that some of the parasites might had been not encountered by the author during the period of study. The higher prevalence in wet season than dry is in consent with many reports around the world (Fritche et al., 1993; Moyo et al., 1996; Tembely et al., 1997; Githigia et al., 2005). This could be due to the existence of a direct relationship between prevalence with the rainfall, humidity and temperature. The presence of sufficient rainfall and moisture during the wet season favoured the survival of infective larvae in the pasture and higher probability of uptake of the infective larvae leading to higher prevalence rate (Sissay, 2007).

The study further revealed that sex of the animals showed an association with the prevalence of the parasites, it was observed that females were more infected than their counter partners. This could be due to the physiological peculiarities of the female animals, which usually constitute stress factors thus, reducing their immunity to infections, and for being lactating mothers, females happen to be weak/malnourished, as a result of which they are more susceptible to the infections besides some other reasons (Blood and Radostists, 2000).

Similarly, a 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; Nwosu et al., 1996, Kiyyu, 2003; Nganga et al., 2004) from different corners of world. The reason for which may be the fact that younger animals are more susceptible to infections than adults. Adult animals may acquire immunity to the parasites through frequent challenge and expel the ingested parasite before they establish infection, (Dunn, 1978; Shah-Fischer and Say, 1989).

The study also indicated higher prevalence in Kargil which is comparatively lowland as compared to Leh (high altitudes) which is in consent with reports from many parts of world (Teklye, 1991, Fikru et al., 2006).These low lands are characterized by a comparatively hot humid environmental situation which is favorable for the survival of the infective larval stage of most of the parasites.

The possible reason for higher prevalence of infection in weak animals could be that these animals possess weak immune system which cannot fight against the parasites to the same extent as that of the healthy immune system, or the reason could be sampling error as the number of healthy animals examined was comparatively more than the weak animals (Kuchai, 2008).

CONCLUSION

Based on the findings of present study it is clear that goats of Ladakh are infected with a variety of nematode parasites so may be the case with other animals of this region, therefore it seems to be an urgent task to take further steps towards the same field in order to gather more and more knowledge for a better management of helminth parasites which will lead to the better production.

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REFERENCES

Akerejola, O. O. Schillhorn van Veen, T. W. and Njoku, C. O. (1979). Ovine and caprine diseases in Nigeria: a review of economic losses. *Bull. Anim. Hlth. Prod. Afr*. 27: 65-70.

Blood DC and Radostits OM (2000). Veterinary Medicine, 7th 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, I. H. (1972). Helminthiasis in domestic and wild ruminants in Botswana- prelimnary

investigations. *Trop. Anim. Hlth. Prod.* 4: 175-181.

Dunn AM (1978). Veterinary Helminthoogy, 2nd edition London: William Heinemann Medical Books.

Fikru R Teshale S Reta D Yosef K (2006). Epidemiology of gastrointestinal parasites of ruminants in Western Oromia, Ethiopia. *International J. Applied Res. Vet. Med.,* 4(1): 51-57.

Fritche T Kaufmann J and Pfister K (1993). Parasite spectrum and seasonal epidemiology of gastro-intestinal nematodes of small ruminants in Gambia. *Vet. Parasit.,* 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. *Bull. Anim. Hlth. Prod. Afr*. 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. *Vet. Res. Communic.,* 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, 4th Jammu and Kashmir Science Congress.

Moyo DZ Bwangamoi O Hendrikx WM and Eysker M (1996). The epidemiology of gastrointestinal nematodes infections in communal cattle and commercial beef cattle on the highveld of Zimbabwe. *Vet. Parasit.,* 67(1-2): 105-120.

Nganga CJ Maingi N Munyua WK and Kanyari PW (2004). Epidemiology of helminth infection in ruminants of semi-arid area of Kenya. *Ondestepool J.Vet. Res.,* 71(3): 219-226.

Nwosu CO Ogunrinade AF and Fagbemi BO (1996). Prevalence and seasonal changes in the gastrointestinal helminths of Nigerian goats. *J. Helminth.,* 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).

Singh, K. S. and Srivastava, H. D. (1977). *Diagnosis and treatment of helminthic infections*. ICAR: New Delhi.

Sissay MM Uggla A and Waller PJ (2007). Prevalence and seasonal incidence of helminth parasite infections of ruminants in eastern Ethiopia. *Trop. Anim. Health Prod.,* 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. *Vet. Parasit.,* 70(1-3): 129-141.

Yamaguti S (1959). *Systema Helminthum* Volume I Inter Science Publishers.

Yamaguti S (1959). *Systema Helminthum* Volume I Inter Science Publishers.