

Parasitic fauna infections in Pashmina goats of cold arid region of Ladakh, India

I MAQBOOL¹, Z A WANI², I M ALLAIE³, R A SHAHARDAR⁴, F A BABA⁵ and AIMAN ASHRAF⁶

S K University of Agricultural Sciences and Technology, Shuhama, Srinagar, Jammu and Kashmir 190 001 India

Received: 21 May 2015; Accepted: 23 June 2015

Key words: Ladakh, Nematodirus, Parasitic fauna, Pashmina goats

Goats are one of the earliest domesticated ruminants which have served mankind longer than cattle and sheep. Goats can survive under limited fodder availability and they are capable of withstanding water scarcity (Upadhyay 2003). Pashmina goats (*Capra siberica*) play an important role in economy throughout the world and satisfy a number of needs of mankind in different ways. Rearing of Pashmina goats is a traditional practice of people of Ladakh-region of Jammu and Kashmir, for ensuring their livelihood. The wool of these animals is very costly, being used for production of world's finest shawls. The environmental conditions of this region suits for the development of Pashmina, therefore, these animals are reared in large numbers in Ladakh. Gastro-intestinal (GI) parasites cause major drain on the production of goats due to their adverse effects like reduction in appetite, loss of body weight, hypoproteinemia, impaired digestive efficiency, lowered productivity, retarded growth rate and even death (Holmes 1986, Sykes 1994, Al-Shaibani *et al.* 2009). Prevalence of GI parasites varies in diverse geographical conditions and is influenced by climate, management, vegetation and livestock density. In Jammu and Kashmir, the incidence of parasitic infection in goats from Jammu region has been reported by Khajuria and Kapoor (2003), Yadav *et al.* (2006), Khajuria *et al.* (2013) and Mir *et al.* (2013) and from Kashmir Valley by Tariq *et al.* (2010), Ahmad *et al.* (2012) and Bihaqi (2013). Due to the inclement weather, no transport facility, and very remoteness of the Ladakh-region from Srinagar city, only two studies by Kuchai *et al.* (2011) and Kuchai *et al.* (2012) are on record till date from this region regarding prevalence of parasites in goats. So, the present study was undertaken to report the occurrence of gastrointestinal parasites in Pashmina goats of Ladakh.

Ladakh being one of the highest places on earth with average altitude of about 12,000 feet constitutes the eastern-

most part of the state of Jammu and Kashmir and covers about 117,000 square km area. Climate of Ladakh experiences extremely cold winters with heavy snowfall, but it hardly rains here because of the lofty surrounding mountainous ranges. The summers and winters in Ladakh experience an average temperature of approximately -3°C to 30°C and -20°C to 15°C respectively. This area remains cut off from the rest of state during most parts of the year due to blockage of roads by snow and avalanches.

In the present study, 60 faecal samples from Pashmina goats were collected directly from the rectum of adults (> 2 yrs of age) using a gloved hand in disposable polythene bags and brought to Division of Veterinary Parasitology, SKUAST-K without adding any preservative as Ladakh is having cold arid type of climate. Samples were first examined grossly for colour, consistency, presence of blood, mucous and dead worms. Then they were examined by standard sedimentation and floatation techniques (Solusby 1982). Positive samples were pooled and then subjected to quantitative examination by Stoll's dilution technique to determine the parasitic load (eggs per gram and oocysts per gram) of faeces.

During the present study, 56.66% samples were found positive for one or the other parasitespecies. Strongyle worm eggs including *Nematodirus* (26.66%), *Moniezia* (15.0%), *Trichuris* (1.66%) and oocysts of *Eimeria* (28.33%) were recovered. Pure infection with *Nematodirus* spp. was observed in 23.33% of samples (Fig 1). Mixed infection was observed in (15.0%) samples (Table 1). Prevalence of GI helminths has been reported ranging from 0.72% to

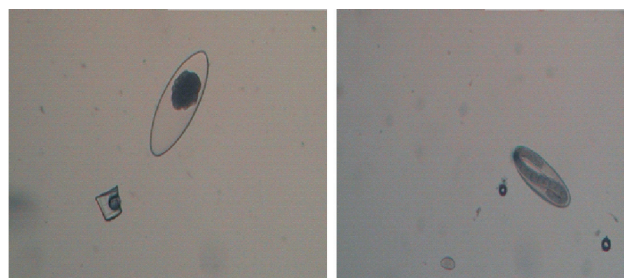


Fig. 1. *Nematodirus* egg and larva within egg. (left) *Nematodirus* egg (10 $\times$); (right) *Nematodirus* larva within egg (10 $\times$).

Present address: ^{1,6}M.V.Sc. Scholar (naikirshad919@gmail.com, aimanashrafmir@gmail.com), ²Assistant Professor (zahoorwani_103@yahoo.co.in), ³Assistant Professor (dr.idreesallaie@gmail.com), ⁴Professor (dr.rafiqshahrdar@gmail.com), Division of Veterinary Parasitology, ⁵M.V.Sc. Scholar (firdousbaba869@gmail.com), Division of LPM, Faculty of Veterinary Sciences and Animal Husbandry.

Table 1. Parasitic fauna of Pashmina goats of cold arid region of Ladakh, India

Samples examined	Samples positive	Strongyle eggs*	<i>Nematodirus</i> eggs	<i>Moniezia</i> eggs	<i>Trichuris</i> eggs*	<i>Eimeria</i> oocysts	Mixed infection	Mean EPG**	Mean OPG
60	34 (56.66)	16 (26.66)	14 (23.33)	9 (15.00)	1 (1.66)	17 (28.33)	9 (15.00)	100	100

*Including *Nematodirus* infection, ** EPG for strongyle worms. Figure in the parenthesis represent percentage of infection.

84.1% in domestic animals from various parts of the world (Bundy *et al.* 1983, Khan *et al.* 2010). Kuchai *et al.* (2011) examined GI tract of goats in Ladakh and reported 43.28% infection with single or multiple nematohelminth parasites and subsequently Kuchai *et al.* (2012) found that 31.42% Pashmina goats were infected with GI parasites. Tariq *et al.* (2010) reported prevalence of GI nematodes to the tune of 54.30% in goats of Kashmir Valley while Bihaqi (2013) reported 74.70%. Ahmad *et al.* (2012) reported 83.64% slaughtered goats positive for GI helminths in Ganderbal district of Kashmir Valley. The probable reasons of decreased infection of gastrointestinal helminths in the present study may be due to the unfavorable environmental factors for the development and growth of most helminth species (Andrews 1999, Lima *et al.* 1998), geographical locations, sample size, breed of the animals and managemental practices involved. Low strongyle infection observed in the study is mainly due to lower environmental temperature as the area is the world's cold desert and the temperature falls below -30°C . Since eggs of *Nematodirus* spp. require prolonged low temperature for hatching (Soulsby 1982), hence *Nematodirus* infection (23.33%) was reported in this study. The mean EPG for strongyleworms and OPG for Eimerian oocysts was observed 100 for each. Chenyambuga *et al.* (2009) reported that geometric mean faecal egg count (GFEC) ranged from 71.3 to 200.9, 185.8 to 516.4 and 273.5 to 924.7 eggs per gram (EPG) at the end of dry season, mid and end of rainy season, respectively in Small East African (SEA) goats and F_1 crosses of SEA with Saanen and Boer goats. Shija *et al.* (2014) reported that the EPG count in goats of Kongwa and Mvomero districts of Tanzania was observed to be 169 ± 0.03 and 171 ± 0.04 and OPG to be 793 ± 0.04 and 364 ± 0.2 respectively. Tariq *et al.* (2010) reported mean EPG of 2552.3 ± 85.7 in summer and 134.1 ± 9.1 in winter. Bihaqi (2013) also reported an average EPG count 312.7 ± 17.76 in goats of Kashmir Valley. The lower mean EPG for strongyle worms could be due to less number of samples examined as only 26.66% samples were found positive and also better managemental practices being adopted there. Since environmental conditions are harsh for most parts of the year, which make the survival of larva on the pasture difficult and they get killed before they are taken by the host, hence resulting in low infection and eventually low EPG for strongyle worms. Low EPG may also be due to breed resistance. This preliminary study could pave a way for conducting the extensive surveillance on prevalence to map out the flora and fauna of this region so as to evolve the package of practices for effective control of parasites.

SUMMARY

This preliminary study based on examination of 60 faecal samples was carried out on traditionally raised Pashmina goats (*Capra siberica*) of Ladakh region during the year, 2014. Out of 60 samples, 34 (56.66%) were positive for one or the other parasite species. Strongyle worm eggs including *Nematodirus* (26.66%), *Moniezia* (15.00%), *Trichuris* (1.66%) and oocysts of *Eimeria* (28.33%) were recovered. Pure natural infection with *Nematodirus* spp. was observed in 23.33% of samples. Mixed infection was observed in 15.00% of animals. The present study may be regarded as a step forward for evaluating the prevalence of parasites parasitizing the Pashmina goats of Ladakh, so as to evolve package of practices for their effective control.

REFERENCES

- Ahmad L B, Chisti M Z, Fayaz A and Hidayatullah T. 2012. A survey of GI helminths parasites of slaughtered sheep and goats in Ganderbal, Kashmir. *Global Veterinary* **8**: 338–41.
- Al-Shaibani I R M, Phulan M S and Shiekh M. 2009. Anthelmintic activity of *Fumaria parviflora* (Fumariaceae) against gastrointestinal nematodes of sheep. *International Journal of Agriculture Biology* **11**: 431–36.
- Andrews S J. 1999. The life cycle of *Fasciola hepatica*. *Fasciolosis*. pp 1–29. (Ed.) Dalton J P. CAB, Wallingford.
- Bihaqi. 2013. 'Prevalence and therapeutic studies on gastrointestinal helminth parasites of Goats in Kashmir valley.' M.V.Sc. thesis submitted to SKUAST-K.
- Bundy D A P, Arambulo P V and Grey C L. 1983. Fascioliasis in Jamaica: epidemiologic and economic aspects of a snail-borne parasitic zoonosis. *Bulletin Pan. Animal Health Organisation* **17**: 243–58.
- Chenyambuga S W, Mbagha S H and Muhikambe V R M. 2009. Seasonal variations of nematode infection in Small East African goats and their crosses with Boer and Saanen reared under extensive and semi-intensive systems. *Tanzania Veterinary Journal* **26**: 110–15.
- Holmes P H. 1986. Pathogenesis of trichostrongylosis. *Veterinary Parasitology* **18**: 89–101.
- Khajuria J K and Kapoor P R. 2003. Prevalence of parasites in sheep and goats at Kathua- Jammu. *Journal of Veterinary Parasitology* **17**: 121–26.
- Khajuria J K, Katoch R, Yadav A, Godara R, Gupta S K and Singh A. 2013. Seasonal prevalence of gastrointestinal helminths in sheep and goats of middle agro-climatic zone of Jammu province. *Journal of Parasitic Diseases* **37**: 21–25.
- Khan M N, Sajid M S, Iqbal Z and Hussain A. 2010. Gastrointestinal helminthiasis: prevalence and associated determinants in domestic ruminants of district Toba Tek Singh, Punjab, Pakistan. *Parasitology Research* **107**: 787–94.
- Kuchai J A, Chishti M Z, Tak H and Lone B A. 2012. Faecal examinations of Pashmina goats (*Capra siberica*) of Ladakh

- for nematode infections. *Global Journal of Science Frontier Research Biological Sciences* **12**: 37–40.
- Kuchai J A, Chishti M Z, Bhat A A and Tak H. 2011. A survey on caprine nematodiasis in Ladakh. *Worlds Veterinary Journal* **1**: 1–4.
- Lima W S. 1998. Seasonal infection pattern of gastrointestinal nematodes of beef cattle in Minas Gerais State-Brazil. *Veterinary Parasitology* **74**: 203–214.
- Mir M R, Chisti M Z, Rashid M, Dar S A, Khuchay J and Dar J A. 2013. Prevalence of gastrointestinal parasites in goats of Jammu region. *International Journal of Recent Scientific Research* **4**: 208–10.
- Shija D S N, Kusiluka J M, Chanyambuga S W, Shyo D and Lekule F P. 2014. Animal health constraints in dairy goats kept under small holder farming systems in Kongwa and Mvomero districts. *Tanzania Journal of Veterinary Medicine and Animal Health* **6**: 268–79.
- Soulsby E J L. 1982. *Helminths, Arthropods and Protozoa of Domesticated Animals*. Bailliere, Tindall and Cassel, London, pp 809.
- Sykes A R. 1994. Parasitism and Production in farm ruminants. *Animal Production* **59**: 155–72.
- Tariq K A, Chishti M Z and Ahmad F. 2010. Gastro-intestinal nematode infection of goats relative to season, host sex and age from the Kashmir valley. *Indian Journal of Helminthology* **84**: 93–97.
- Upadhyay B A. 2003. *Goat breeding strategies with reference to commercial goat production*. Department of Animal Science and Dairy science, Mahatma Phule Krishi Vidhyapeeth, Rahuri, Maharashtra. State level workshop on recent advance-goat rearing.
- Yadav A, Khajuria J K and Raina A K. 2006. Seasonal prevalence of gastrointestinal parasites in sheep and goats of Jammu. *Journal of Veterinary Parasitology* **20**: 65–68.