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

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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, Sykes1994, 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 Stolls 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 parasites species. 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 (10x); (right) Nematodirus larva within egg (10x).](image-url)
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 nematodes. While 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 low temperature for hatching (Soulshy 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 (GPEC) 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 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 Ladakh. 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 low temperature for hatching (Soulshy 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 (GPEC) 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 F1 crosses of SEA with Boer and Saanen reared 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 F1 crosses of SEA with Boer and Saanen reared 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 F1 crosses of SEA with Boer and Saanen reared

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

<table>
<thead>
<tr>
<th>Samples examined</th>
<th>Samples positive</th>
<th>Strongyle eggs*</th>
<th><em>Nematodirus</em> eggs</th>
<th><em>Moniezia</em> eggs</th>
<th><em>Trichuris</em> eggs*</th>
<th>Eimerian oocysts</th>
<th>Mixed infection</th>
<th>Mean EPG**</th>
<th>Mean OPG</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>34 (56.66)</td>
<td>16 (26.66)</td>
<td>14 (23.33)</td>
<td>9 (15.00)</td>
<td>1 (1.66)</td>
<td>17 (28.33)</td>
<td>9 (15.00)</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

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

**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**


