Seasonal prevalence of gastrointestinal parasites in sheep of Kashmir valley

MM Shah, I Maqbool, A Manzoor, N Shabnum, T Rather and SA Ahanger

Abstract
The survey was conducted to find out the prevalence of gastrointestinal (GI) parasites in different seasons in sheep of Kashmir valley. A total of 5361 faecal samples subjected to standard flotation technique revealed an overall prevalence of 46.70% for different gastrointestinal parasites. Highest prevalence was observed for strongyles (34.94%) followed by Eimeria spp. (7.59%), Moniezia spp. (3.49%) and Strongyloides spp. (0.69%). Among strongyle parasites recovered, the prevalence of Nematodirus spp. was reported to be 1.00%. Overall seasonal variation revealed highest prevalence of GI parasites in summer (55.39%) followed by autumn (52.52%), winter (44.66%) and spring (36.44%), the difference being statistically significant (P < 0.05) between spring and winter, spring and summer and spring and autumn. Moniezia spp. was found significantly (P < 0.05) highest in winter with a prevalence of 5.05 percent. Significantly (P < 0.05) highest prevalence of strongylo worms was found in autumn (47.16%) followed by summer (33.8%) and winter (32.70%) and spring (27.33%) season. Nematodirus and Strongyloides spp. were found significantly (P < 0.05) highest in summer (1.90%) and autumn (1.04%) seasons, respectively. Eimeria spp. revealed highest prevalence in summer (19.7%) followed by winter (6.00%) spring (3.94%) and autumn season (2.40%), the difference being statistically significant (P < 0.05) between spring and summer, autumn and winter, spring and winter and summer and winter.

Keywords: Gastrointestinal parasites, Kashmir valley, sheep, Seasonal prevalence

1. Introduction
Gastrointestinal parasitism due to nematodes is one of the major constraint for livestock production as heavy losses are inflicted in the form of decreased production, impaired gastrointestinal functions, morbidity, mortality, less feed conversion ratio (FCR), dull hair coat and changes in water balance (Nwosu et al. 2007; Lashari et al. 2011) [6, 10]. The infection caused by gastrointestinal nematodes (GIN) in ruminants has a worldwide distribution but higher prevalence’s are present in temperate areas where climatic conditions favour the development of free-living stages of parasites (Martínez et al. 2013) [9]. Coccidiosis also represents one of the most important disease threatening animal industry and is clinically associated with dysentery, reduced growth, dehydration, fever, inappetence, weight loss, anaemia, death in young animals and even wool breaking specialists in sheep (Galip, 2004 and Yakhchali and Golami, 2008) [4, 22]. Moniezia spp. are associated with diarrhoea, unthriftness, depressed wool and meat production (Soulby 1982) [15]. Inspite of such health problems and economic losses, the problem of GI parasites is neglected due to its insidious and chronic nature. In order to develop suitable control measures for parasitic diseases there is a need to map out the parasitic fauna from every geographic zone of the world as local climatic conditions and seasonal variations mainly affect the prevalence of parasites. Therefore, the present study was undertaken to work out the prevalence of GI parasites focusing specially on moneiziosis, GI nematodiosis and coccidiosis in sheep of Kashmir valley in different seasons to evolve a package of practices for control of these parasites.

2 Materials and Methods
2.1 Study area: The study was conducted on locally reared sheep from different districts (Central/North/South) of Kashmir valley. Kashmir valley is situated between the Pir Panjal range and the Zanskar range and has an area of 15220 sq kms. The latitude and longitude of Kashmir Valley is 33.27 and 76.2519, respectively. The valley is bounded on all sides by mountains and average height of the valley is 1850 metres above sea level.
The climate of the valley is temperate cum mediterranean type and in the higher reaches, the temperature remains cold throughout the year.

2.2 Parasitological examination: Studies on the prevalence of GI parasites in sheep of Kashmir valley was carried out by randomly collecting 5361 samples from locally reared sheep. The samples were collected directly from the rectum and brought to the Disease investigating laboratory Nowshera, Srinagar in mini polythene bags for examination. The samples were collected in all the four seasons viz; spring (March-May), summer (June-August), autumn (September-November) and winter (December-February). Samples were subjected to standard Floatation technique as described by Soulsby (1982) [15] to work out the prevalence of different genera of gastro-intestinal parasites.

2.3 Statistical Analysis: The results were subjected to standard statistical analysis as per Snedecor and Cochran (1994) [16]. Chi square test was employed to determine whether differences between various parameters within and between groups were statistically significant or non-significant.

3. Results and Discussion

The present study revealed an overall prevalence of GI parasites (cestode, nematodes & coccidia) to the tune of 46.70%. The parasites observed were Moniezia spp. (3.49%), strongyles (34.94%), and Nematodirus spp. (1.00%) Strongyloides spp. (0.69%) and Eimeria spp (7.9%). This is in line with Bhat et al. (2012) [2] who reported prevalence of Moniezia spp. as 3.0% in sheep of Kashmir valley. However results differed from those of Makhdoomi et al. (1995) [7], Pandit et al. (2003) [11], Shahnawaz et al. (2011) [14] and Tramboo et al. (2015) [16] who reported prevalence of Moniezia spp. as 1.89, 9.03, 11.83 and 7.92% respectively in sheep from different areas of Kashmir valley. Prevalence of strongyles reported in the present study is lower than reported by Tramboo et al. (2015) [16] and Allaie et al. (2018) [1] who reported prevalence of strongyloge worms as 57.75 and 72.85% in sheep of Budgam district and among small ruminants of Kashmir valley, respectively. However Bhat et al. (2012) [2] reported lower prevalence of strongyloge worms (24.61%) amongst sheep of Kashmir valley. The highest prevalence of strongyloge worms in the present study may be due to the reason that these worms are prolific egg layers and take lesser time for completion of life cycle and thus grazing areas become heavily infested with the larvae of strongyle worms within a period of fortnight. Prevalence of Strongyloides spp. is in close approximation with with Yadav et al. (2006) [21] in Jammu region (1.15%). The observed prevalence of Eimeria spp is in accordance to Bhat et al. (2012) [2] who reported prevalence of Eimeria spp. as 9.8% in sheep of Kashmir valley. However results differed from those of Rehman et al. (2011) [12], Reshi & Tak (2014) [13] and Maqbool et al. (2016) [8] who observed prevalence of Eimeria spp. as 55.99, 54.68, 28.33% in goats of Pakistan, sheep of Kashmir valley and Pashmina goats of Ladakh region, respectively.

Overall seasonal variation revealed highest prevalence of GI parasites in summer (55.39%) followed by autumn (52.52%), winter (44.66%) and spring (36.44%), the difference being statistically significant (P<0.05) between spring and winter, spring and summer and spring and autumn. Moniezia spp. was found significantly (P<0.05) highest in winter with a prevalence of 5.50 percent. This in accordance with Bhaiqi et al. (2017) [3] who reported prevalence of Moniezia spp. highest in winter season among goats of Kashmir valley. Significantly (P<0.05) highest prevalence of strongyle worms was found in autumn (47.16%) followed by summer (33.8%), winter (32.70%) and spring (27.33%) season. The results of the present study differed from those of Tramboo et al. (2015) [16] and Bhaiqi et al. (2017) [3] who observed highest prevalence of strongyle worms in summer season in sheep and among goats of Budgam district & Kashmir valley, respectively. Also wani et al. (2011) [30] reported highest prevalence of GIN in summer season amongst sheep of Ganderbal district of Kashmir valley. The rainy season starting in spring and continuing to early summer make environmental conditions more favourable for the development and survival of pre-parasitic stages of strongyle worms and leads to an increased availability of infective larvae in the rainy and post rainy seasons. Nematodirus and Strongyloides spp. were found significantly (P<0.05) highest in summer (1.90%) and autumn (1.04%) seasons, respectively. Eimeria spp. revealed highest prevalence in summer (19.7%) followed by winter (6.00%) spring (3.94%) and autumn season (2.40%), the difference being statistically significant (P<0.05) between spring and summer, autumn and winter, spring and winter and summer and winter. This is in accordance to Wald et al. (2018) [19] who reported highest prevalence of Eimeria spp. in summer amongst sheep of Egypt. However results differed from those of Sivajoti & Reddy (2018) [15] who reported lowest prevalence of Eimeria spp. in summer season in sheep of Andra Pradesh.

<table>
<thead>
<tr>
<th>Season</th>
<th>No. Examined</th>
<th>No. Positive</th>
<th>M</th>
<th>S</th>
<th>N</th>
<th>N. St.</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring</td>
<td>1372</td>
<td>500 (36.44%)</td>
<td>62 (4.52%)</td>
<td>375 (27.33%)</td>
<td>9 (0.66%)</td>
<td>9 (0.66%)</td>
<td>54 (3.94%)</td>
</tr>
<tr>
<td>Summer</td>
<td>1159</td>
<td>642 (55.39%)</td>
<td>14 (1.21%)</td>
<td>392 (33.82%)</td>
<td>22 (1.90%)</td>
<td>8 (0.69%)</td>
<td>228 (19.67%)</td>
</tr>
<tr>
<td>Autumn</td>
<td>1249</td>
<td>656 (52.52%)</td>
<td>24 (1.92%)</td>
<td>589 (47.16%)</td>
<td>7 (0.56%)</td>
<td>13 (1.04%)</td>
<td>30 (2.40%)</td>
</tr>
<tr>
<td>Winter</td>
<td>1581</td>
<td>706 (44.66%)</td>
<td>87 (5.50%)</td>
<td>517 (32.70%)</td>
<td>16 (1.01%)</td>
<td>7 (0.44%)</td>
<td>95 (6.00%)</td>
</tr>
<tr>
<td>Total</td>
<td>5361</td>
<td>2504 (46.70%)</td>
<td>187 (3.49%)</td>
<td>1873 (34.94%)</td>
<td>54 (1.00%)</td>
<td>37 (0.69%)</td>
<td>407 (7.59%)</td>
</tr>
</tbody>
</table>

Figures within parenthesis indicate percentage. Values with different superscript in a column under a subgroup vary significantly (P<0.05). M= Moniezia spp, S= Strongyles, N= Nematodirus spp, St. = Strongyloides spp, E= Eimeria spp.
4. Conclusion
The present study revealed prevalence of GI parasites (Moniezia spp., Strongyle worms, Strongyloides spp. and Eimeria spp.) in accordance to different seasons of the year. Hence it is concluded that appropriate management practices be adopted including use of those anthelmintics/anticoccidials which are effective against GI nematodes/coccidia therapeutically as well as prophylactically to prevent production losses.

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6. References