

*Original Research***Prevalence of Gastrointestinal Parasites of Goats in Aeolian Plains of Haryana, India****Priyanka, Sukhdeep Vohra, Satyavir Singh and Arun K. Sangwan***

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Abstract

A total of 1080 goat faecal samples were examined from six villages of three districts (Charkhi dadri, Bhiwani and Mahendergarh) in aeolian plains of Haryana, of which 988 (91.50%) were positive for helminthic infections. The various helminth parasites observed were strongyles (89.81%), *Strongyloides* spp. (37.04%), *Trichuris* spp. (11.67%) and *Moniezia* spp. (3.15 %). Infection was significantly higher in adults (92.90%) as compared to young animals (80.8%). Significantly higher ($p < 0.05$) infection rate was observed in monsoon (98.9%) as compared to winter (86.7%), spring (87.8%) and summer (92.6%) season. A non-significant difference was observed between male and female for gastrointestinal parasites in the study area. Coproculture studies revealed *Haemonchus contortus* (86-94%) as predominant parasite during all the seasons, followed by *Strongyloides* spp. (1-8%), *Trichostrongylus* spp. (2-5%) and *Oesophagostomum* spp (1%).

Key words: Aeolian Plains, Goats, Prevalence, Risk Factors**How to cite:** Sheoran, P., Vohra, S., Singh, S., & Sangwan, A. (2019). Prevalence of Gastrointestinal Parasites of Goats in Aeolian Plains of Haryana, India. International Journal of Livestock Research, 9(12), 28-33. doi: 10.5455/ijlr.20190926101437**Introduction**

Goats are considered as an important livestock species all over the globe, especially in tropical and subtropical regions. Goat has a pivotal role in small scale farming and rural economy of developing societies because goat farming generates employment and supplement house hold income. Furthermore, goats can survive under limited fodder and are also capable to withstand water scarcity (Upadhyay, 2003). Goats are primarily raised for milk, meat, hair and leather production (Hassan *et al.*, 2011). These small ruminants suffer from various diseases among which helminth parasitism is globally considered to be the most important (Sanyal, 1996). Among helminth parasitism, gastrointestinal (GI) nematodosis, is a major parasitic disease and is widely spreading in the world (Men *et al.*, 2016) causing huge economic losses in a wide range of agro-climatic zones (Waller, 1997). These infections are responsible for a number of

economic losses in a variety of ways like losses through lower fertility, reduced work capacity, involuntary culling, reduction in feed intake, lower weight gains, reduction in milk and meat production, increased treatment costs and mortality in heavily parasitized animals (Fikru *et al.*, 2006). It has always been a major impediment in small ruminant production and this problem is severe in tropical and sub-tropical climates due to favourable ecological factors available for transmission of helminth parasites (Gupta *et al.*, 2013). Hence, a proper understanding about the epidemiology of GI parasitism is a prerequisite for the rational designing of the effective preventive and control measures against these diseases. In Haryana, limited studies have been undertaken to provide information on the epidemiology of GI infections in small ruminants of Haryana (Gupta *et al.*, 1987). Keeping the same in view, the present study was taken into consideration in order to explore the prevalence of various GI parasites infecting the goats in aeolian plains of Haryana and various associated risk factors for an effective management.

Materials and Methods

Study Area

The prevalence of GI parasites was studied in goats of six villages belonging to three districts *i.e.* Satnali and Dalanwas village of Mahendergarh district, Loharu and Kairu village of Bhiwani district and Badhra and Kadma village of Charkhi Dadri district in aeolian plains of Haryana.

Sample Collection and Processing

Fifteen faecal samples per month, from the same flock of each village were collected throughout the year from March, 2018 to February, 2019. Faecal samples were collected at random along with relevant epidemiological data according to the age, sex, month and season. The faecal samples were collected appropriately from rectum using protective disposable gloves. All the samples were subjected to floatation and sedimentation techniques to enumerate the prevalence of GI parasitism in goats. Positive samples were subjected to quantitative examination using McMaster coprological diagnostic technique to assess the intensity of GI parasitism (EPG) (Soulsby, 1982). Coproculture techniques were employed to differentiate the third stage larvae (L₃) for species identification of GI parasites based on morphological and morphometric characteristics (Keith, 1953). Results of these techniques were analyzed and interpreted. Seasons were categorized as spring (February-March), summer (April to June), monsoon (July to September) and winter (October to January). Animal's factors like age *i.e.* young (≤ 6 months) or adult (>6 months) and sex (male or female) were also incorporated in study. The data was statistically analysed using chi square and z-test.

Results and Discussion

The coprological examination of 1080 faecal samples in aeolian plains of Haryana revealed the presence of strongyle, *Strongyloides* spp., *Trichuris* spp. and *Moniezia* spp. eggs (Table 1). A total of 988 (91.50%) animals were positive for single or mixed infection. The infection of strongyle, *Strongyloides* spp., *Trichuris* spp. and *Moniezia* spp. was 89.81%, 37.04%, 11.67% and 3.15%, respectively. Almost similar findings have been reported by Singh *et al.* (2015) in goats of Madhya Pradesh; Varadharajan and Vijayalakshmi (2015) in small ruminants of Tamil Nadu; Vohra *et al.* (2018) in small ruminants in Hisar, Haryana and Zvinorovae *et al.* (2016) in goats in Zimbabwe.

Table 1: Prevalence of various gastrointestinal (G.I) parasites in aeolian plains of Haryana

GI Parasites	Number of examined goats (n= 1080)	
	No. of goats infected	Prevalence (%)
Strongyle	970	89.81
<i>Strongyloides</i> spp.	400	37.04
<i>Trichuris</i> spp.	126	11.67
<i>Moniezia</i> spp.	34	3.15
Overall positive	988	91.5

The number of goats positive for different GI parasites and their prevalence in relation to age, sex and season is depicted in Table 2. The results in relation to age showed a significantly higher infection of strongyle ($p < 0.01$) and *Strongyloides* spp. ($p < 0.05$) in adults as compared to young animals.

Table 2: Prevalence of various gastrointestinal parasites in relation to age, sex and season

Risk factors		No. Examined	Number positive (%)				
			Strongyle	<i>Strongyloides</i> spp.	<i>Trichuris</i> spp.	<i>Moniezia</i> spp.	Overall
Age	Young	125	93 (74.40)	35 (28.00)	21 (16.80)	7 (5.60)	101 (80.8 ^a)
	Adult	955	877 (91.83)	365 (38.22)	105 (10.99)	27 (2.83)	887 (92.9 ^b)
	Chi-square		36.719**	4.951*	3.615 ^{NS}	2.787 ^{NS}	
Sex	Male	111	96 (86.49)	49 (44.14)	13 (11.71)	5 (4.50)	99 (89.2 ^a)
	Female	969	874 (90.20)	351 (36.22)	113 (11.66)	29 (2.99)	889 (91.8 ^a)
	Chi-square		1.498 ^{NS}	2.68 ^{NS}	.000 ^{NS}	0.746 ^{NS}	
Season	Spring	180	153 (85.00 ^a)	70 (38.89 ^b)	39 (21.67 ^b)	11 (6.11 ^a)	158 (87.8 ^{ab})
	Summer	270	250 (92.59 ^b)	91 (33.70 ^b)	74 (27.41 ^b)	8 (2.96 ^a)	250 (92.6 ^b)
	Monsoon	270	265 (98.15 ^c)	149 (55.19 ^c)	9 (3.33 ^a)	6 (2.22 ^a)	267 (98.9 ^c)
	Winter	360	302 (83.89 ^a)	90 (25.00 ^a)	4 (1.11 ^a)	9 (2.50 ^a)	312 (86.7 ^a)
	Chi-square		41.155**	62.052**	139.497**	6.468 ^{NS}	

** Significant at 1% level, * Significant at 5% level, NS- Non-Significant

The infection of *Trichuris* spp. and *Moniezia* spp. did not reveal any statistical difference. Our findings were in concordance with Yadav *et al.* (2006), Emiru *et al.* (2013) and Singh *et al.* (2017) at Jammu, South west Ethiopia and Punjab, respectively. The possible reason may be consumption of higher amount of

vegetation and grazing on larger area of pastures being contaminated with various flocks and different stress conditions on animals like climate, long daily traveling and gestation in adults. On the other hand, young animals are less affected by parasites due to consumption of lesser amount of vegetation and less exposure for grazing as they mainly depend upon milk feeding. The coprological results revealed a non-significant difference between males and females. Almost similar percentage of infection in both male and female animals in our study might be due to similar management practices and same area visited during grazing activity.

The results in goats showed maximum infection of strongyle and *Strongyloides* during monsoon season. The infection of strongyle, *Strongyloides* spp. and *Trichuris* spp. was significantly ($p < 0.01$) associated between seasons. Similar were the observation of Gupta *et al.* (1987) in eastern region of Haryana and Gaherwal *et al.* (2016) in Madhya Pradesh. The higher prevalence in monsoon could be attributed to the favourable climatic conditions, viz., humidity and temperature which support parasitic growth and development leading to increased availability of infective larvae during monsoon. It is well documented that GI parasitism in grazing animals is directly related to the availability of larvae on pasture and seasonal pasture contamination (Gaherwal *et al.*, 2016). Climatic factors also influence larval dispersion on the herbage which increases the chance of contact between host and larvae. Higher rate of infection in monsoon may also be attributed to suitable molarities of salt present in soil which is an important factor for ecdysis (Soulsby, 1966). Such climatic conditions also help in bacterial multiplication which provides nutrition to free-living larvae.

The monthly examination of faeces revealed maximum (100%) animals were infected with one or other type of infection during August and September months. A minimum of 82.22% infections in goats was observed during October. There was a significant difference ($P < 0.05$) between prevalence of various GI parasites during July (96.7%), August (100%) and September (100%) with other months. This may be due to the seasonal dynamics influencing ecological and environmental conditions for the development and survival of preparasitic stages in the study area. The month wise mean egg per gram (EPG) counts of strongyles in goats belonging to aeolian plains of Haryana revealed that the mean EPG of animals was maximum (2081.11) during the month of August and minimum (262.78) during the month of February. The present result varied with the report of Khajuria *et al.* (2013) from Jammu who reported two peaks of EPG i.e. August and May months. This might be due to variation in the geographical location and environmental conditions of the study areas.

The results of coproculture studies of GI nematodes in sheep are presented in Table 3. The faecal culture showed that the larvae of *Haemonchus contortus*, *Trichostrongylus* spp., *Oesophagostomum* spp. and *Strongyloides* sp. were present. The larvae of *H. contortus* (86-94%) were the main contributor throughout the study period among all the four species identified in coproculture. Gupta *et al.* (1987) also demonstrated

infective larvae of *Haemonchus* spp. and *Trichostrongylus* spp. throughout the year in goats and sheep of eastern Haryana. Other workers who reported the predominance of *Haemonchus* were Tariq *et al.* (2010) in goats of Kashmir valley; Lone *et al.* (2012) in small ruminants at Ganderbal district, Kashmir; Gaherwal *et al.* (2016) in Barwani district, Madhya Pradesh; Zvinorovae *et al.* (2016) in Zimbabwe and Sivajothi and Reddy (2018) in Andhra Pradesh.

Table 3: Larval composition (%) in coproculture studies in aeolian plains of Haryana

Season	<i>Haemonchus contortus</i> (%)	<i>Trichostrongylus</i> spp. (%)	<i>Oesophagostomum</i> spp. (%)	<i>Strongyloides</i> spp. (%)
Spring	91	2	1	6
Summer	94	4	1	1
Monsoon	86	5	1	8
Winter	93	2	1	3

Conclusion

The prevalence of GI parasites in goats of aeolian plains in Haryana was 91.50%. The highest prevalence of strongyle, followed by *Strongyloides*, *Trichuris* and *Moniezia* was observed. Maximum prevalence was recorded in monsoon season during August and September months and highest epg of strongyles was observed during August. The coproculture study revealed the predominance of *Haemonchus contortus* throughout the study period.

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