International Journal of Livestock Research, Vol. 11 (2) Feb' 2021
http://www.ijlr.org
eISSN: 2277-1964
NAAS Rating 2020 – 5.36

Original Research

Prevalence of Gastrointestinal Parasites in Goats in and Around Rewa, India

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How to cite this paper: Chaurasiya, R., Dixit, P., & Dixit, A. (2021). Prevalence of Gastrointestinal Parasites in Goats in and around Rewa, India. *International Journal of Livestock Research*, 11(2), 150-154. http://dx.doi.org/10.5455/ijlr.20201129033041

Received : Dec 09, 2020
Accepted : Jan 09, 2020
Published : Feb 28, 2021

Abstract

To estimate the prevalence of gastrointestinal parasites in goats in and around Rewa, India, faecal samples collected from 504 goats were screened for eggs of different gastrointestinal parasites using standard floatation and sedimentation methods. The overall prevalence of gastrointestinal parasites was 79.96% with 29.28% samples having mono infection while 70.72% samples were having mixed infection. Prevalence was highest for strongyles (55.95%) followed by coccidia (45.83%), amphistomes (33.73%), Trichuris spp. (15.28%), Moniezia spp. (11.51%), Strongyloides sp. (3.57%) and Fasciola sp. (2.38%). The prevalence in kids (87.5%) was non-significantly higher than adults (79.71%). The prevalence in females (85.78%) was significantly higher ($p<0.01$) as compared to males (55.21%). Maximum prevalence of parasites was found in winter months (93.47%) followed by monsoon (89.28%), summer (70%), and post monsoon (62.06%). The study will provide baseline data for control of gastrointestinal parasites in the area.

Keywords: Goat, Gastrointestinal parasite, Prevalence, Risk factors

Introduction

Prevalence studies on gastrointestinal nematodes are of utmost importance. Due to climate changes, deforestation and increased irrigation facilities, the ecological niche of the parasites as well as of its intermediate hosts changes resulting into changes in prevalence or the epidemiology of the parasitic diseases (Dixit *et al.*, 2017a). Studies conducted on this aspect have reported the prevalence from around the globe (Asmare *et al.*, 2016) including different parts of India (Khajuria *et al.*, 2013; Sorathiya *et al.*, 2017). In Madhya Pradesh, studies have been undertaken for determining the prevalence and risk factors associated with gastrointestinal nematodes in goats in Jabalpur (Gupta *et al.*, 2013; Dixit *et al.*, 2016; Sunandhadevi *et al.*, 2017). But no data are available on prevalence of gastrointestinal parasites from Rewa (M.P.) hence the present work was conducted to reveal the present situation of prevalence of gastrointestinal parasites.

Materials and Methods

Rewa is situated at 24°31′57″ N latitude and 81°17′32″ E longitudinal at 309 MSL (Mean sea level), having humid subtropical climate with total annual rainfall of 1128 mm. A total of 504 faecal samples of goats were collected per rectally from different localities in and around Rewa during one year period from February 2017 to January 2018. In the present study, year was divided into four seasons' *viz.* winter (Dec-Feb), summer (March-May), monsoon (June-Sept) and post – monsoon (Oct-Nov). Goats were divided into two groups according to their age as kids (<6 months) and adults (>6 months).

Before collection of faecal samples, signalment (age, sex) of the animal was also recorded. Faecal samples were collected in individually labelled polythene bags and taken to the laboratory at the earliest for further examination by standard coprological methods i.e., salt flotation and sedimentation techniques. The eggs and oocysts were identified based on morphological characteristics (Zajac and Conboy, 2012). The association of different risk factors (*i.e.*, season, age and sex) with the prevalence of parasites was tested employing Chi-square test of independence of attributes. Risk factor correlations with $p<0.05$ were considered significant and $p<0.01$ were considered highly significant (Snedecor and Cochran, 1994).

Results and Discussion

The overall prevalence of gastrointestinal parasites was 79.96 per cent. This prevalence was higher than 63.4% and 63.88 % prevalence recorded by Rahman *et al.* (2017) and Amran *et al.* (2018), respectively from Bangladesh. Babjak *et al.* (2017) and Verma *et al.* (2018) have reported a higher prevalence of 95.90 and 86.11% for gastrointestinal parasites in goats, from Slovakia and semi-arid region of India, respectively. Gupta *et al.* (2016) and Sunandhadevi *et al.* (2017) reported prevalence 72.78% and 73.15% (close to the present investigation) for gastrointestinal parasites in goats in and around Jabalpur district of Madhya Pradesh, respectively. While Shakya *et al.* (2017) had reported lower prevalence of 43.44 per cent in and around Mhow area of Madhya Pradesh.

In the present study, the prevalence was apparently higher in kids (87.50%) than that of adults (79.71%) (Table 1) which can be due to lower immunity of the young host to parasite (Urquhart *et al.*, 1996). Wondimu and Gutu (2017) reported higher prevalence of gastrointestinal parasites in young small ruminants (88.18%) than in adults (86.74%). Jena *et al.* (2018) and Dugassa *et al.* (2018) also reported higher prevalence in kids as compared to adults. Though Shakya *et al.* (2017) reported higher prevalence of gastrointestinal parasites in older goats (50.43%) as compared to that of young goats (19.31%). Sunandhadevi *et al.* (2017) also reported higher prevalence of gastrointestinal parasites percent in adult goats (84.14%) as compared to that of kids (64%) in Jabalpur, Madhya Pradesh. Sex wise, the prevalence of GI parasites was significantly higher in females (85.78%) as compared to males (55.21%) (Table 1) comparable to reports of Shakya *et al.* (2017) and Islam *et al.* (2017). The prevalence was generally higher in females due to high stress and low immunity status during lactation period, post parturient period and also when the animal is pregnant (Jena *et al.*, 2018). In pregnant animals, high levels of prolactin and progesterone hormone also increase the susceptibility of females to any infection (Lloyd, 1983). Contrary to this, Hossain *et al.* (2015) reported higher prevalence of gastrointestinal parasites in males (55%) as compared to that of females (45%). The prevalence reported in females in the present study was almost similar to the prevalence reported by Wondimu and Gutu (2017).

In the present study, maximum prevalence of parasites was found in winter months (93.47%) followed by that of monsoon (89.28%), summer (70%), and post monsoon (62.06%) (Table 1). Dixit *et al.* (2017b) also reported higher

prevalence of GI parasites in winters in goats. This pattern is slightly different from the finding of Sorathiya *et al.* (2017) who have reported higher incidence during monsoon season than the summer and winter season. Islam *et al.* (2017), Shakya *et al.* (2017), Rahman *et al.* (2017) and Amran *et al.* (2018) have also reported higher prevalence of the parasites in rainy season in small ruminants while Saiyam *et al.* (2018) reported highest prevalence of gastrointestinal helminths in postmonsoon season (83.16%). In the present study, higher prevalence (almost similar to that of rainy season) in winter could be attributed to climatic changes and rainfall in early winters too. Comparatively lower prevalence of gastrointestinal parasites in summer as compared to that of winter and monsoon might be due to high temperature and low rainfall in this season which is detrimental to the development and survival of free-living stages of parasite (Swarnkar and Kumawat, 2013; Jas and Pandit, 2017).

Table 1: Prevalence of gastrointestinal parasites in goats

Factor	Level	Examined	Prevalence (%)	Degree of freedom	X^2 Value
Age	Young	16	14 (87.5)	1	0.58
	Adult	488	389 (79.71)		
Sex	Female	408	350 (85.78)	1	45.34**
	Male	96	53 (55.21)		
Season	Monsoon	252	225 (89.28)	3	47.67**
	Post monsoon	116	72 (62.06)		
	Winter	46	43 (93.47)		
	Summer	90	63 (70)		

*Figures in parentheses indicate percentage; ** X^2 values were considered highly significant at $p<0.01$ level*

Parasite wise, highest prevalence was of strongyles (55.95%) followed by that of coccidia (45.83%), amphistomes (33.73%), *Trichuris* spp. (15.28%), *Moniezia* spp. (11.51%), *Strongyloides* sp. (3.57%), and *Fasciola* sp. (2.38%). Dixit *et al.* (2017a), Gupta *et al.* (2016), Sunandhadevi *et al.* (2017) and Shakya *et al.* (2017) had also reported variable prevalence of different species of gastrointestinal parasites in goats from different areas of Madhya Pradesh. Dugassa *et al.* (2018) had also reported highest prevalence of strongyles (54.17%) among all other gastrointestinal parasites of small ruminants while *Eimeria* spp. was the predominant parasite in the study done by Zvinorova *et al.* (2016) in Zimbabwe. Hossain *et al.* (2015) reported the highest prevalence of amphistomes (50%) in small ruminants in Bangladesh. Higher prevalence of *Eimeria* spp. and strongyle might affect the host condition adversely as some nematodes suck blood of host while *Eimeria* spp. affect intestinal epithelium adversely leading to further lack of nutrient absorption (Radostitis *et al.*, 2007).

Out of 403 positive samples, 285 samples (70.72%) were positive for mixed infections while 118 samples (29.28%) were positive for mono infection. The results of present study are similar to the results of studies done by Gupta *et al.* (2016) and Satish *et al.* (2018) who reported higher mixed infections as compared to mono infections while Sunandhadevi *et al.* (2017) reported almost similar prevalence of mono and mixed infections in goats in Jabalpur.

Conclusion

This seems to be the first exhaustive study on prevalence of gastrointestinal parasites in small ruminants in and around Rewa (Madhya Pradesh). The prevalence of parasites was high (79.96%). Sex and season are the main risk factors for prevalence. This data will help the veterinarians of the area in planning future research and control strategies.

Conflict of Interests

There is no conflict of interest.

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