SHORT COMMUNICATION

Prevalence and Risk Factors of Caprine Gastrointestinal Parasites in and around Rewa, Madhya Pradesh, India

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Abstract

Prevalence studies are important for the control of parasitic diseases. A total of 1003 fecal samples of goats in and around Rewa were screened with standard flotation and sedimentation methods. The overall prevalence of gastrointestinal parasites was 92.52% in goats. The maximum prevalence of strongyles was 92.22% followed by coccidia (27.22%), *Trichuris* spp. (13.06%) and *Moniezia* spp. (7.78%). The prevalence was significantly higher ($p < 0.05$) in the kids (96.39%) as compared to that of adults (91.59%). The prevalence of gastrointestinal parasites was non-significantly higher in males (93.97%) than that of females (91.69%). Season-wise prevalence was highest in monsoon season (95.65%) followed by that of post-monsoon season (95.41%), winter season (91.47%) and summer season (79.73%). Sex and season were the main risk factors found in the study.

Keywords: Gastrointestinal parasites, Goat, Prevalence, Seasonal changes.

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Introduction

As per the 20th livestock census, India has the second-largest population of goat (148.88 million) globally. Gastrointestinal (GI) parasites are a major constraint to goat production as they cause significant losses in the form of reduced production, weight gain, growth, fertility, and increased cost of treatment (Perry and Randolph, 1999). The economic losses due to nematode infection in India have been estimated to be $ 103 million/year (Mcleod, 2004). Prevalence indicates the total number of cases existing in the population. In nematode parasites, the development from eggs to infective L_3 larva mostly occurs in the soil and therefore, their prevalence mainly depends upon climatic factors such as temperature, average rainfall, soil type, and pH. Prevalence studies also help to correlate different risk factors associated with the high prevalence of parasites in an area. These risk factors can play a significant role in planning parasite control strategies. Due to the scarcity of data related to the prevalence of GI parasites in Rewa district of Madhya Pradesh, the present study was planned to assess the prevalence of gastrointestinal parasites and associated risk factors.

Materials and Methods

A total of 1003 faecal samples of goats from April 2018 to March 2019 were screened in and around Rewa District of Madhya Pradesh for gastrointestinal parasites. Faecal samples were collected in individually labeled polythene bags and were taken to the laboratory at the earliest for further examination. The age, sex, breed, and history of deworming of the animals were also recorded. Goats less than six months of age were included in kids and more than six months were included in adults. In the present study, the whole year is divided into four seasons, viz. winter (Dec-Feb), summer (March-May), monsoon (June-Sept) and post-monsoon (Oct-Nov). The saturated salt floatation technique was applied to detect nematode and cestode eggs/ coccidial oocyst. Sediment was also examined for the presence of trematode eggs (Zajac and Conboy, 2012). Chi-square test was applied to analyze the prevalence data (Snedecor and Cochran, 1994).

Results and Discussion

Due to climatic changes and other risk factors, annual prevalence of different parasites in an area may also change. A cumulative study of annual prevalence of gastrointestinal parasite in an area can provide data of parasite period prevalence. So, the present study has been planned to know the prevalence of gastrointestinal parasites in and around Rewa as compared to the earlier study (Chaurasiya *et al.*, 2021).

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Table 1: Prevalence of caprine gastrointestinal parasites in and around Rewa

Factor	*Level*	*Examined*	*Prevalence (%)*	*Degree of freedom*	*X^2 Value*
Age	Kid	194	187 (96.39%)	1	5.20*
	Adult	809	741 (91.59%)		
Sex	Female	638	585 (91.69%)	1	1.74
	Male	365	343 (93.97%)		
Season	Monsoon	276	264 (95.65%)	3	24.50**
	Post monsoon	196	187 (95.41%)		
	Winter	457	418 (91.47%)		
	Summer	74	59 (79.73%)		

Figures in parentheses indicate percentage
** X^2 values were considered significant at $p < 0.01$ level
* X^2 values were considered significant at $p < 0.05$ level

Table 2: Species wise prevalence of gastrointestinal parasites in goats

Factor	*Level*	*Examined*	*Strongyle (%)*	*Trichuris spp. (%)*	*Moniezia spp. (%)*	*Coccidia (%)*
Age	Kid	194	95.88	17.53	19.07	41.24
	Adult	809	91.35	11.99	5.00	23.86
Sex	Female	638	91.54	10.19	6.27	23.98
	Male	365	93.42	18.08	10.41	32.88
Season	Monsoon	276	95.29	3.26	2.90	10.51
	Postmonsoon	196	95.41	3.06	20.92	32.14
	Winter	457	91.03	25.16	3.50	31.51
	Summer	74	79.73	1.35	17.00	50.00

Out of 1003 goats, 928 (92.52%) goats were found positive for different gastrointestinal parasites. In earlier studies, Dixit *et al.* (2017a) and Chaurasiya *et al.* (2021) reported 82.75% and 79.69% prevalence of gastrointestinal parasites in goats in and around Jabalpur and Rewa district of Madhya Pradesh, respectively. However, various workers reported lower prevalence rates in different geographical areas (Rahman *et al.,* 2017; Babjak *et al.,* 2017; Amran *et al.,* 2018).

In the present study, the maximum prevalence of strongyles was 92.22%, followed by coccidia (27.22%), *Trichuris* spp. (13.06%) and *Moniezia* spp. (7.78%). The prevalence of strongyles was comparatively higher than that of earlier studies in and around Rewa (Chaurasiya *et al.*, 2021). Annual changes in temperature and moisture might be the reason behind the higher prevalence of strongyles in the present study. Dixit *et al.* (2017a) reported a comparatively lower prevalence of strongyles (32.59%) and higher prevalence of *Moniezia* spp. (12.50%) in and around Jabalpur district of M.P. in goats.

Significantly higher ($p < 0.05$) prevalence was found in the kids (96.39%) as compared to that of adults (91.59%) (Table 1). The species-wise prevalence of parasites in kids was highest for strongyles (95.88%) followed by coccidia (41.24%), *Moniezia* spp. (19.07%) and *Trichuris* spp. (17.53%). In adults, the parasite-wise prevalence was highest for strongyles (91.35%) followed by coccidia (23.86%), *Trichuris* spp. (11.99%) and *Moniezia* spp. (5%) (Table 2). Dixit *et al.* (2017a), Jena *et al.* (2018) and Chaurasiya *et al.* (2021) also reported a higher prevalence in kids (95.02%) as compared to adults. The reason for higher prevalence in younger animals can be explained based on lower immunity of the host to the parasite (Urquhart *et al.*, 1996). Contrary to this, Shakya *et al.* (2017) and Sunandhadevi *et al.* (2017) reported higher prevalence in adults (50.43% and 81.14%) as compared to kids (19.31% and 64%).

The prevalence of gastrointestinal parasites was non-significantly higher in males (93.97%) as compared to that of females (91.69%), (Table 1), which agrees to the finding of Hossain *et al.* (2015) and Saravanan & Palanivel (2017), who have reported higher prevalence of gastrointestinal parasites in males as compared to that of females.

Season wise highest prevalence was observed in the monsoon season (95.65%) and post-monsoon (95.41%),

followed by the winter season (91.47%) and summer (79.73%). The overall prevalence was significantly lower ($p < 0.01$) in the summer months as compared to other seasons (Table 1). Prevalence of strongyles was comparatively lower in the summer season, which could be attributed to the dry environment detrimental to survival of larval stages. Increased prevalence of *Moniezia* in summers and post-monsoon may be due to more vector survival. A higher prevalence of parasites in rainy season has been reported by many workers (Singh *et al.,* 2015, Sorathiya *et al.,* 2017, Shakya *et al.,* 2017, Islam *et al.,* 2017, Rahman *et al.,* 2017; Amran *et al.,* 2018). Almost similar prevalence in monsoon and post-monsoon season agrees with Saiyam *et al.,* (2018). This pattern is slightly different from the findings of Chaurasiya *et al.* (2021) and Dixit *et al.* (2017b). Higher prevalence of parasites in rainy season may be due to suitable environmental conditions for growth and development of gastrointestinal parasites. Compared to winter and monsoon, the lower prevalence of gastrointestinal parasites in summer might be due to high temperature and low rainfall in this season, which is detrimental to the development and survival of free-living stages.

Conclusion

The study concluded that the overall prevalence of gastrointestinal parasites in goats was high, among which strongyles dominated the population and sex and season were the main risk factors.

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References

Amran, M.A., Yadav, S.K., Akter, F., Sarkar, S., Hossain, M.A., Joy, S.M. & Samrat, A.A.K. (2018). Prevalence of gastrointestinal parasitic infections in different existing goat breeds in different districts of Bangladesh. *The Journal of Advances in Parasitology*, *5*, 11-21.

Babjak, M., Konigova, A., Urda-dolinska, M. & Varady, M. (2017). Gastrointestinal helminth infections of dairy goats in Slovakia. *Helminthologia*, *54*(3), 211-217.

Chaurasiya, R., Pooja Dixit & Dixit, A.K. (2021). Prevalence of gastrointestinal parasites in goats in and around Rewa. *International Journal of Livestock Research*, *11*(2), 150-154.

Dixit, A.K., Das, G. and Baghel, R.P.S. (2017a). Gastrointestinal helminthosis: prevalence and associated determinants in goats of Jabalpur, India. *Journal of Parasitic Diseases*, *41*(2), 414-416.

Dixit, A.K., Das, G. & Dixit, P. (2017b). Prevalence of gastrointestinal helminths in goats under organized farm conditions in Jabalpur, Madhya Pradesh. *Journal of Veterinary Parasitology*, *31*, 54-57.

Hossain, M., Bhuiyan, M.J.U., Alam, M.S., Islam, K.M., Nath, T.C., Datta, R. & Uddin, A.H.M.M. (2015). Cross sectional epidemiological investigation on the prevalence of gastrointestinal parasites of small ruminants in sullah upazilla of Sunamgonj district, Bangladesh. *The Journal of Advances in Parasitology*, *2*(4), 100-104.

Islam, M.S., Hossain, M.S., Dey, A.R., Alim, M.A., Akter, S. & Alam, M.Z. (2017). Epidemiology of gastrointestinal parasites of small ruminants in Mymensingh, Bangladesh. *Journal of Advanced Veterinary and Animal Research*, *4*(4), 356-362.

Jena, A., Deb, A.R., Kumari, L., Biswal, S.S. & Joshi, S.K. (2018). Prevalence of gastrointestinal helminthes among goats in and around Ranchi, Jharkhand, India. *International Journal of Current Microbiology and Applied Sciences*, *7*(1), 3506-3513.

Mcleod R.S. (2004). Economic impact of worm infestations in small ruminants in South East Asia, India and Austrailia. In: Sani R.A., Gray G.D. & Baker R.L., editors. Worm control of small ruminants in tropical Asia. Canberra: ACIAR Monograph, pp. 23–33.

Perry, B. D. & Randolph, T. F. (1999). Improving the assessment of the economic impact of parasitic diseases and of their control in production animals. *Veterinary Parasitology*, *84*(3-4), 145-168.

Rahman, M.A., Labony, S.S., Dey, A.R. & Alam, M.Z. (2017). An epidemiological investigation of gastrointestinal parasites of small ruminants in Tangail, Bangladesh. *Journal of Bangladesh Agricultural University*, *15*(2), 255-259.

Saiyam, R., Das, G., Verma, R. & Kumar, S. (2018). Seasonal prevalence of caprine gastrointestinal helminths in central Madhya Pradesh. *Journal of Entomology and Zoology Studies*, *6*(4), 979-982.

Saravanan, S. & Palanivel, K.M. (2017). Detection of gastrointestinal helminthic and protozoan infections in diarrhoeic goats. *International Journal of Current Microbiology and Applied Sciences*, *6*(4), 801-805.

Shakya, P., Jayraw, A.K., Jamra, N. Agrawal, V. & Jatav, G.P. (2017). Incidence of gastrointestinal nematodes in goats in and around Mhow, Madhya Pradesh. *Journal of Parasitic Diseases, 41*(4), 963-967.

Singh, A.K., Das, G., Roy, B. Nath, S., Naresh, R. & Kumar, S. (2015). Prevalence of gastrointestinal parasitic infections in goat of Madhya Pradesh, India. *Journal of Parasitic Diseases*, *39*(4), 716–719.

Snedecor, G.W. & Cochran W.G. (1994). Statistical methods, Oxford and IBH Publilishing Co., Calcutta, Edn. 7th, p 445.

Sorathiya, L.M., Fulsoundar, A.B., Rao, T.K. & Kumar, N. (2017). Prevalence and risk factors for gastrointestinal parasitism in traditionally maintained goat flocks of South Gujarat. *Journal of Parasitic Diseases*, *41*, 137-141.

Sunandhadevi, S., Rao, M.L.V., Dixit, Pooja, Das, G., Shukla, P.C. & Dixit, A.K. (2017). Prevalence of gastrointestinal nematodes and risk factors in goats in Jabalpur. *Environment & Ecology*, *35* (2A), 920-922.

Urquhart, G.M., Armour, J., Duncan, J.L., Dunn, A.M. & Jennings, F.W. (1996). Veterinary Parasitology, Blackwell Science., Edn. 2nd, pp: 213-356.

Zajac, A.M. & Conboy, G.A. (2012). Veterinary Clinical Parasitology, Wiley, UK, Edn. 8th, p 3-170.