
Submitted : 30-07-2017

Accepted : 30-09-2017

Published : 15-11-2017

Prevalence of Gastrointestinal Parasites of Goats in and around Jabalpur, Madhya Pradesh

Kusum Lata, G. Das, Nitesh Kumbhakar and Rupanjali Saiyam

Department of Veterinary Parasitology

College of Veterinary Science and Animal Husbandry, NDVSU, Jabalpur - 482001 (M.P.)

Corresponding Author: kusslata555@gmail.com, gdas7@yahoo.com

This work is licensed under the Creative Commons Attribution International License (<http://creativecommons.org/licenses/by/4.0/P>), which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited.

Copyright ©: 2017 by authors and SVSBT.

Abstract

The present study was conducted to investigate the prevalence of gastrointestinal (GI) parasites of goats in and around Jabalpur. During 9 months of study period, out of 1675 faecal sample of goats examined, 1224 (73.07%) were found positive for different gastrointestinal parasites. The maximum prevalence recorded was of Strongyles (61.43%) followed by Coccidia (25.97%), Amphistomes (9.73%), *Monieziaexpansa* (8.66%), *Trichuris* spp. (2.03%), *Strongyloides* spp. (1.79%) and *Fasciolagigantica* (0.66%). When prevalence was compared in goats maintained at field and farm conditions, significantly higher infection ($P<0.01$) was observed at farm (85.90%) as compared to field (67.22%) conditions. The prevalence of gastrointestinal parasitism was found higher in adults (73.83%) in comparison to young goats (69.71%). Overall specific species prevalence showed strongyles infection was significantly higher ($P<0.01$) in adult (64.25%) as compared to young (48.86%) whereas Coccidia and *Monieziaexpansa* infection was observed significantly high in kids than adult goats. The seasonal prevalence of gastrointestinal parasites was found significantly higher ($P<0.01$) in Monsoon (81.20%) and post-monsoon (76.66%) as compared to spring and winter seasons.

Keywords: Gastrointestinal parasites, Goats, Prevalence, Jabalpur.

Introduction

Domestic goat is among the earliest animals domesticated by man and is distributed worldwide with higher concentrations in tropical areas and in dry zones (Di Cerbo *et al.*, 2010). Goats are excellent meat producers for human consumption in view of its short generation intervals and the absence of religious taboos associated with their meat as they are rich sources of protein and can help bridge the gap of protein malnutrition among consumers (Ozung *et al.*, 2011). Gastrointestinal (GI) parasitic infections are common in goats causing considerable economic impact on mortality and morbidity losses (measured in terms of decreased production of meat and milk), enhanced susceptibility to diseases, losses resulting from condemnation of carcasses and organs as well as cost of drugs and veterinary aids and poor reproductive performance (Rajakaruna and Warnakulasooriya, 2011). This problem is severe in tropical countries due to highly favourable environmental conditions for helminth transmission (Singh *et al.*, 2013). Therefore, the present work

was designed to generate epidemiological data regarding gastrointestinal parasitism of goat for developing worm management strategies in and around Jabalpur.

Materials and Methods

The present study was carried out in Madhya Pradesh called Heart of India and it is situated between 17° to 25° latitude and 72° to 85° E longitudes. Jabalpur Tehsil of Madhya Pradesh, where the study was undertaken, is situated at 23.17 latitude and 79.57E longitude at 410.87 MSL (Meters above Sea Level).

Total of 1675 freshly laid or per rectally collected faecal samples of goat were collected from July 2016 to March 2017 in an individually labelled polythene bags and was carried to the laboratory for further study. Gross examination was done for colour, consistency and for presence of any adult worms. The faecal samples were processed and screened by direct smear method, Willis's floatation and sedimentation techniques. The ova of parasites were identified from their morphological features (Soulsby, 1982). The data were analysed by applying χ^2 test as per Snedecor and Cochran (1994).

Results and Discussion

The overall prevalence of infection with GI parasites was 73.07%. A higher overall prevalence of 90.05 per cent as compared to the present study was reported by Lalbiaknungi (2002) whereas Singh *et al.* (2017) recorded overall prevalence of 83.08 per cent in small ruminants of western zone of Punjab which may be due to collection procedure of sample from both sheep and goat. Singh *et al.* (2015) reported in Balaghat, Narsinghpur and Chhindwara district of Madhya Pradesh. District wise variation is mainly due to variation in agro-climatic condition of the study area. Olanike *et al.* (2015) studied the prevalence of gastrointestinal parasites of goats in Ibadan, Southwest, Nigeria and observed 75.75 per cent prevalence which is similar to our findings. Das *et al.* (2017) recorded the low overall prevalence of GI parasitic infections in goats (28.65%) that may be due to hilly region of Meghalaya.

Among gastrointestinal parasites maximum prevalence recorded was of Strongyles (61.43%) followed by Coccidia (25.97%), Amphistomes (9.73%), *Monieziaexpansa* (8.66%), *Trichuris* spp. (2.03%), *Strongyloides* spp. (1.79%) and *Fasciolaspp.* (0.66%) (Table1). According to Singh *et al.* (2015) coccidia was predominant (82.4 %) followed by strongyles (69.27 %) and amphistomes (22.71%). The observed differences in prevalence between the present and other previous studies could be mainly due to variations in geographical and climatic conditions.

Prevalence of gastrointestinal parasites was recorded significantly higher ($P<0.01$) in farm (85.90%) than under field condition (67.22%). Species wise prevalence was also observed significantly higher in farm than in field conditions except *Strongyloides* infection which was 2.52% in field and 0.19% at farm (table 1). Similar pattern had been reported by Dixit (2016), with higher prevalence at farm (92.10%) than field (82.75%). Singh *et al.* (2015) also reported higher prevalence (84.58%) in farm as compared to field (75.23%). Higher prevalence at farm may be due to emergence of anthelmintic resistant gastrointestinal nematodes and restricted grazing area which reduces the susceptible population in *refugia*.

Age wise prevalence at Jabalpur area revealed that the gastrointestinal parasitic infection was higher in adults (73.83%) than in young goats (69.71%) (table 1). It could be explained that higher nematode prevalence in adults might be due to grazing on larger area of pastures being contaminated with various flocks and different stress conditions such as climate, long daily travelling, and gestation. Shakya *et al.* (2017) also found significantly higher infection rate in >1 year-old-goats (50.43%) than <1 year-old-goats (19.31%). Contrary to this, Shirale *et al.* (2001) observed higher incidence in kids as compared to adults in Nagpur (India). Increase in incidence of infection in kids corroborates to the finding of Bagde (2010). Higher prevalence of infection in kids could be attributed to the susceptibility to infection with coccidia and *Moniezia*.

Table 01:Prevalence of gastrointestinal parasites in goats

PREVALENCE	Area	No. Examined	Positive (%)	Strongyle (%)	<i>Strongyloides</i> (%)	<i>Trichouris</i> (%)	<i>Fasciola</i> (%)	Amphistomes (%)	<i>Moniezia</i> (%)	<i>Coccidia</i> (%)
AREA WISE	Farm	525	451 (85.9)	404 (76.95)	1 (0.19)	28 (5.33)	7 (1.33)	76 (14.48)	77 (14.67)	137 (26.1)
	Field	1150	773 (67.22)	625 (54.35)	29 (2.52)	6 (0.52)	4 (0.35)	87 (7.57)	68 (5.91)	298 (25.91)
	χ^2 -Value	pf=2	63.98*	77.74**	11.14**	41.96**	5.37**	19.6**	34.93**	NS
AGE WISE	Adult	1368	1010 (73.8)	879 (64.25)	21 (1.54)	21 (1.54)	10 (0.73)	155 (11.33)	103 (7.53)	328 (23.98)
	Young	307	214 (69.71)	150 (48.86)	9 (2.93)	13 (4.23)	1 (0.33)	8 (2.61)	42 (13.68)	107 (34.85)
	χ^2 -Value	df=1	NS	25.08**	NS	9.19**	NS	21.73**	11.99**	15.43**
SEASON WISE	Monsoon	803	652 (81.2)	552 (68.74)	27 (3.36)	20 (2.49)	7 (0.87)	117 (14.57)	75 (9.34)	256 (31.88)
	Post Monsoon	287	220 (76.66)	200 (69.69)	0	2 (0.7)	1 (0.35)	8 (2.79)	27 (9.41)	78 (27.18)
	Winter	454	270 (59.47)	227 (50)	3 (0.66)	10 (2.2)	2 (0.44)	16 (3.52)	37 (8.15)	72 (15.86)
	Spring	131	82 (62.6)	50 (38.17)	0	2 (1.53)	1 (0.76)	22 (16.79)	6 (4.58)	29 (22.14)
	χ^2 Value	df=3	78.8**	81.33**	22.2**	NS	NS	64.51**	NS	39.95**
Total		1675	1224 (73.07)	1029 (61.43)	30 (1.79)	34 (2.03)	11 (0.66)	163 (9.73)	145 (8.66)	435 (25.97)

Significant **P<0.01, NS- Non Significant

In the present study, Amphistome was recorded significantly higher in Adult (11.33%) as compared to kids (2.61%). However, contrary findings were indicated by Bedarkar *et al.* (2000) who recorded higher amphistomes incidence in kids as compared to adult goats in the marshy areas of Marathawada region in Maharashtra. It is a general practice in villages that the kids below six months of age are not allowed to go out for grazing near to forest area along with adult animal. Having less opportunity of exposure to infection from the field, especially at younger age, the kids, therefore, showed lower incidence that may account for this discrepancy as reflected by the observations of the present study.

In present investigation, overall seasonal prevalence of gastrointestinal infection showed that prevalence was significantly higher (P<0.01) in monsoon (81.20%) and in post-monsoon (76.66%) as compared to spring (62.60%) and winter (59.47%) seasons. Low prevalence in winter season was due to reduced grazing hours of the animals, which helps in reducing the chances of contact between host and parasites (Katoch *et al.*, 2000). Sharma *et al.* (2015) also recorded highest prevalence of 81.64 per cent of the total positive during monsoon season followed by summer

(63.46%) and lowest during winter (48.07%) season.

Significantly higher ($P < 0.01$) prevalence of strongyles infection were recorded in post-monsoon (69.69%) and monsoon (68.74%) season as compared to winter (50%) and spring (38.17%) season. These observations are in agreement with those reported earlier by Singh and Swarnkar (2010) from Rajasthan. The probable reason for high incidence of parasites in monsoon season might be due to suitability of this season for survival, development and dissemination of nematode larvae in pasture, which leads to higher infection in the pasture grazing animal like goat.

Amphistomes were significantly higher in spring (16.79%) and monsoon (14.57%) season as compared to winter (3.52%) and post-monsoon (2.79%) season. During the course of study carried out for a period of 9 months, an incidence of 9.73 per cent of amphistomes was recorded. Seasonal incidence was high in spring season followed by monsoon and winter. The goats in the present study were kept on semi intensive grazing system and thus get the infection with the metacercaria of the amphistomes during the dryer months particularly during winter and summer when the grasses are not available on the upper land and get attracted to the lush green grasses in the water lodge area with high concentration of snail intermediate host. The eggs of amphistomes started to come out in the faeces later on during spring to rainy season as the pre-patent period of the parasite is long as compared to nematodes.

The result of the present investigation indicated that of all the gastrointestinal parasites recorded in goats, coccidia ranked second exhibiting highest (25.97%) rate of infection (table 1). The oocyst load was significantly high during monsoon season followed by post-monsoon season. Earlier findings on highest oocyst count and incidence of coccidia infection during rainy season as reported from dry zone of Sri Lanka (Faizal and Rajapakse, 2001) is in agreement with those recorded in the present study. It can also be concluded that gastrointestinal parasitic infections are prevalent in Jabalpur District of Madhya Pradesh. The seasonal pattern of the prevalence of these parasitic infections will definitely help in preparation of suitable control strategies, which will be helpful for goat rearing and industry.

Acknowledgements

The authors are thankful to the Dean, College of Veterinary Science and A.H., NDVSU, Jabalpur and "All India Network Programme on Gastrointestinal Parasitism" project under ICAR, New Delhi, India for providing the facilities required for conducting research work.

Conflict of interest: All authors declare on conflict of interest

References:

- Bagde, V., Jumde, P., Bansod, S., Shende, K. and Maske, D.K. (2010). Prevalence of coccidiosis in goats in Nagpur region of Maharashtra. *Indian J. Fld. Vets.*, **5**(3): 39-40.
- Bedarkar, S.N. Narladkar, B.W. and Deshpande, P.D. (2000). Prevalence of snail borne fluke infections in ruminants of Marathwada region. *India. Indian Vet. J.*, **77**: 751-754.
- Das, M., Laha, R., Goswami, A. and Goswami, A. (2017). Gastrointestinal parasitism of goats in hilly region of Meghalaya, India. *Vet. World*, **10**(1): 81-85.
- Di Cerbo, A.R., Manfredi, M.T., Zanzani, S. and Stradiotto, K. (2010). Gastrointestinal infection in goat farm in Lombardy (Northern Italy): Analysis on community and spatial distribution of parasites. *Small Rumin. Res.* **88**: 102-112.
- Dixit, A.K. (2016). Detection of benzimidazole resistance in *Haemonchus contortus* of goats. PhD thesis (Veterinary Parasitology), Nanaji Deshmukh Veterinary Science University, Jabalpur.
- Faizal, A.C.M. and Rajapakse, R.P.V.J. (2001). Prevalence of coccidian and gastro-intestinal

nematode infections in crossbred goats in the dry areas of Sri Lanka. *Small Rumin. Res.*, **40**: 233-238.

Katoch, R., Chauhan, P.P.S. and Johri, D.K. (2000). Seasonal incidence of gastrointestinal nematodes in goats of Mathura region. *Indian Vet. J.*, **77**(3): 259-260.

Lalbiaknungi, K. (2002). Epidemiological studies on gastro-intestinal parasites of the goats (*Capra hircus*) in rural areas around Jabalpur. M.V.Sc & A.H. thesis (Veterinary Parasitology), Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur.

Olanike, A.O., Olayide, A.J., Oludunsin, F.O., Racheal, A.O. and Japhet, D.W. (2015). Prevalence of gastrointestinal parasites of goats in Ibadan, Southwest, Nigeria. *World J. Ag. Res.*, **3**(2): 49-51.

Ozung, P.O., Nsa, E.E., Ebegebulem, V.N. and Ubuja, J.A. (2011). The Potentials of Small Ruminant Production in Cross River Rain Forest Zone of Nigeria: A Review, *C.J. Ani. Vet. Res.*, **3**(1): 33-37.

Rajakaruna, R.S. and Warnakulasooriya, K.N. (2011). Gastrointestinal parasites in dairy cattle in Kandy district in Sri Lanka. *Annu Res J SLSAJ.*, **11**: 92-99.

Shakya, P., Jayraw, A.K. and Jamra, N. (2017). Incidence of gastrointestinal nematodes in goats in and around Mhow, Madhya Pradesh. *J. Parasit. Dis.* doi:10.1007/s12639-017-0919-1

Sharma, S., Patel, P.V., Choudhary, D., Asopa, S. and Manohar, M.S. (2015). Seasonal Variation of helminthic infestation in goats in Anand district of Gujarat. *Indian J. Vet. Sci. Biotech.*, **10**(4): 57-59.

Shirale, S.Y., Maske, D.K. and Kolte, S.W. (2001). Bionomics of gastrointestinal helminthes in goats at Nagpur. 11th National Congress of Veterinary Parasitology, Tirupati, 25-27 August, pp 76.

Singh, A.K., Das, G., Roy, B., Nath, S., Naresh, R. and Kumar, S. (2015). Prevalence of gastrointestinal parasitic infections in goat of Madhya Pradesh, India. *J. Parasit. Dis.*, **39**(4): 716-719.

Singh, E., Kaur, P., Singla, L.D. and Bal, M.S. (2017). Prevalence of gastrointestinal parasitism in small ruminants in western zone of Punjab, India. *Vet. World*, **10**(1): 61-66.

Singh, V., Varshney, P., Dash, S.K. and Lal, H.P. (2013). Prevalence of gastrointestinal parasites in sheep and goats in and around Mathura, India. *Vet. World*, **6**(5): 260-262.

Singh, D. and Swarnkar, C.P. (2010). Regional profile of ovine coccidiosis in Rajasthan. *J. Vet. Parasitol.*, **24**(2): 121-124.

Snedecor, G.W. and Cochran, W.G. (1994). *Statistical Methods*. Indian Edition, Oxford & IBH Publishing Co., New Delhi, pp 1-593.

Soulsby, E.J.L (1982). *Helminths, Arthropods and Protozoa of Domesticated Animals*. 7th Edn, ELBS, Baillere and Tindal, London.

□