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## Seasonal prevalence of caprine gastrointestinal helminths in central Madhya Pradesh

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**Abstract**

A total of 1478 faecal samples of goats were examined during the study period of nine months (July 2017 to March 2018) and 1194 (80.78%) were found positive for GI helminths out of which 77.47 per cent, 7.37 per cent and 14.75 per cent were positive for nematodes, trematodes and cestode, respectively. Among various helminths, maximum prevalence was of strongyles (75.17%) followed by *Moniezia* (14.75%), *Strongyloides* (7.92%), *Trichuris* (6.16%), *amphistomes* (4.59%) and *Fasciola* (1.76%). Prevalence of GI helminths was non-significantly higher in post monsoon (83.16%) season followed by monsoon (81.08%) season. Prevalence of GI helminthes and nematodes infection was recorded non-significantly higher in adult (81.04% and 96.39%, respectively) than in kids (77.68% and 89.66%, respectively). When prevalence was compared in goats maintained at field and farm conditions, prevalence of helminthes was recorded significantly higher ( $p < 0.01$ ) in farm (87.36%) as compared to the field (72.33%).

**Keywords:** Gastrointestinal helminths, prevalence, goats, central Madhya Pradesh

**Introduction**

Small ruminant livestock are important assets of landless and marginal farmers and help in improving rural Indian economy. Among various diseases, helminthosis is one of the most important constraints to small ruminant production. The occurrence of parasitic infections in grazing animals, the associated loss of production, the cost of anthelmintics, death of infected animals and increasing frequency of drug resistance are all major concerns. These problems are severe in tropical countries due to highly favorable environmental conditions for helminthes transmission<sup>[1]</sup>. Studies on the prevalence of gastrointestinal parasites in ruminant have been reported from different states of India<sup>[2-5]</sup>. Information on the prevalence of gastrointestinal helminths in goats of central Madhya Pradesh is scanty although limited data were reported by Dixit *et al.*<sup>[6]</sup> and Kusumlata *et al.*<sup>[7]</sup> from Jabalpur region, Singh *et al.*<sup>[8]</sup> from Mahakoshal region and Bansal *et al.*<sup>[9]</sup> and Shakya *et al.*<sup>[10]</sup> from Malwa region of Madhya Pradesh. The present investigation records the prevalence of gastrointestinal helminths in goats of central Madhya Pradesh.

**Materials and Methods**

A total of 1478 faecal samples from goats were collected over a period of 9 month from July 2017 to March 2018 from different village of Jabalpur districts of central Madhya Pradesh. The study period was divided according to seasons i.e. monsoon (July–September), post monsoon (October–November), winter (December–February) and spring (March). Faecal samples were collected directly from the rectum or freshly laid sample were collected in an individually labeled polythene bag and were brought to the laboratory for further study. Gross examination was done for colour, consistency and for presence of any adult worms. Faecal samples were examined qualitatively by standard floatation and sedimentation methods and ova of helminthes were identified by their morphological features as describe by Sloss *et al.*<sup>[11]</sup>. The data on prevalence of GI helminths were analyzed season wise, age wise and area wise by applying Chi square test as describe by Snedecor and Cochran<sup>[12]</sup>.

**Results**

A total of 1478 faecal samples of goats were examined during the study period of nine months (July 2017 to March 2018) and 1194 (80.78%) were found positive for GI helminths infections in which 77.47%, 7.37% and 14.75% goats were positive for nematode, trematodes

and cestode infection. Among various prevalent helminths strongyles were predominant (75.17%) followed by *Moniezia* (14.75%), *Strongyloides* (7.92%), *Trichuris* (6.16%), *Amphistome* (4.59%) and *Fasciola* (1.76%) (Table 1).

**Season wise prevalence**

Season wise prevalence of GI helminths was non-significantly higher in post monsoon (83.16%) season followed by monsoon (81.08%), winter (79.50%) and spring (77.59%). The prevalence of nematodes (80.53%) and strongyles (77.89%) were non-significantly higher in the post monsoon season. But, there was no significant seasonal difference in the prevalence of nematodes as a whole and strongyles infections. Prevalence of *Strongyloides* sp. (12.04%), *Trichuris* sp. (10.97%) and Amphistomes (13.55%) was significantly higher ( $p<0.01$ ) in the Monsoon season as compared to the other seasons. Whereas, prevalence of cestode (*Moniezia* sp.) was significantly higher ( $p<0.01$ ) in winter (18.96%) followed by post Monsoon (14.21%) and Monsoon (12.04%) season (Table 1).

**Age wise prevalence**

Age wise prevalence revealed that GI helminths and

nematodes were non-significantly higher in adult (81.04% and 96.39%, respectively) than in kids (77.68% and 89.66%, respectively). Prevalence of *Trichuris* sp. infection was significantly higher ( $p<0.05$ ) in adult (6.59%) as compare to kids (0.89%), where as *Moniezia* sp. infection was significantly higher ( $p<0.01$ ) in kids (26.79%) as compare to adult (13.76%) and *Strongyloides* sp. was non-significantly higher in kids (8.04%) than in adult (7.91%). However, Strongyles, *Fasciola* sp. and Amphistomes were non-significantly higher in adult (75.77%, 1.9% and 5.05%, respectively) as compare to kids (67.86%, 0% and 3.57%, respectively). (Table 1)

**Area wise prevalence**

Prevalence of GI helminthes and nematodes was significantly higher ( $p<0.01$ ) in farm (87.36% and 83.63%, respectively) as compare to the field (72.33% and 69.55%, respectively). Prevalence of strongyles, *Trichuris* sp, and *Moniezia* sp. (cestode) infection was significantly higher ( $p<0.01$ ) in farm (80.63%, 9.87% and 16.73%, respectively) than in field (68.16%, 1.39% and 12.21% respectively). In contrary, *Strongyloides* sp. infection was non-significantly higher in field (8.19%) than in farm (7.70%) as depicted in Table 1.

**Table 1:** Prevalence (%) of gastrointestinal helminths in goats

Prevalence (%)		No. Examined (%)	Helminthes (%)	Nematodes (s%)	Strongyles (%)	<i>Strongyloides</i> (%)	<i>Trichuris</i> (%)	Trematodes (%)	<i>Fasciola</i> (%)	Amphistome (%)	Cestodes <i>Moniezia</i> (%)
Season wise	Monsoon	465	377 (81.08)	357 (76.77)	340 (73.12)	56 (12.04)	51 (10.97)	70 (18.57)	19 (4.09)	63 (13.55)	56 (12.04)
	Post Monsoon	380	316 (83.16)	306 (80.53)	296 (77.89)	30 (7.89)	14 (3.68)	11 (3.48)	6 (1.58)	5 (1.32)	54 (14.21)
	Winter	517	411 (79.50)	393 (76.02)	386 (74.66)	26 (5.03)	18 (3.48)	3 (0.73)	0 (0)	2 (0.39)	98 (18.96)
	Spring	116	90 (77.59)	89 (76.02)	89 (76.72)	5 (4.31)	8 (6.9)	4 (4.44)	1 (0.86)	3 (2.59)	10 (8.62)
	Chi square Value		NS	NS	NS	18.85**	29.16**	103.08*	24.44**	108.22**	13.54**
Age wise	Adult	1366	1107 (81.04)	1067 (78.11)	1035 (75.77)	108 (7.91)	90 (6.59)	84 (7.59)	26 (1.9)	69 (5.05)	188 (13.76)
	Kids	112	87 (77.68)	78 (77.68)	76 (67.86)	9 (8.04)	1 (0.89)	4 (4.6)	0 (0)	4 (3.57)	30 (26.79)
	Chi square Value		NS	4.25*	NS	NS	5.81*	NS	NS	NS	13.96**
Area wise	Field	647	468 (72.33)	450 (69.55)	441 (68.16)	53 (8.19)	9 (1.39)	33 (7.05)	8 (1.24)	26 (4.02)	79 (12.21)
	Farm	831	726 (87.36)	695 (83.63)	670 (80.63)	64 (7.7)	82 (9.87)	55 (7.58)	18 (2.17)	47 (5.66)	139 (16.73)
	Chi square Value		52.94**	41.33**	30.28**	NS	45.24**	NS	NS	NS	5.90*
Overall		1478	1194 (80.78)	1145 (95.9)	1111 (75.17)	117 (7.92)	91 (6.16)	88 (7.37)	26 (1.76)	73 (4.94)	218 (14.75)

NS= Non-significant, \* =  $p<0.05$  and \*\* =  $p<0.01$

**Discussion**

The prevalence of caprine GI helminths recorded in the study was 80.78 per cent and the prevalence of nematodes, trematodes and cestode was 77.47%, 7.35% and 14.75%, respectively. Dixit *et al.* [6] and Kusumlata *et al.* [7] reported 82.75 per cent and 73.03 per cent prevalence of helminth infections in goats of Jabalpur, respectively. These observations are in agreement with those recorded earlier by Bhat *et al.* [13], Tambe *et al.* [14], Das *et al.* [15] and Jena *et al.* (2018). Maske *et al.* [2] reported 88.23% occurrence of helminth parasites in goats in Nagpur. Highest occurrence may be due to variation in geographical region and climatic

conditions of the study area. Gupta *et al.* [16] also recorded 72.78 per cent prevalence of nematodes and are in agreement with our finding. Among various helminths, maximum prevalence was of strongyles (75.17%) followed by *Moniezia* (8.62%), *Strongyloides* (7.92%), *Trichuris* (6.16%), *Amphistome* (4.59%) and *Fasciola* (1.76%). Similar finding has also been reported by Dixit *et al.* [6] and Kusumlata *et al.* [7] with maximum prevalence recorded was of strongyles.

Season wise prevalence of GI helminthes in goats was non-significantly higher in post monsoon season (83.16%) followed by monsoon season (81.08%). Non-significantly higher prevalence of nematodes and strongyles was recorded

in the post monsoon season (80.53% and 77.89%). Kusumlata *et al.* [7] also reported higher prevalence of strongyle infections in post monsoon (69.69%) season. *Strongyloides* infection was significantly higher ( $p < 0.01$ ) in monsoon (12.04%). Dixit *et al.* [6] reported higher incidence of *Strongyloides* in monsoon. The probable reason for high infection of parasites in post-monsoon season might be due to suitability of season for survival, development and dissemination of nematode larvae in pasture, which lead to higher infection in grazing animal. On contrary Talukdar [17] recorded highest strongyle incidence during summer in Assam. This period indicated with heavy rainfall and high humidity in the eastern states of the country. Amphistomes (13.55%) were significantly higher ( $p < 0.01$ ) in the Monsoon season as compared to the other seasons. Workers from Bareilly [18], Pantnagar [19] and Maharashtra [20] have also reported incidence of amphistomes throughout the year with the peak incidence during rainy season. Probable reason for higher prevalence of amphistomes during monsoon season may be due to the prevalence of intermediate host “snails” which are predominant during monsoon season. Contrary to our observation Bansal *et al.* [9] recorded higher prevalence of amphistomes in summer (8.09%). The prevalence of *Fasciola* sp. and amphistomes depend on intermediate host “snails” which are predominant during monsoon season, but high prevalence in summer may be due to getting infection by ingestion of metacercaria during grazing in water lodged area where overcrowding of the infective stage occur.

Age wise distribution of GI helminths and nematodes was recorded non-significantly higher in adult than in kids. The higher prevalence of nematodes in adult corroborates to the findings of Kusumlata *et al.* [7], Shakya *et al.* [10] and Singh *et al.* [4] also recorded higher prevalence in adult as compare to the young, which are in agreement with our findings. Higher prevalence of GI helminths in adult may be due to various stress conditions such as change in climate, gestation or grazing in contaminated pasture or might be due to lack of deworming programme or grazing in restricted area. Age wise prevalence showed *Strongyloides* sp. and coccidia were non-significantly higher in kids than adult. Prevalence of *Moniezia* sp. was also significantly higher ( $p < 0.01$ ) in kid (26.79%) as compare to adult (13.76%). Similar finding has also been reported by Dixit *et al.* [6] and Kusumlata *et al.* [7] who record significantly higher prevalence of *Moniezia* sp. in young than adult. The probable cause may be because of development of immunity in adult goats. Whereas, prevalence of amphistomes was non-significantly higher in adult as compare to kids. Similar finding has also been reported by Kusumlata *et al.* [7]. However, contrary findings were indicated by Baedarkar *et al.* [21] who recorded higher amphistomes incidence in kids as compared to adult goats in the marshy area of Marathwada region in Maharashtra. It is a general practice in villages that kids below six months of age are not allowed to go out for grazing near forest area along with adult animals. 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.

Area prevalence reveal significantly higher ( $p < 0.05$ ) prevalence of helminths and nematodes and cestode (*Moniezia*) in farm as compare to the field conditions. Dixit *et al.* [6] and Kusumlata *et al.* [7] also reported higher prevalence of helminths and nematodes in farm as compared to the field conditions. The intensive method of goat keeping on farm,

overcrowding, grazing in restricted area and emergence of anthelmintic resistance were considered as main factor of high prevalence of parasites in farm. On the contrary, Pant *et al.* [22] reported higher prevalence of GI parasites in goats in villages than in organized farm.

### Conclusions

The result of the present investigation indicated that 80.78% goats positive for helminthes and the prevalence non significantly higher in post monsoon (83.16%) followed by monsoon (81.08%), winter (79.50%) and spring (77.59%). It is concluded that gastrointestinal helminths infection are prevalent in Jabalpur. The study will help in the formulation of control strategies for the GI helminths.

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