

Original Research Article

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Prevalence of Gastrointestinal Nematode Infection in Goats

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ABSTRACT

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The prevalence of gastrointestinal nematodiasis was studied on goats in the three villages of Durg and Jagdalpur region of Chhattisgarh state in India. A total number of 380 goats irrespective of breed, age and sex were examined for a period of 6 months for the study. Gross and microscopic examinations were done from collected faecal samples for the presence of nematodes. The overall prevalence of gastrointestinal nematode infection was 43.88% with 47.70% and 40% at Jagdalpur and Durg regions respectively with maximum incidence in July month. The *Strongyloides spp* was more prominent in Jagdalpur (54.00%) whereas *Trichuris spp* was (49.00%) more prominent in Durg region, respectively.

Introduction

India has the largest livestock population in the world which contributes about 7.0% to its national income. Livestock is an important integral component of agriculture in India and contributes immensely to the rural economy of the country (Chowdhury, 2002). Livestock sector plays a critical role in the welfare of India's rural population. Small ruminant rearing is an asset of livelihood for the farmers among poor and developing countries. It contributes nine percent to Gross Domestic Product (GDP) and employs eight

percent of the labor force. This sector witnessed significant increase in output of its products like meat, milk and skin. Goat has a tremendous potential to adapt in harsh agro-climatic conditions, thus suitable to large number of rural households of entire country. Owing to increase in per capita income and buying capacity of the individual and dietary consciousness, the demand for the goat products has also increased. Besides low capital investment and recurring cost, quick return and less risk attracted the variety of households towards profitable and sustainable goat farming (Singh *et al.*, 2013).

Among various ailments of goat gastrointestinal parasitism has been recognized as a major health issue in small ruminant production systems and its consequence can be extensive ranging from reduced performance to mortality (Sykes, 1994). Prominent nematode that infect goat and sheep are *Haemonchus contortus*, *Trichostrongylus columbriformis*, *Teladorsagia circumcincta*, *Cooperia* spp., *Nematodirus pathiger*, *Oesophagostomum* spp., *Trichuris* spp., *Dictyocaulus filaria* and *Strongyloides papillosus*. Further goats are more susceptible to infection with gastrointestinal nematodes than sheep. Among the various helminths, nematodes are considered to be of utmost importance on the basis of their prevalence and adverse effect worldwide (Mini *et al.*, 2013) and responsible for inflicting huge economic loss to the goat industry (Jallow *et al.*, 1994).

The gut helminths induce many functional disturbances in the host body including metabolic changes, retardation of growth, weight loss, haemato-biochemical changes and increased susceptibility to a variety of diseases (Khan *et al.*, 2015; Fleming *et al.*, 2006). Nematodes that are dependent on blood prehension such as *Haemonchus contortus* induce specific clinical and subclinical symptoms (Khanolkar, 2018). As a result, decreased digestibility of food and diversion of nutrient towards repair of tissue damage leads to disturbances in the hematological, biochemical parameters of the host (Sykes, 1994; Venkatesh *et al.*, 2013).

The available literature indicates that similar studies on the prevalence of gastrointestinal helminthic infection and their effects on goats have been conducted in various states in our country. However, meager literature regarding prevalence of gastrointestinal nematode in goats of Chhattisgarh state is available. Therefore, it is imperative to find

out the rate of prevalence of such helminthic infection in Chhattisgarh state also.

Materials and Methods

The prevalence of gastrointestinal nematodiasis was observed mainly on goats in the three villages of Durg and Jagdalpur region. A total number of 380 goats irrespective of breed, age and sex were examined for a period of 6 months for the study. The prevalence of gastrointestinal nematode infection was calculated by considering total number of goats screened for gastrointestinal nematode infection and number of goats detected positive as per the formula Gastrointestinal helminth infection (%) = No. of gastrointestinal nematode infection cases detected/ Total no. of goats screened for gastrointestinal infection X100.

Collection of clinical samples

Faecal sample of about 5 gm from each animal was collected in a zip lock cover from individual goats per-rectally. Care was taken to avoid intermixing and gross contamination of faecal sample with urine or bedding materials. Fortnight visits were made for collection and for studying the prevalence of nematode helminths. The processing and examining were done macroscopically as well as microscopically by the method as described by Soulsby (1982) and Ruprah *et al.*, (1986). Gross and microscopic examination of collected faecal samples was done for the presence of nematodes. Microscopic examination of faecal samples was carried out as follows.

Direct Smear Technique

A small quantity of faecal material was taken on a glass slide with the help of glass rod and mixed with 4-5 drops of water and covered with coverslip and examined under 10x power

of microscope to detect parasitic eggs/ larvae. The samples found negative were subjected to further examination.

Sedimentation technique

About 3-5 gm of faeces was emulsified with 20-30 ml of water in beaker. The content was strained into a sedimentation flask. The flask was filled upto its brim with water or saline and allowed to stand for 20 minutes. The supernatant was thrown off. This process was repeated until the clear supernatant is obtained. After last sedimentation the supernatant was discarded and drop of sediment was taken on clean glass slide, covered with coverslip and examined thrice under low power of microscope to detect the presence of trematode/ nematode eggs/ larvae, as directed by Ruprah *et al.*, (1986).

Quantitative examination

The faecal samples of heavily infected animals were taken up for quantitative examination to estimate Egg Per Gram (EPG) of faeces. The Stoll's technique as described by Soulsby (1982) was used. In this technique 3 gm of faecal sample was taken in 100 ml glass beaker to which tap water was added to make volume 45 ml.

The solution was homogenized with the help of automatic magnetic homogenator. From this solution 0.15-ml quantity was taken with the help of graduated pipette on glass slide. After putting a rectangular coverslip, the slide examined under low power microscope and the egg number was counted. Eggs per gram were counted by multiplying the number of eggs by dilution factor 100.

Statistical analysis

The numerical data collected from the obtained results was statistically analysed by

employing t-test as per the methods described by Snedecor and Cochran (1967) and one-way ANOVA using Statistical Package for Social Sciences (SPSS).

Results and Discussion

The current study was conducted in the various regions of Jagdalpur and Durg. During the study 360 goats were examined of 180 in each of the mentioned regions out of which 86 and 72 goats were found positive from Jagdalpur and Durg region respectively. The month wise percentage of total positive goats out of total examined goats in Jagdalpur and Durg region. respectively. The overall of prevalence of nematodes recorded was 47.78% (Table 1 and 2) and 40% in Jagdalpur and Durg respectively. Table 3 shows various localities of Durg and Jagdalpur region of sample collections.

These findings are near in resemblance with Akhter *et al.*, (2011) who reported 43.10% of the overall prevalence. Nabi *et al.*, (2014) also reported that the overall incidence of gastrointestinal parasite in goat in Pakhtumkhwa region of Pakistan to be 40.67%. However, Javaid *et al.*, (2018) showed higher prevalence rate of 70.55% gastrointestinal nematodes in goats. Similarly, much higher prevalence of 86.8 was reported by Yadav and Tandon (1989), than recorded in the present studies.

The variability in the overall prevalence of gastrointestinal nematode infections might be due to variation in agro- climatic conditions of the region which could affect the survivability and development of infective larval stage of nematode parasites. Further the use of various anthelmintic and grazing practices adopted might have contributed for the difference in the rate of incidence (Getachew *et al.*, 2017).

Table.1 Month wise prevalence of Helminths infections in goats of Jagdalpur region (C.G)

Month	No of goats examined	No of goat positive	Percentage of infection (%)
February	35	18	51.43
March	25	13	52.0
April	29	13	44.82
May	31	8	25.80
June	20	9	45.0
July	40	25	62.50
Total	180	86	47.78

Table.2 Month wise prevalence of Helminths infections in goats of Durg region (C.G)

Month	No of goats examined	No of goat positive	Percentage of infection (%)
February	30	14	46.66
March	25	11	44.0
April	28	10	35.71
May	25	9	36.0
June	37	11	29.72
July	35	17	48.57
Total	180	72	40

Table.3 Prevalence of Nematode infection in goats of different localities of Durg and Jagdalpur region

S.NO	Location	No. of samples examined	No. of samples positive	% of infection
Durg region				
1	Anjora	90	29	16.11
2	Thannod	50	23	12.78
3	Nagpura	40	20	11.11
4	TOTAL	180	72	40
Jagdalpur region				
1	Kangoli	60	25	15.00
2	Tetarkhuti	30	18	10.
3	Kilepal	49	24	12.22
4	Palli	41	19	10.56
5	TOTAL	180	86	47.78

Table.4 Species wise prevalence of G.I nematodes in Jagdalpur region

Month	Total examined	Total positive	Strongyle (%)	Strongyloides (%)	Trichuris (%)
Feb	35	18	4(11.42)	8(22.85)	6(17.14)
Mar	25	13	3(12)	6(24)	4(16)
Apr	29	13	2(6.89)	7(24.13)	4(13.79)
May	31	8	1(3.22)	4(12.90)	2(6.45)
June	20	9	1(5)	5(25)	3(12)
July	40	25	3(7.5)	16(40)	6(15)
Total	180	86	14(16.27)	46(53.4)	25(29.06)

Table.5 Species wise prevalence of G.I nematodes in Durg region

Month	Total examined	Total positive	Strongyle (%)	Strongyloides (%)	Trichuris (%)
Feb	30	14	3(10)	3(10)	8(26.66)
Mar	25	11	2(5.40)	4(10.81)	5(13.51)
Apr	28	10	3(10.71)	3(10.71)	4(14.28)
May	25	9	1(4)	3(12)	5(20)
June	37	11	3(12)	2(8)	6(24)
July	35	17	4(11.42)	6(17.14)	7(20)
Total	180	72	16(22.22)	21(29.16)	35(48.61)

The current study witnessed significantly higher incidence of GI nematodes (62.5% in Jagdalpur and 48.75% in Durg during the initiation of monsoon season i.e. July month (Table 1 and 2) which is in accordance with the findings Deshpande *et al.*, (2001), Sharma *et al.*, (2009), Barua *et al.*, (2015), Singh *et al.*, (2015) and Thakuria *et al.*, (2015). The highest incidence of GI nematodes in monsoon might be due to the presence of adequate moisture and temperature in the environment which might have favored increased frequency of transmission of the infective larvae to the final host.

Table 4 and 5 depict *Strongyloides spp* 53.4% and 29.16%, *Strongyle spp* 16.27% and 22.22% *Trichuris spp* 29.06% and 48.16% among 86 and 72 positive goats of Jagdalpur and Durg region respectively. *Strongyloides spp* were most predominant in Jagdalpur

region than *Strongyle spp* and *Trichuris spp*. Predominance of *Strongyloides spp* over *Strongyle* and *Trichuris spp* has also been reported by Yusof and Isa (2016). On the contrary *Trichuris spp* were more predominant in Durg as compared to *Strongyle spp* and *Strongyloides spp*. These findings are in accordance with the findings of Shakya *et al.*, (2017) reporting predominance of *Strongyle spp* in mhow region of Madhyapradesh. Prevalence of nematode infection in the various localities of Durg and Jagdalpur are presented in Table 3 showing 16.11%, 12.78% and 11.11% of nematode prevalence was recorded in Anjora, Thannod, and Nagpura localities of Durg respectively. Similarly, in the Kangoli, Tetarkhuti, Kilepal and Palli localities of Jagdalpur region the prevalence recorded was 15.0%, 10.0%, 12.22% and 10.56%. Species wise prevalence from the month February to

July in Jagdalpur and Durg region is presented in Table 4 and 5 respectively. At Jagdalpur the prevalence of *Strongyle* in the month of February, March, April, May, June and July was 11.42%, 12%, 6.89%, 3.22%, 5% and 7.5%, respectively. Prevalence of *Strongyloides* recorded in the month of February, March, April, May, June and July was 22.85%, 24%, 24.13%, 12.90%, 25%, and 40% respectively. Similarly, 17.14%, 16%, 13.79%, 6.45%, 12% and 15% of prevalence was recorded for *Trichuris* in the month of February, March, April, May, June and July respectively. At Durg the prevalence of *Strongyle* in the month of February, March, April, May, June and July was 10%, 5.40%, 10.71%, 4.0%, 12.0% and 11.42% respectively. Prevalence of *Strongyloides* recorded in the month of February, March, April, May, June and July was 10.0%, 10.81%, 10.71, 12%, 8%, and 17.14% respectively. Similarly, 26.66%, 13.51%, 14.28%, 20.0%, 24.0% and 20.0% of prevalence was recorded for *Trichuris* in the month of February March, April, May, June, and July respectively.

In conclusions the current study was carried out in and around Durg and Jagdalpur region of Chhattisgarh state. The overall prevalence of gastrointestinal nematode was 40% in Durg and 47.78 % in Jagdalpur with its maximum intensity in the month of July. The overall prevalence of gastrointestinal nematode infection was 43.88% with 47.70% and 40% at Jagdalpur and Durg regions respectively with maximum incidence in July month. The *Strongyloides spp* was more prominent in Jagdalpur (54.00%) whereas *Trichuris spp* was (49.00%) more prominent in Durg region respectively.

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