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Epidemiology of gastrointestinal parasites in goats of Kumarganj region of Uttar Pradesh

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Abstract

The present study was designed to find out the epidemiology of gastrointestinal parasites in goats of Kumarganj and nearby surrounding area. The overall percentage of gastrointestinal helminth infestation was found to be 58.4%. Out of 250 goats, 146 (58.4%) were found infected with gastrointestinal helminth, 29 goats (11.9%) with *Trichuris* infestation, 56 goats (22.4%) with *Strongyle* infestation, 16 goats (6.4%) with *Amphistome* infestation and 45 (17.6%) were having mixed infestation (i.e. more than one parasite). Out of 250 samples, 190 were females and 60 were males in which 40 (16%) males and 106 (42.4%) females found positive for helminth infestation. Fecal Analysis revealed highest incident of *Strongyle* infestation 52.50% in males and 36.5% of mixed type of parasitic infestation was found in females, followed by *Trichuris* 25% and *Strongyle* 33% in males and females respectively. In both gender lowest incidence of *Amphistome* was observed. The study also showed that the age group of more than two year (45.2%) was more prone to infestation than the young ones.

Keywords: gastrointestinal parasites, goats, epidemiology

Introduction

Goats were among the first farm animals to be domesticated. According to 18th livestock census (2007) there are 72 million sheep and 141 million goats, in India, contributing 20.4 percent of total small ruminants population (Anonymous, 2011) [2]. Small ruminants rearing has become a major source of income especially for the poor marginal farmers in rural areas of India (Sood, 1981; Kumar and Yadav 1994) [47, 23]. But various hindrances affect the goat industry in which helminth infestation is the most important hurdle that needs immediate attention (Dhar *et al.*, 1982, Leiper, 1992) [28, 24]. It is well known that more than 90% goats get infected with helminth infestation in any stage of their life span. Surveys indicate that in tropical region *Haemonchus* & *Trichostrongylus* are the most common helminth affecting up to 95% sheep and goat (Rey, 1991) [39]. So undoubtedly, helminth infestation pose a serious threat to goat industry owing to its higher morbidity rate thereby diminishing the economic value of goats in terms of production, reproduction and growth rate. Faizal (1999) [10] reported 33% growth retardation in ruminants due to helminth infections. Herlich (1978) [17] reported 5-10 % mortality and 10-20 % morbidity in small ruminants is caused by helminth. It is estimated that more than 300 species of helminthes of livestock are known in India and new species are being frequently discovered (Singh *et al.*, 1977) [46]. The incidence of helminthes infestation varies with age, sex, season and agro-climatic conditions. Adverse effects on the host includes alteration in haemato-biochemical changes (Rasool *et al.*, 1995; Iqbal *et al.*, 1998; Hayat *et al.*, 1996, Hayat *et al.*, 1999) [37, 19, 15, 16], loss of body weight (Khan *et al.*, 1988) and huge economic losses (Iqbal *et al.*, 1993) [18]. Parasites also damage vital organs of animal and increases susceptibility to other pathogenic agents (Skykes *et al.*, 1992).

Seasonal occurrence and variable prevalence rate (39.34–92.4 %) of these parasitic infections have been reported from different states of India as Andhra Pradesh (Sreedhar *et al.* 2009) [49], Chhattisgarh (Pathak and Pal 2008) [34], Haryana (Gupta *et al.* 1987) [14], Jammu and Kashmir (Mir *et al.* 2008; Tariq *et al.* 2010; Khajuria *et al.* 2012; Lone *et al.* 2012) [27, 22, 25], Karnataka (Murleedharan 2005) [28], Maharashtra (Maske *et al.* 1990; Chavhan *et al.* 2008; Sutar *et*

al. 2010; Padwal *et al.* 2011) [26, 7, 50, 51, 32], Meghalaya (Bandyopadhyay *et al.* 2010a, b) [3, 4], Punjab (Singh *et al.* 2012), Sikkim (Rahman *et al.* 2012) and Uttar Pradesh (Bano and Sultana 2003, 2009). Detailed information about epidemiology of helminthes in goats of Kumarganj and nearby areas is scanty. The present study was therefore designed to study the prevalence of gastrointestinal helminthes in goats in and around Kumarganj area.

Materials and method

The present study was carried out at eleven villages in and around Kumarganj area and at university's instructional livestock farm complex, Kumarganj, Faizabad. A total number of 250 fecal samples of goats, 190 females and 60 males, of different age groups were examined for presence or absence of gastro intestinal parasitic eggs. Out of the total 250 faecal samples, 40 samples were from ILFC and 210 were collected from 11 villages and examined for different types of

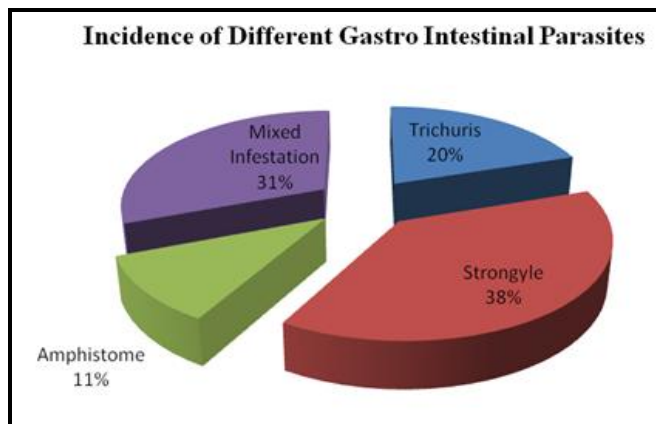
eggs of parasites. Faecal samples were collected for the identification of egg of parasite. Fresh 10-15gm faecal samples were collected directly from the rectum of goats for parasitological examinations and examined qualitatively using floatation and sedimentation methods for evaluating the incidence of infections. Plastic bottles were used for collection of faecal samples and transported to laboratory for further analysis. The samples collected from the remote areas were preserved in 4% formalin and then transported to the laboratory and kept in refrigerator before further analysis.

Result

In the present coprological investigation out of 250 samples, 146 samples were found positive with 58.4% incidence rate. Highest incidence was of *Strongyle* (38.3%) infestation, followed by mixed helminth (30.8%), and *Trichuris* (19.9%). Minimum infestation was found of *Amphistome* (10.6%).

Table 1: Incidence of Different Gastro Intestinal Parasites

No of total animal screened	No of Positive samples in each group				Overall incidence
	<i>Trichuris</i>	<i>Strongyle</i>	<i>Amphistome</i>	Mixed	
250	29 (19.9%)	56 (38.3%)	16 (10.6%)	45 (30.8%)	146(58.4%)



Highest incidence of helminth infestation was found in village Jarai Kala (75%), followed by Village Bawan (73.33%), Mukundpur (66.7%) etc. Lowest incidence was noticed in

Village Barai Para (40%). Higher *Trichuris* infestation found in Barai para village (50%), followed by jarai kla (18.7%), Chattarganj (18.2%) etc. In Sonrao highest *Strongyle* incidence (36.4%) was noticed and lowest incidence was observed in Harintanganj (20%) Bhithi village (20%) and Barai Para (20%). Infestation of *Amphistome* was highest in Harintanganj area (40%) and lowest was found in jarai kala (8.3%) and Pithla villages (8.3%). Mixed type of infestation observed highest in Saonrao village (45.4%), followed by Akma (30%), Barai Para (30%), Harintanganj area (30%). Lowest incidence was recorded in Chattarganj village (5.6%). Total 40 samples were screened on ILFC, in which 23 (57.5%) samples found positive for different gastro intestinal helminths in which highest incidence of *Strongyle* was noticed followed by *Trichuris* and Mixed infestation. No eggs of *Amphistomes* were found in goats of ILFC.

Table 2: Village wise incidence of different gastro intestinal parasites

Village	No. of samples	Positive	<i>Trichuris</i>	<i>Strongyle</i>	<i>Amphistome</i>	Mixed
Bawan	15	11(73.33%)	2(13.3%)	4(26.7%)	2(18.2%)	3(20%)
Harintanganj	18	10 (55.56%)	1(10%)	2(20%)	4(40%)	3(30%)
Jrai kla	16	12(75%)	3(18.7%)	4(25%)	1(8.3%)	4(25%)
Jrai Khurd	18	11(61.1%)	2(11.1%)	5(27.8%)	1(9.1%)	3(27.3%)
Mukundpur	18	12(66.7%)	2(11.1%)	4(22.2%)	2(16.7%)	4(22.2%)
Bhithi	20	13(65.0%)	2(10%)	4(20%)	2(10%)	3(15%)
Chattarganj	18	11(61.1%)	2(18.2%)	4(22.2%)	2(11.1%)	1(5.6%)
Barai Para	25	10(40%)	5(50%)	2(20%)	0	3(30%)
Akma	20	10(50%)	2(10%)	5(25%)	0	3(30%)
Pithla	22	12(54.5%)	2(9.09%)	6(27.2%)	1(8.3%)	3(13.6%)
Saonrao	20	11(55%)	1(9.1%)	4(36.4%)	1(9.1%)	5(45.4%)
Total	210	123(58.6%)	24(19.6%)	46(37.4%)	6(4.9%)	37(30.1%)
ILFC	40	23(57.5%)	5(21.7%)	10(25%)	0	8(20%)
Total	250	146(58.4%)	29(19.9%)	56(38.4%)	16(10.9%)	45(30.8%)

Among the total infected population, 40 (27.4%) were males and 106 (72.6%) were females. Fecal analysis revealed highest incident of *Strongyle* infestation (52.50%) in males and 36.5% of mixed type of parasitic infestation was found in

females, followed by *Trichuris* 25% and *Strongyle* 33% in males and females respectively. In both gender lowest incidence of *Amphistome* was observed.

Table 3: Sex Wise Incidence of Gastro-Intestinal Helminth Parasites

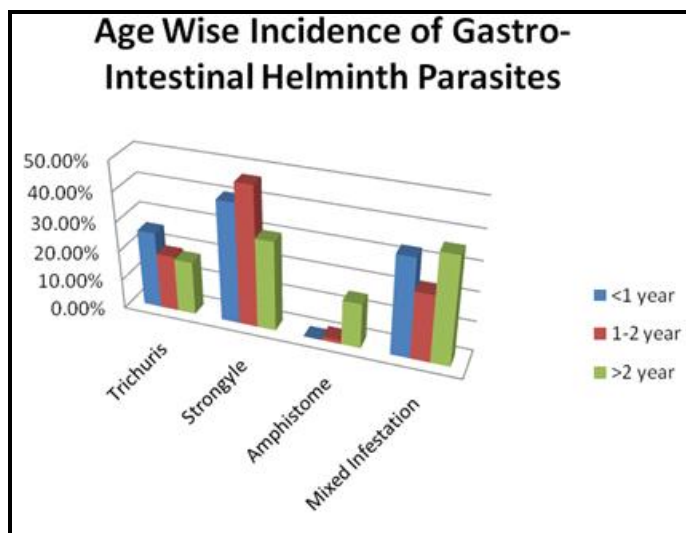
Sex	Total	Helminth Infestation				Overall Incidence
		<i>Trichuris</i>	<i>Strongyle</i>	<i>Amphistome</i>	Mixed Infestation	
Male	60	10 (25%)	21 (52.5%)	3 (7.5%)	06 (15%)	40 (27.4%)
Female	190	19 (17.9%)	35 (33%)	13 (12.3%)	39 (36.5%)	106 (72.6%)
Total	250	29 (19.9%)	56 (38.3%)	16 (10.9%)	45(30.8%)	146(58.4%)

Highest infestation of gastro intestinal helminth was found in age group of more than 2 years. Result of fecal analysis revealed *Trichuris* infestation was found prominently in age group of less than one year (25.9%) and lowest incidence was in age group of more than two year. Highest infestation of *Strongyle* (47.2%) in age group between 1-2 year, minimum (30.3%) in age group of more than two year. *Amphistome*

infestation was highest (15.1%) in age group of more than two year and in age group less than 1 year, infestation of *Amphistome* found lowest (0%). Mixed type of infestation was found superior in age group of more than two year (36.4%) and lowest in in age group of less than one year (33.3%).

Table 4: Age Wise Incidence of Gastro-Intestinal Helminth Parasites

Age	Infected				Overall Incidence
	<i>Trichuris</i>	<i>Strongyle</i>	<i>Amphistome</i>	Mixed Infestation	
<1 year	7(25.9%)	11(40.7%)	00	09(33.3%)	27(18.5%)
1-2 year	10(18.9%)	25(47.2%)	06(11.3%)	12(22.6%)	53(36.3%)
>2 year	12(18.1%)	20(30.3%)	10(15.1%)	24(36.4%)	66(45.2%)
Total	29	56	16	45	146



Discussion

In the present coprological investigation 58.4% incidence rate was observed. Sutar *et al.*, (2010) [50, 51] reported 60.83% incidence rate of gastrointestinal parasites which is similar to present findings. Singh *et al.*, 2013, reported 75% incidence of gastrointestinal parasites from Veterinary college farm Mathura. Rafique and Hayat (1997) [35] reported much higher occurrence of gastrointestinal parasites. Relatively high prevalence rate (72.99–92.4 %) has also been reported from other geographical provinces (Maske *et al.* 1990; Bandyopadhyay *et al.* 2010a) [3] of India. These findings clearly revealed that prevalence rate of gastrointestinal parasitic infection greatly vary from one geographical region to another and also vary from species to species in domestic animals. The higher incidence might be due to number of factors such as education of the farmers, grazing dependent keeping of the animals, faulty design of drainage. Prevailing agro-climatic conditions like overstocking, grazing of young and adult animals together supply an ideal condition for the transmission of gastro intestinal parasites (Gadahi *et al.*, 2009) [11].

Strongyle was the most common parasite in our finding which was in agreement with Jithendran *et al.* (2001) [20], Regasa *et al.* (2003, 2004) [38], Muraleedharan (2005) [28] and Gebeyehu

et al. (2013) [12]. Nwosu *et al.* (2007) [30] also reported 35.4% incident of *Strongyle* which was much closer to our finding. This is due to the fact that *Strongyle* nematodes are a large group of parasite comprising of *Trichostrongylus*, *Haemonchus*, *Oesophagostomum*, *Ostertagia*, *Cooperia*, *Charbatia* and *Nematodirus*. Rafique *et al.* (1997) [35] reported almost similar incident of *Trichuris spp* as observed in our finding, which is higher than Jithendran *et al.* (2001) [20], Nwosu *et al.* (2007) [30] and Gebeyehu *et al.* (2013) [12]. Incidence of the *Amphistome* is lowest in our finding which is in collaboration with the finding of Bandyopadhyay *et al.* (2010) [3, 4]. The contributing factor towards the high prevalence of *Strongyle* nematodes may be due to poor farm management, unhygienic watering and poor drainage systems resulting in high humidity inside animal house. The observed differences in incidence between the present and other previous studies could be mainly due to variations in geographical and climatic conditions. Among other factors that may further contribute to the discrepancies observed could be the breeds of the host, grazing habits (Ouattara and Dorchie, 2001). The least infection of amphistome in sheep and goats may be due to the presence of fewer water bodies in the study, which limited the accessibility of infection through snails.

Quayyum (1992), Welemehret *et al.* (2012) [55] reported higher incident of gastro intestinal parasites in female than male goats, which is similar to our observations. Incidence of *Strongyle* infestation in male was noticed higher than females. This is in general agreement with the findings of Jittapalpong *et al.*, (2003) [21]. Incident of *Trichuris* infestation is higher in male animals than female in our fecal analysis report, which is in agreement with Sangvaranond *et al.* (2010) [41]. Incidence was higher in Female goats because of lowered resistance of female animals on the part of their reproductive events and insufficient/unbalanced diet against higher needs.

Highest prevalence of gastro intestinal parasites in age group of more than 2 years was reported by Quayyum (1992), which was in general agreement with our findings. In goats of age group more than 1 year, lowest (26%), incidence rate of gastrointestinal parasites was recorded by Nabi *et al.* (2014) [29] which was similar to our findings. Highest incidence of

Trichuris spp was seen in less than one year old goats in our findings which were similar to the findings of Sangvaranond *et al.* (2010) [41]. Some other workers also noticed higher prevalence in adults as compared to kids (Anene *et al.*, 1994) [1]. The observed differences in incidence between the present and other previous studies could be mainly due to variations in geographical, climatic conditions of the area and lack of management knowledge.

The helminthic species which parasitize goats belong to three classes namely trematodes, cestodes and nematodes and pathogenicity of these helminths also varies with different intensity. Goats are mainly infested by different helminths like *Paramphistomum spp.*, *Fasciola spp.*, *Haemonchus spp.*, *Trichuris spp* (Dube *et al.*, 2003) [9].

Haemonchus contortus is a major helminthic parasite responsible for anaemia and gastroenteritis (Leiper, 1992) [24]. Haematophagous nematodes such as *Haemonchus contortus* & *Ostertagia ostertagi* suck about 0.05 ml blood/worms/day causing significant economic losses worldwide (Soulsby, 1986) [48].

Strongyle infestation is much more important as a veterinary problem and causes pathological conditions like anemia, poor body growth, and bottle jaw and milk production. Trapani *et al.*, (2013) [53] suggested that the immune response to infection by *Trichostrongyle* was characterized by an increased rate of the severity of the histological lesions, an increase rate of T cell lymphocytes recruitment to the intestinal mucosa and quantitative and qualitative changes in the histo-chemical composition of mucin in goblet cells. *Trichuris ovis* is less pathogenic but in severe infestation diarrhoea, haemorrhage, anemia, necrosis, oedema of caecal mucosa has been reported. In some cases a large numbers of worms cause a diphtheritic inflammation of the caecal mucosa. Saha *et al.*, (1998) [40] reported that in *Trichuris* infestation, slight catarrhal inflammation was observed with petechial hemorrhages on the mucosa, infiltration of lymphocytes, eosinophils and macrophages on the caecum and colon and proliferation of goblet cells. *T. ovis* penetrates the anterior parts of intestinal wall.

It can therefore be concluded that the practice of deworming should be propagated and farmers should be encouraged to adopt this to enhance the productivity and profitability. If this simple change becomes a habit, large economic gains can be achieved and goat farming can be looked forward as a profitable business venture.

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