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INTESTINAL PARASITES IN RUMINANTS FROM GABTOLI CATTLE MARKET AND KERANIGANJ, DHAKA

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Abstract: The present study was designed to determine the prevalence of intestinal parasites in ruminants. A total of 124 fecal samples from ruminants (92 samples from large ruminants – cattle, buffalo and 32 from small ruminants- goat and sheep) were collected from Gabtoli cattle market and Keraniganj, Dhaka from May to September 2017. Formol ether concentration technique was used to process the fecal samples. Among the large ruminants, the maximum prevalence was shown by *Entamoeba* sp. among protozoan parasites in Gabtoli (46.43%; CPG, 16.2±4.5) and Keraniganj (44.44%; CPG, 10.1±1.5) respectively. *Fasciola* sp. showed the uppermost prevalence (35.71%; EPG 173.6±61) in Gabtoli while, from Keraniganj, *Dicrocoelium* sp. (27.78%; EPG 6.4±2) showed the uppermost prevalence among the trematodes infesting large ruminants. *Dipylidium* sp. (35.71%; EPG 5.5±2.5) and *Taenia* sp. (35.71%; EPG, 13.1±1.5) showed high prevalence in Gabtoli cattle market, whereas, Keraniganj, the most prevalent cestode was *Moniezia* sp. (38.9%; EPG, 9±1). In both Gabtoli and Keraniganj, *Ascaris* sp. showed the highest prevalence (42.86%; EPG, 36.3±12 and 38.9%; EPG, 12.1±1, respectively) among the large ruminants. Among the small ruminants, the maximum prevalence was presented by *Balantidium* sp. (25%; CPG, 32.5±9.5) and *Entamoeba* sp. (25%; CPG, 30±1.5), *Fasciola* sp. (37.5%; EPG, 22.5±9.5), *Taenia* sp. (25%; EPG, 12.5±1) and *Ascaris* sp. (43.75%; EPG, 20±2), respectively, for protozoans, trematodes, cestodes and nematodes. Female ruminants showed higher prevalence of parasites than that in male.

INTRODUCTION

Parasitism has been considered as one of the major constraints of livestock production in Bangladesh (Jabbar and Green 1983, Rahman 1988). The grazing animals (cattle, buffalo, sheep and goat) are always exposed to parasites and are thus constantly being re-infected in chain reactions mode. It is most likely that communal grazing of cattle and goats with high stock density make the grasslands more conducive for the development and transmission of various

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gastrointestinal parasites. Global reports have suggested that severe economic losses are inflicted by parasitic diseases on the livestock industry which adversely affect the health, weight gain, feed conversion efficiency and reproduction of animals (Spithill *et al.* 1999, Kamaruddin 2003, Jan *et al.* 2015). The infection with various types of gastrointestinal parasites in large ruminants is a worldwide problem (Regassa *et al.* 2006). Small ruminant (goats and sheep) production systems are also significantly constrained by haemo and gastrointestinal parasites (Josiah *et al.* 2015, Biu *et al.* 2009).

Protozoan parasites that infect cattle, goat and sheep are *Eimeria* sp., *Giardia* sp., *Cryptosporidium* sp., *Balantidium* sp., *Entamoeba* sp., etc (Islam *et al.* 2014, Rafiullah *et al.* 2011, Mohemed 2006, Maharana *et al.* 2016, Singh *et al.* 2012, Kumar *et al.* 2016, Murthy and Souza 2016, Choubisa and Jaroli 2013, Kandasamy *et al.* 2013, Juliet *et al.* 2013, The Cattle Site 2011). Fascioliasis or liver rot is a helminth disease caused by three trematodes, *Fasciola hepatica* (liver fluke) *Fasciola buski* and *Fasciola gigantica* (Mass-coma *et al.* 2005). Significant economic loss occurs due to fasciolosis in livestock worldwide, mainly due to condemnation of livers at abattoirs, mortality in infected flocks, persistently depressed growth and feed conversion efficiency, loss of productivity, impaired fertility and also the cost of treatment (Bennema *et al.* 2011, Rahman *et al.* 2017).

Cestodes found in gut are acquired by eating contaminated food or water found to be largely affecting the ruminants like cattle and sheep. This group comprises of the genera *Moniezia* sp., *Taenia* sp., *Hymenolepis* sp., *Dipylidium* sp. etc. which are commonly found in domesticated and wild carnivores and herbivores. These are mostly found in Asia and Africa (Yeasmin 2013).

Infection with gastrointestinal nematodes is regarded as one of the important factor causing the productivity loss. The most important and widely prevalent nematodes are *Ascaris sp., Bunostomum sp., Capillaria sp., Ostertagia sp., Trichostrongylus sp., Cooperia sp., Oesophagostomum sp., Haemonchus* sp. *Nematodirus* sp. *Trichuris* sp. etc (Josiah *et al.* 2015, Kandasamy *et al.* 2013, Agumah *et al.* 2015, Juliet *et al.* 2013, Kelemework *et al.* 2016, Samanta and Santa 2009).

In developing countries, small ruminants are under severe influence of clinical and sub-clinical gastrointestinal helminth infestation which reduces their reproductive potential (Zeryehun 2012; Ayaz *et al.* 2013). Majority of the infected animals show a number of little obvious clinical signs due to parasitism during their productive life and their effects are gradual and chronic, the problems are often neglected (Raza *et al.* 2010). Antiparasitic drugs are effective in minimizing the internal parasites in grazing herd, such as benzimidazole,

levemisole and ivermectin which have developed resistance (FAO 2004, Terrill *et al.* 2001, Kaplan 2004). Therefore an integrated approach (Wells 2002, Rahmann and Seip 2007) becomes obligatory to control the internal parasites with the objective of harvesting the optimum productivity from grazing herds. A proper understanding of the epidemiology of parasitic diseases is a prerequisite for the rational design for the effective preventive and control measures against the dreadful parasitic diseases. Hence, the current investigation will give an overall idea about the prevalence of gastrointestinal parasitic infections in the market and free ranging area which will eventually assist the veterinarians for designing strategies and alert the farmers to take appropriate control measures.

MATERIAL AND METHODS

A total of 124 fecal samples (92 from large ruminants viz. cow, buffalo, ox and 32 from small ruminants viz. sheep, goats) were examined and collected from Gabtoli cattle market and Keraniganj (free ranging area), Dhaka between May and September 2017. Samples were collected from the ruminants through random selection. Among 56 large ruminants from Gabtoli cattle market, 31 were male and 25 were female in the present study. Out of 124, n56 cattle faecal sample were collected from Gabtoli cattle market and 36 from Keraniganj, while, 32 faecal samples of sheep from Keraniganj Cattle Market. Mostly fresh fecal samples were collected carefully from the ground just after defecation. The ruminants were restrained suitably prior to sample collection. All possible aseptic measures viz. apron, hand gloves and gumboot were taken to avoid contagion. About 20-25 grams of feces were collected carefully from each host in a ziplock bag. Each fecal sample was preserved using 10% formaldehide. Samples were transported to the Parasitology Laboratory, Department of Zoology, University of Dhaka within six hours of collection. Formol Ether Concentration technique was applied to identify the protozoan cysts and helminth ova. Stoll's ova counting method (Cheesebrough 1987) was applied to measure egg per gram and cyst per gram Parasite cysts and eggs were examined through microscopy using 10X and 40X objectives. Soulsby (1987) and Cheng (1986) were used to confirm the morphological features of the cysts and ova.

RESULTS AND DISCUSSION

Total 24 parasite species were identified from large ruminants (cow, buffalo, ox) comprising four protozoans, four trematodes, four cestodes and 12 nematode parasites. In Gabtoli and Keraniganj, the maximum prevalence was of *Entamoeba* sp. (46.43%; CPG, 16.2±4.5 and 44.44%; CPG, 10.1±1.5, respectively) among protozoan parasites. The lowest prevalence was recorded in

Table 1. Prevalence and intensity of protozoa, cestodes and trematode parasites in cattle from Gabtoli cattle market (Total N=56, Infected n=26) and Keraniganj (Total=36, Infected=16)

Name of parasites	Gabtoli Cattle Market			Keraniganj		
	Infected	Prevalence (%)	CPG/ EPG	Infected	Prevalence (%)	CPG/ EPG
Protozoan						
Balantidium sp.	20	35.71	28.9±5.5	14	38.90	40±7.5
Eimeria sp.	18	32.14	32±11.5	8	22.22	12.5±2
Entamoeba sp.	26	46.43	16.2±4.5	16	44.44	10.1±1.5
Giardia sp.	2	3.57	5±2.5	0	0	0
Trematodes						
Dicrocoelium sp.	18	32.14	17.1±5	10	27.78	6.4±2
Fasciola sp.	20	35.71	173.6±61	8	22.22	85±3.5
Paramphistomum sp.	10	17.86	19±9	0	0	0
Schistosoma sp.	6	10.71	25±0.5	4	11.11	10.5±2.5
Cestodes						
Dipylidium sp.	20	35.71	5.5±2.5	4	11.11	14±1
Hymenolepis sp.	16	28.57	31.9±8	6	16.67	53.3±3
Moniezia sp.	16	28.57	15.3±4	14	38.9	9±1
Taenia sp.	20	35.71	13.1±1.5	10	27.78	4.8±1

Table 2. Prevalence and intensity of nematode parasites in cattle from Gabtoli cattle market (Total=56, Infected=26) and Keraniganj (Total=36, Infected=16)

Name of parasites	Gabtoli Cattle Market			Keraniganj		
	Infected	**Prevalence (%)**	**EPG**	**Infected**	**Prevalence (%)**	**EPG**
Ascaris sp.	24	42.86	36.3±12	14	38.90	12.1±1
Ancylostoma sp.	6	10.71	16.7±2.5	8	22.22	18.8±3
Bunostomum sp.	4	7.14	6±1.5	4	11.11	9.5±0.5
Chabertia sp.	6	10.71	16±1	4	11.11	16.5±1.5
Cooperia sp.	4	7.14	12.5±0.5	4	11.11	7.5±0.5
Dictyocaulus sp.	6	10.71	10±1.5	0	0	0
Haemonchus sp.	22	39.30	47.5±12.5	6	16.67	75.7±4.5
Oesophagostomum sp.	6	10.71	4.7±1.5	6	16.67	10.3±4
Ostertagia sp.	18	32.14	53.7±13.5	10	27.78	41.4±5.5
Trichuris sp.	22	39.30	46.8±13	8	22.22	52.5±1.5
Trichostrongylus sp.	20	35.71	49.8±14	6	16.67	57.3±4
Strongyloides sp.	10	17.86	15±0.5	2	5.56	11±5.5

those of *Giardia* sp. (3.57%; CPG, 5±2.5) and *Eimeria* sp. (22.22%; CPG, 12.5±2) from Gabtoli. In Keraniganj, the lowest prevalence was recorded for (Table 1). Gupta *et al.* (2012) found the highest prevalence of coccidian (24.25%). Islam *et al.* (2014) found *Balantidium coli* (41.76%) and *Eimeria* sp. (4.11%) in their study. In the present study, *Fasciola* sp. showed the upper most prevalence

(35.71%; EPG 173.6±61) in Gabtoli while in cattle from Keraniganj, *Dicrocoelium* sp. (27.78%; EPG 6.4±2) showed the highest prevalence (Table 1). According to Copeman and Copland (2008), rainfall and production system mostly determine the prevalence of fasciolosis in a tropical country. As the samples were collected in rainy season, the temperature and rainfall might have initiated suitable settings for the overall development of the parasites.

Table 3. Prevalence and intensity of protozoa, cestode and trematode parasites in sheep from Keraniganj Cattle Market (Total=32, Infected=14)

Name of parasites	Infected	Prevalence (%)	CPG/ EPG
Protozoans			
Balantidium sp.	8	25.00	32.5±9.5
Eimeria sp.	4	12.50	37.5±0.5
Entamoeba sp.	8	25.00	30±1.5
Giardia sp.	2	6.25	12±6
Trematodes			
Dicrocoelium sp.	2	6.25	7±3.5
Fasciola sp.	12	37.5	22.5±9.5
Schistosoma sp.	2	6.25	13±6.5
Cestodes			
Dipylidium sp.	4	12.50	11±1.5
Hymenolepis sp.	2	6.25	15±7.5
Moniezia sp..	4	12.50	25±1
Taenia sp.	8	25.00	12.5±1

Table 4. Prevalence and intensity of nematode parasites in sheep from Keraniganj Cattle Market (Total=32, Infected=14)

Name of parasites	Infected	Prevalence (%)	EPG
Ascaris sp.	14	43.75	20±2
Ancylostoma sp.	8	25	1.5±1.5
Haemonchus sp.	2	6.25	19±8.9
Oesophagostomum sp.	4	12.5	13.5±1
Ostertagia sp.	10	31.25	33.4±3.5
Trichuris sp.	6	18.75	23.44±11.5
Trichostrongylus sp.	10	31.25	46.4±30
Strongyloides sp.	12	37.5	50±18

In both the sites, *Schistosoma* sp. (10.71%; EPG 25±0.5 and 11.11%; EPG 10.5±2.5, respectively Gabtali and Keraniganj) showed the lowest prevalence (Table 1). Islam *et al.* (2014) reported *Fasciola gigantica* (4.11%) and *Schistosoma* sp. (5%) from their study in Pabna district, Bangladesh which showed lower prevalence than this present study.

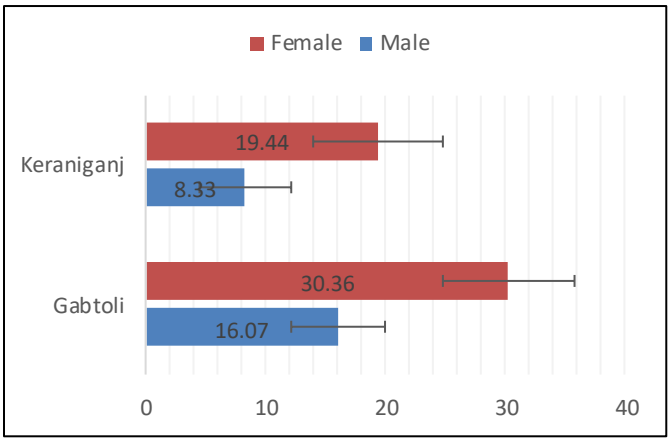

Fig. 1. Sex based occurrence of intestinal parasitic infections among the large ruminants.

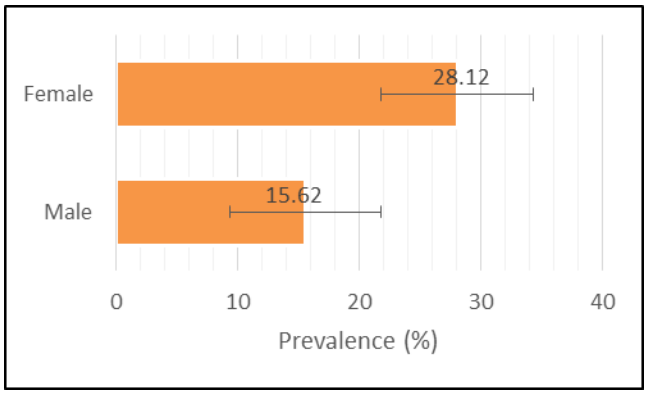

Fig. 2. Sex based occurrence of intestinal parasitic infections among the small ruminants of Keraniganj, Dhaka.

Among cestodes, *Dipylidium* sp. (35.71%; EPG 5.5±2.5) and *Taenia* sp. (35.71%; EPG, 13.1±1.5) showed the highest prevalence while *Hymenolepis* sp. (28.57%; EPG, 31.9±8) and *Moniezia* sp. (28.57%; EPG, 15.3±4) showed lowest prevalence in cattle of Gabtoli. In Keraniganj, the most prevalent parasite was *Moniezia* sp. (38.9%; EPG, 9±1) while *Dipylidium* sp. (11.11%; EPG, 14.5 ±1) had the lowest prevalence (Table 1). Ahmed *et al.* (2015) reported low prevalence of *Moniezia* spp. (6%) from cattle of Banskhali Upazilla, Chittagong.

Among nematodes, the highest prevalence was displayed by *Ascaris* sp. (42.86%; EPG, 36.3±12) and the lowest by *Bunostomum* sp. (7.14%; EPG, 6±1.5) and *Cooperia* sp. (7.14%; EPG, 12.5±0.5) in cattle from Gabtoli. In Keraniganj, *Ascaris* sp. (38.9%; EPG, 12.1±1) showed the highest and *Strongyloides* sp. (5.56%; EPG, 11±5.5) showed the lowest prevalence (Table 2). Akanda *et al.*

(2014) found the highest prevalence of *Haemonchus* spp. (4.56%) followed by *Trichostrongylus* sp. (4.41%). Chowdhury *et al.* (2017) reported the highest nematode infection of *Toxocara* sp. (12%) and the lowest of *Trichostrongylus* sp (2%).

Female large ruminants displayed higher parasitic infection (n=17; 30.36%) than the males (n=9; 16.07%). Midst 36 large ruminants from Keraniganj, 23 were female 13 were male. Among males, 3 (8.33%) and among females, 7 (19.44%) were screened parasite positive for at least one parasite (Fig. 1). Female cattle showed higher prevalence (45.41%) than male (34.73 %) ($p > 0.05$) (Maharana *et al.* 2016). Higher percentage of infection in female was also reported by Das *et al.* (2010). According to Radostits *et al.* (1994), animals with specific condition like pregnancy, lactation and malnutrition may account for greater prevalence of parasitic infection.

Islam *et al.* (2014) found higher rate of infections in female cattle (78.83%) than in the males (75.76%) in Vangura Upazila, Pabna. The female cattle (52.2%) were more infected than male (47.8%) in the Hilly areas of Bangladesh (Nath *et al.* 2016). *Trichostrongylus colubriformis* was the most prevalent in both male and female (13.83% and 16.24% respectively) cattle of Khyber Pakhtunkhwa while *Ostertagia ostertagi* (6.65%) showed the lowest prevalence in female (Rafiullah *et al.* 2011). The present investigation revealed that the female cattle were more infected than the males in both study areas. It may be due to some hormonal influences in female cattle. A very high level of prolactin and progesterone hormone may make the female more susceptible to the infection The breeding and lactation period of the female may be the reason of the susceptibility to various infections Khanum *et al.* 2014).

From the small ruminants (goats and sheeps), total 23 parasite species were identified comprising four protozoans, 4 trematodes, 4 cestodes and 11 nematode parasite species Musa *et al 2021*. In the present study, among protozoan parasites, the highest prevalence was presented by *Balantidium* sp. (25%; CPG, 32.5±9.5) and *Entamoeba* sp. (25%; CPG, 30±1.5), while, the lowest prevalence was displayed by *Giardia* sp. (8.33%; CPG, 6±0.5) (Table 3). Bhowmik *et al.* (2020) found *Eimeria* sp. among the small ruminants from Sandwip Island, Chattogram, Bangladesh.

Among trematodes, *Fasciola* sp. (37.5%; EPG, 22.5±9.5) showed the highest prevalence and *Dicrocoelium* sp. (6.25%; EPG, 7±3.5) and *Schistosoma* sp. (6.25%; EPG, 13±6.5) showed the lowest prevalence (Table 3). Hossain *et al.* (2015) in Sullah Upazilla of Sunamgonj District, Bangladesh found higher prevalence of *Fasciola gigantica*in in goat (46.67%) and sheep (37.50%). In sheep, Poddar *et al.* (2017) found relatively lower prevalence of *F. gigantica* (11.3%) and *Schistosoma indicum* (3.8%) from Sherpur.

Among cestodes, *Taenia* sp. (25%; EPG, 12.5±1) showed the peak prevalence and *Hymenolepis* sp. (6.25%; EPG, 15±7.5) had the minimum prevalence (Table 3). Along with incurring economic losses in livestock production, several species of cestodes are responsible for zoonotic infections such as cysticercosis and hydatidosis in human (Lightowlers 1990).

Among nematodes, the maximum prevalence was shown by *Ascaris* sp. (43.75%; EPG, 20±2) and the minimum by *Haemonchus* sp. (6.25%; EPG, 19±8.9) (Table 4). Menkir (2007) mentioned *Haemonchus contortus* being the most prevalent (65-80%) followed by *Trichostrongylus* sp. in small ruminants.

In the present study, among the 32 small ruminants from Keraniganj, 21 were males and 11 were females. Females showed higher prevalence of parasites (n=9; 28.12%) than that of males (n=5; 15.62%) (Fig. 2). The findings partially support Bhowmik *et al.* (2020), who found the female sheep to be more vulnerable to parasitic infections. However, the opposite trend was observed in goats by them. Biu *et al.* (2009) and Rahman *et al.* (2017) also found higher prevalence of parasites in female small ruminants from Tangail. The similar result was obtained by Sangma *et al.* (2012) who found higher infection in the female sheep than the male in Tangail, Bangladesh. The female domesticated sheep were found to be mostly infected than the male in Peshawar, Pakistan (Jan *et al.* 2015). Raza *et al.* (2014) found the female sheep (79.5%) to be mostly infected than the male (73.6%) in Cholistan Desert, Pakistan. Opposite result was reported by Yeasmin *et al.* (2014) and Khanum and Yeasmin (2015) where the male sheep (81.58%) were found more susceptible to helminth infection than that of the female (72.73%). In the study areas, the female sheep were exposed to the gastrointestinal parasites more than that of male may be because of their lack of immunity and hormonal imbalances during breeding period and lack of food supplement, proper hygiene etc. Besides, the lactating females become weak or malnourished which make them more susceptible to infections. The male sheep are normally well nourished which may prevent the infection by many protozoa and helminth parasites.

CONCLUSIONS

Further investigation is necessary to detect and estimate the ecto, endo and haemo-parasites from large and small ruminants in Bangladesh. High level of parasitic infection in ruminants is a threat to animal health and national economy as well. Proper control measures are indispensable to generate defense against economic damage regarding livestock production and management and to minimize the deadly effect of parasites on animal health.

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