Shobuj Bangladesh Publications House
International Journal of Natural and Social Sciences
ISSN: 2313-4461

Prevalence of gastrointestinal parasites in cattle at Vangura upazila in Pabna district of Bangladesh

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ABSTRACT

A survey on gastrointestinal parasitic infections in cattle was conducted at Vangura upazila, Pabna district, Bangladesh during the period from July to November, 2012 using coproscopy. The effects of age and sex on the prevalence of parasitic infections were determined. Among 170 fecal samples examined, 133 (78.24%) were found positive for parasitic infections and mean egg per gram of feces (EPG) was 403.01±31.82. The parasites identified on fecal examinations were snail borne trematodes namely, *Fasciola gigantica* (4.11%), amphistomes (40%), *Schistosoma* spp. (5%), nematodes namely, *Haemonchus* sp. (3.52%), Strongyles (1.17%), Strongyloides (1.17%), *Trichuris* sp. (1.76%), *Dictyocaulus* sp. (0.58%) and cestodes *Moniezia* spp. (3.52%), and protozoal infections namely, *Balantidium* coli (41.76%) and *Eimeria* spp. (4.11%). Age between calf and adult cattle had significant ($p<0.05$) influence on the infections with the gastro-intestinal parasites, whereas the sex of the cattle had no significant effect. Lower infection with *Moniezia* spp. (3.33%) was found in young cattle than in the adults (4.08%). Higher rate of infections was also recorded in females (78.83%) than in the males (75.76%). However, the present study demonstrated that age and sex of cattle had significant influence on the prevalence of gastrointestinal parasitic infection.

Key words: gastrointestinal parasite, cattle, Pabna, Bangladesh

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INTRODUCTION

Bangladesh is an agricultural country. Its economy mostly depends on agriculture. The livestock is considered to be the back bone of agriculture of Bangladesh (Anon, 1985) especially for the draft power. There is a lot of demand for the livestock products and by-products throughout the country. The contribution of livestock sector in GDP was 2.54% and growth rate was 2.41% in the year 2009-2010 (BES, 2011). Livestock sector plays a significant role in milk and meat production and source of hides and skin. The cattle population in Bangladesh is about 23 million (DLS, 2009). The cattle are kept mostly by poor, landless, marginal and small-scale farmers. In addition, 80% of the poor and ultra-poor people rear livestock as a major means of livelihoods (BBS, 2007). The hygiene and bio-security are not maintained properly. Domesticated ruminants in Bangladesh are at continuous risk of infection with one or more harmful helminths and the extent of financial losses is estimated between 25 and 30 million sterling pounds annually (Rahman, 1999). The geo-climatic conditions together with the water logged and low-lying areas in Bangladesh are conducive to parasitic diseases in domestic ruminants (Durrani, 1965). The climatic condition of Bangladesh with an average rainfall of 90 mm, humidity of 75%, temperature ranges between 11°C and 35°C are favorable for the optimal ecological survival of most of the parasites and the intermediate hosts (Rahman, 1988).

How to cite this article: Islam MR, MG Yasin, MAA Noman, Begum N and Mondal MMH (2014). Prevalence of gastrointestinal parasites in cattle at Vangura upazila in Pabna district of Bangladesh. International Journal of Natural and Social Sciences, 1(2): 45-52.

In fact, cattle of Bangladesh are affected by various types of helminth parasites (Rahman and Razzak, 1973; Rahman and Mondal, 1983). The losses due to parasitism take in the form of mortality, poor general health condition, retarded growth, lower output of work, decrease in the production of milk and meat (Faiz, 1972). ADB report (1984) clearly mentioned that the loss of productivity of animals in terms of mortality, milk, meat, generation loss and other productive traits due to parasitism (50%) in Bangladesh.

Gastrointestinal parasite cause impaired digestion and also affect the absorption of minerals particularly the calcium and phosphorus (Speedy, 1992). Like other diseases, parasitic infections or concurrently occurring infections cause economic losses in terms of mortality, stunted growth, loss of body weight gain leading to poor quality of skin, decreased milk and meat production (Dewan et al. 1979; Nooruddin *et al*. 1987; Ahmed et al. 1994). Gastrointestinal nematodes are also serious problems for ruminants, especially young animals. Debnath *et al*., (1995) suggested that 50% calves up to 1 year of age died due to gastrointestinal parasites that cause digestive disturbances and malnutrition leading to calf mortality. Different helminth infections are responsible for about 54.22% calf mortality in Bangladesh.

Economic losses caused by these parasites are enormous. Estimated losses due to mortality in different tropical countries stand at 30% in kids/calves, morbidity losses in adults are figure out at 15% in each of body weight gain, work output and milk production. FAO (1962) reported that losses from internal parasites might be as high as 30% of the market value. Afazuddin (1985) estimated an annual loss of taka 0.10 million due to parasitic disease in savar, Military Farm, Dhaka. Rahman and Ahmed (1991) reported calves to gain daily weight gain by 400 gm/day when treated compared to 200 gm/day in non-treated cases and subsequently reaching to sexual maturity in 24 months by treated calves compared to 36-40 months by non-treated calves.

Vangura upazila of Pabna district is one of the largest milk pocket area in the country. As per report of Upazila Livestock Office, Vangura, Pabna, total cattle population of Vangura is about 125500, daily milk production is 105000 liters and meat production is 95 metric ton. Bangladesh Milk Producers' Co-operative Union Limited (BMPCUL), which commonly known as Milk Vita is situated here. Chillng plants of different organizations situated here are Arong, Akij, Pran, Tatka, Quality milk, Aftab etc also collect milk from Vangura. Most of the cattle of this area are cross bred. Cattle in Pabna usually face huge parasitic problems as revealed by Islam (2008). Therefore the present study was undertaken to study the prevalence of gastrointestinal parasites in cattle at Vangura, Pabna.

MATERIALS AND METHODS

Study area and animal

Samples were collected from the different areas of Vangura upazila, Pabna district for the convenience of the study and availability of the animals during the period from July to November, 2012. Coprological examination was conducted in the Department of Parasitology, Bangladesh Agricultural University, Mymensingh. A total of 170 cattle were selected randomly, the age of the cattle were calf ≤ 6 months, yearling 6 months to 2 years, adult >2 years. During collection of samples the age and sex of animals were recorded.

Fecal samples collection and preservation

The cattle were selected randomly irrespective of their age and sex. The age of the animals was determined by interrogating the farmers by examining teeth and counting the rings of horn. After taking all the relevant information, the fecal samples were collected directly from the rectum of the animals or immediately after defecation. Before collection, the animals were restrained properly and all possible hygienic measures including wearing apron, hand gloves and gumboot were taken to avoid contamination. Fresh fecal samples were also collected from the ground when the animals were found in the act of defecation. A total of 170 samples were collected. About 15-25 grams of feces were collected from the animals. Each sample was kept in separate polythene bag, tied carefully and numbered

properly and the samples were preserved in 10% formalin. The correctly labeled and properly numbered polythene bags containing the fecal samples with all required information were brought to the laboratory.

Examination of fecal samples and identification of egg of parasites

The fecal samples were examined by Modified Stoll's Ova Dilution Technique for counting the number of eggs per gram (EPG) of feces and identification of egg of different gastrointestinal parasites was performed with the help of compound (x10) microscope by their characteristic morphological features (Soulsby, 1982 and Rahman *et al*., 1996).

Statistical Analysis

Statistical analyses were carried out by Statistical Package for Social Science (SPSS, version 16) using Z-test. Odds Ratio also was calculated according to the formula given by Schlesslmam (1982).

RESULTS AND DISCUSSION

Overall prevalence of gastrointestinal parasites in Cattle

During the study period a total of 170 cattle were examined through fecal sample examination, of which 133 were found infected with one or more species of gastrointestinal parasites indicating an overall prevalence 78.24%. A total of 9 genera of helminths and 2 genera of protozoa were identified, of them snail borne trematodes were *F. gigantica* (4.11%), amphistomes (40%), *Schistosoma* spp. (5%); nematodes namely, *Haemonchus* sp. (3.52%), *Strongyles* (1.17%), *Strongyloides* (1.17%), *Trichuris* sp. (1.76%), *Dictyocaulus* sp. (0.58%); cestodes *Moniezia* spp. (3.52%), and protozoa namely, *B. coli* (41.76%) and *Eimeria* spp. (6.47%). From this study, it was observed that the prevalence of *B. coli* (41.76%) was the highest whereas *Dictyocaulus* sp. (0.58%) infections were the lowest (table 1).

In this study, overall prevalence of gastrointestinal parasitic infection in cattle was recorded as 78.24% at Vangura upazila, Pabna of Bangladesh. This finding is similar to the earlier finding of Saifuzzaman (1996) who recorded 86.19% cattle infected with various helminths. On the other hand, the prevalence of helminths infection found in this study is much higher than the findings of Rahman and Razzak (1973) who recorded 37% of cattle infected with various helminths. In this study 4.11% cases with *Fasciola*, 40% cases with amphistomes, 5% cases with *Schistosomes* by fecal sample examination was recorded. In case of *Fasciola*, this finding is lower than the finding of Garrels (1975), Okiluddin (1996) and Singh et al. (2009) who recorded 22.4%, 21.88%, 19.3% fascioliasis in cattle, respectively. The rate of infection found in this study is much lower than the earlier findings of Bhuyan (1970), Rahman and Mondal (1983), Gupta (2002) and Affroze (2009) who recorded 60%, 53%, 36.28%, 70%, 31.14% fascioliasis, respectively in Bangladesh and India. In amphistomes, the finding in this study is similar to the findings of Islam (1989), Borkakoty et al. (1977), Alim (1997) and Singh *et al*. (2009) who recorded 29.5%, 31.1%, 36.19%, 35.8% cattle were infected with amphistomes. This result is higher than the report of Rahman and Mondal (1983) who recorded 21.6% amphistomes infection in cattle. On the other hand, the rate of infection which found in this study is much lower than the earlier findings of Anwar (2008), Islam and Samad (1989) and Rahman and Razzak (1973) who recorded 58.9%, 46.34% and 62.6% infection with paramphistomiasis in cattle in Bangladesh. An overall 5% infection with Schistosoma spp. was recorded in this study. This finding is somewhat similar to the earlier finding of Singh et al. (2009) who recorded 4.4% of cattle infected with *Schistosoma* sp. in India. This result is lower than the earlier record of Naik (1942), Islam (1989) and Anwar (2008) who recorded 20%, 13.9%, 13.7% schistosomiasis, India and Bangladesh respectively. The variations in the finding with the earlier reports might be due to the difference in the sample size, selection of samples, breed, period and place of study, climatic conditions, managemental factors and the availability of intermediate hosts.

It was observed that the prevalence of helminths was insignificantly ($p>0.05$) higher in cattle. In this study, the highest infection was found in cattle with amphistomes (40%), *Haemonchus* sp. (3.52%), *Moniezia* sp. (3.52), *B. coli* (41.76). The influential factors on the prevalence of parasites is difficult to explain but it may be assumed that irregular deworming, feed supplement and management practices may be associated with this variation.

Sex related prevalence of gastrointestinal parasites of cattle

In this study, it was recorded that prevalence of gastrointestinal parasites in male and female cattle was 75.76% and 78.83% respectively and the difference was not statistically significant. However the female cattle were 1.19 times more susceptible than male. In female, in case of trematodes, helminths infection the prevalence rates of amphistomes (40.14%), *F. gigantica* (4.37%) *Schistosoma* spp. (5.80%) was higher than those in male of amphistomes (39.39%), *F. gigantica* (3.03%) and *Schistosoma* spp. (3.03%). In case of nematodes, in female prevalence of *Strongyloides* (1.45), Strongyles *(*1.45), *Haemonchus* sp. (3.64%) and *Trichuris* sp. (2.18%), is relatively higher than those in male with *Strongyloides* (0%), Strongyles (0%), *Haemonchus* sp. (3.03%), *Trichuris* sp. (0%). Among cestodes, *Moniezia* spp. was found only in female (4.37%) cases. And in protozoa, prevalence in female namely, *B. coli* (46.71%) and *Eimeria* spp. (4.37%), is higher than those in male *B. coli* (45.45%) and *Eimeria* spp. (3.03%), respectively (table 2).

There was insignificant difference in the rate of infection in between the male and female cattle. In the female cattle, the infection rate was recorded higher with *F. gigantica* (4.37%) by fecal sample examination than the male cattle in which the infection rate was (3.03%). This finding is in agreement with the findings of Saifuzzaman (1996) who recorded 13.86% and 24.44% prevalence of *F. gigantica* in male and female cattle, respectively in Bangladesh. This result is in contrast to the earlier record of Ibrahim (2004) who recorded no significant difference in *Fasciola* infection rate between male (6.66%) and female (7.14%) cattle. Amphistomes was recorded higher in female (40.14%) than the male (39.39%) in this study. This finding is in conformity with Uddin (1999) who recorded higher infection with amphistomiasis in female than male goat in Bangladesh. An overall 3.03% of male and 5.80% of female cattle infected with schistosomiasis was found in this study. The higher percentage of infection in the females cannot be explained exactly but it might be assumed that hormonal influence as well as stress leading to immune-suppression may be associated with this phenomenon, sample size, selection of samples and breed of cattle may also be associated with this. Liyod (1983) reported higher level of prolactin and progesterone hormones make the individual more susceptible to any infection. In this study, infection with *B. coli* in female (46.71%) higher than in male (45.45%), which support to the previous findings of Haque et al. (2000) who reported female calves have a higher risk of suffering than male calves.

Table 1
Overall prevalence of gastrointestinal parasites in cattle

Name of Helminths	No. Infected (N=170)	Prevalence (%)	EPG (Mean±SE)
Fasciola gigantica	7	4.11	100±00
Amphistomes	68	40	294.12±26.99
Schistosoma spp.	9	5	133.33±33.33
Haemonchus sp.	6	3.52	100±00
Strongyles	2	1.17	250.00±150.00
Strongyloides	2	1.17	100±00
Trichuris sp.	3	1.76	166.67±33.33
Moniezia spp.	6	3.52	116.67±16.67
Dictyocaulus sp.	1	0.58	400±00
Balantidium coli	71	41.76	331.71±30.15
Eimeria sp.	11	6.47	228.57±42.06
Sub total	133	78.24	403.01±31.82

Table 2
Sex related prevalence of gastrointestinal parasites in cattle

Helminths	Male (N=33)		EPG (Mean±SE)	Female (N=137)		EPG (Mean±SE)
	No. of infected	Prevalence (%)		No. of infected	Prevalence (%)	
Fasciola gigantica	1	3.03	100±00	6	4.37	133.33±33.33
Amphistomes	13	39.39	183.33±27.06	55	40.14	321.82±31.75
Schistosoma spp.	1	3.03	100±00	8	5.80	133.33±33.33
Haemonchus sp.	1	3.03	100±00	5	3.64	100±00
Strongyles	0	0	00	2	1.45	100±00
Strongyloides	0	0	00	2	1.45	100±00
Trichuris sp.	0	0	00	3	2.18	200±00
Dictyocaulus sp.	0	0	00	0	0	00
Moniezia sp.	0	0	00	6	4.37	116.67±16.67
Eimeria sp.	1	3.03	100±00	6	4.37	250.00±42.82
Balantidium coli	14	45.45	268.42±37.50	64	46.71	362.90±38.29
Sub total	25	75.76	319.23±42.61	108	78.83	423.36±37.99
Odds Ratio	Female Vs male (1.19)					
P value	0.932					

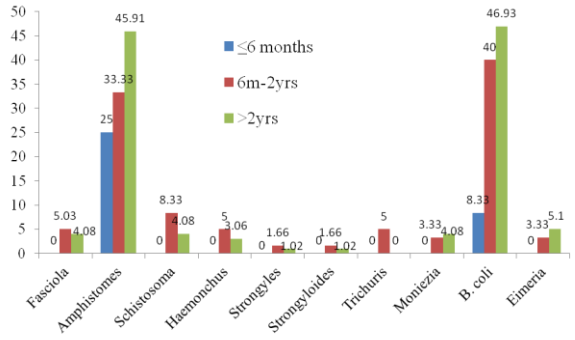

Figure 1
The prevalence of gastrointestinal parasites of cattle in relation to age

Age related prevalence of gastrointestinal parasites of cattle

Age of the host had an effect on the prevalence of gastrointestinal helminths of cattle. In this research, it was observed that the prevalence of gastrointestinal parasites in cattle was the highest in adults (>2 years) cattle (85.71%) followed by yearlings (6 months to 2 years) cattle (71.67%), young calves (≤ 6months) (50%). In case of rate of infection, yearlings were 1.25 times more susceptible than calves, susceptibility of adults were 2.37 times higher than yearlings, adults were 6 times higher than calves. Calves were infected by 8 species of gastrointestinal helminths and 1 species of protozoa, followed by yearling 8 species of helminths and 2 species of protozoa and adult 7 species of helminths 2 species of protozoa. Prevalence of snail borne trematodes amphistomes (45.91%) in adult (>2 years) and the nematode infection in yearling (6 months-2 years) *Haemonchus* sp. (5%), cestodes *Moniezia* spp. (3.33%), protozoa, *B. coli* (46.93%) were found higher extent (figure 1).

Among the age group, significantly ($p<0.01$) higher rate of infection was found in adult (>2 years), and it was (85.71). In this research the highest prevalence of *Fasciola* is recorded in the yearling (6 months to 2 years) cattle (5.08%) which is very dissimilar to the earlier record of Affroze (2009) who recorded at the age above 4 years had highest (33.33%) prevalence of *Fasciola gigantica* in cattle of Netrokona district in Bangladesh. This record is also in contrast with the previous reports of Rahman and Mondal (1983) who recorded heavy infection in cattle of 2-3 years of age than the young. Chowdhury et al. (1994) reported higher rate of infection in cattle of 1-3 years of age (24.72%). The prevalence of infection with amphistomes was observed higher in the age group of >2 years (45.91%) in this study. This result is similar with the findings of Uddin (1999), Rahman and Razzak (1973) and Garrels (1975). In case of *Schistosoma* infections the highest prevalence was recorded at the yearling (6 months to 2 years) cattle (8.33%). This result is similar to the earlier findings of Rahman (2009) who recorded the age group between 1-2 years showed highest infection with *Schistosoma* in cattle (14.5%). The causes of this variation in the prevalence of infection in different age group are difficult to explain but it might be due to an immunological phenomenon, difference in the grazing area and management variation of cattle.

CONCLUSION

Parasitism is one of the major problems affecting health and productivity of livestock. By fecal sample examination, an overall 78.24% gastrointestinal infection was detected in cattle at Vangura upazila, Pabna district, Bangladesh. Age and sex of cattle had significant influence on the prevalence of gastrointestinal parasitic infection. Only the prevalence rate was investigated in this study. The effects of parasites in production performance of cattle are essential to be studied which would be more beneficial for the farmers. So, further study should be carried out to determine the economic losses due to parasites of cattle and to find out effective control measures against it. However, particular emphasis should be given to proper management, regular deworming and improved hygiene, to prevent the parasitic infections in cattle and other animals.

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