

## Prevalence of gastrointestinal parasitism of cattle in Banskhali upazilla, Chittagong, Bangladesh

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### ABSTRACT

The objectives of this study were to investigate the prevalence of gastrointestinal parasitism (GP), and to determine the effects of age, sex, breed, body score and body weight in the occurrences of GP of cattle in Banskhali Upazilla, Chittagong, Bangladesh. A total of 50 fecal samples were randomly collected directly from rectum of cattle. The samples were examined by routine coproscopical methods for the presence of different parasites and oocysts. Overall prevalence of GP infestation was 72% (n=36/50). Prevalence of *Paramphistomum* spp. infestation was found to be the highest (30%; n=15/50) followed by *Toxocara* spp. (12%; n=6/50), *Fasciola* spp. (10%; n=5/50), *Oesophagostomum* spp. (8%; n=4/50), *Moniezia* spp. (6%; n=3/50) and *Trichostrongylus* spp. (2%; n=1/50). Young cattle were mostly infested as compared to adult and calf. The results of this study provides an epidemiological forecast showing the prevalence of GP in cattle, which can be helpful for the clinician in diagnosis of such infections.

### Keywords

Cattle, Gastro-intestinal parasitism, Infection, Prevalence

### ARTICLE HISTORY

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### INTRODUCTION

Agriculture is considered as the key driver of economical growth in Bangladesh. The contribution of agriculture sector to Gross Domestic Product (GDP) in Bangladesh is 12.65%. Bangladesh is currently

estimated to comprise 234.88 lakh cattles, 254.39 lakh goats and 32.06 lakh sheep (BER, 2014). The livestock sub-sector provides a significant contribution in terms of fulfilling the demand of daily requirement of animal proteins. In the fiscal year 2013-14, livestock contributed 1.78% to GDP in Bangladesh (BER, 2014).

Gastrointestinal parasitism (GP) adversely affects the health and productivity of animal worldwide including Bangladesh (Kakar et al., 2008). The climatic condition of Bangladesh favors the growth, development and survival of various parasites or their intermediate hosts. It has been estimated that about 10% animals die annually due to parasitic diseases in the world (Chavhan et al., 2008). Previous studies in Bangladesh revealed that gastro-intestinal parasitic infections are widely prevalent in the country (Siddiki et al., 2009; Alim et al., 2011). In Bangladesh, 80% people in rural areas rear indigenous cattle (Siddiki et al., 2009), and most of the cattle have been originated from primitive and low productive ancestors. The farmers usually rear their cattle under traditional husbandry practices. Nutritional status of the animals in general is not satisfactory as they are over-worked but under-fed or half-fed, which makes the animals susceptible to diseases including different parasitic diseases. About 50% calves until 1-year of age die due to GP. Besides, adult cattle are severely affected by parasitism resulting enormous economic losses in Bangladesh (Sardar et al., 2006). Unfortunately, in Bangladesh these problems are neglected or overlooked sometimes as the animals show little or no clinical signs after infected with parasites (Raza et al., 2010; Alim et al., 2011).

There are several factors such as breed, age, nutritional status, environment, ecology and pathogenesis of the parasites that influence the occurrences of GP (Pfukenyi

and Mukaratirwa, 2013). Banskhali upazilla is situated to the southern part of Chittagong district (Figure 1). The environmental conditions such as low lying water filled grazing land, humidity, environmental temperature of this area are suitable for growth and survival of parasites and their intermediate hosts. However, very few reports were published on parasitic infestation of this area. Therefore, the objectives of this study were to investigate the prevalence of gastrointestinal parasitic infestation in Banskhali upazilla, Chittagong, and to determine the effect of different factors such as breed, age, sex, body score, body weight etc. in the occurrence of such diseases.

## MATERIALS AND METHODS

**Study area and period:** The study was conducted at Upazilla Veterinary Hospital, Banskhali, Chittagong (Figure 1), for a period of 2 months starting from 5<sup>th</sup> May to 4<sup>th</sup> July, 2013.



Figure 1. Study area at Banskhali upazila, Chittagong, Bangladesh. The yellow arrow indicates the area of sample collection.

**Animals and sample collection:** A total of 50 fecal sample collection from the animals (n=50) that were presented to the Upazilla Veterinary Hospital (UVH), Banskhali, Chittagong. The cattle were suspected to be affected with gastro-intestinal parasitic infection on the basis of owner complain, clinical history, clinical signs and physical examination. The samples were collected as per standard guidelines set by the Chittagong Veterinary and Animal Sciences University (CVASU). The cattle were divided into several groups as mentioned in Table 1 and 2. A prototype questionnaire was used to record the information like owner's name and address, animal identification (ID), farm size, breed, age, sex and de-worming history. Approximately 5-10 gm of fecal sample from each individual animal was collected directly from rectum and stored

in plastic containers. The samples were transported to the Parasitology Laboratory at CVASU for parasitological examinations.

**Examination of samples:** In addition to gross examination of collected feces (e.g., color, consistency, presence of blood or mucus), 3 types of qualitative tests such as direct smear, sedimentation and flotation techniques were used for examination. Zinc sulphate solution was used as floatation fluid. At least, two smears were prepared from each sample for each test to identify the morphological characteristics of eggs, cyst, Oocysts, as described by Hendrix (2006).

**Statistical Analysis:** The data were imported, stored and coded accordingly. Data management and analyses were performed using Microsoft Excel and STATA version 12 (StataCorp, College Station, Texas). Descriptive statistics was expressed as proportion with *P*-value for chi-square test. Significance of the data was determined when  $P \leq 0.05$ .

## RESULTS AND DISCUSSION

In this study, overall prevalence of gastrointestinal parasitic infections (single/mixed) was 72% (n=36/50) in this study population. Seven different helminthes species including 2 trematodes, 1 cestode and 3 species of nematodes were found in cattle population of the studied area (Table 2). Table 1 represents association of different variables with overall parasite positive samples. The prevalence of parasitic infection was significantly ( $P < 0.05$ ) highest in cachectic animal (100%) than medium and healthy animal (27%). Dewormed animal showed significantly lower prevalence of gastrointestinal infection (80%) than animal which were not dewormed (48%). The overall prevalence of GP infections found in this study inclined with the report of Samad et al. (2004) who recorded 63.32% cattle in Bangladesh had infested with parasites. However, these observations markedly varied from the report of Alim et al., (2011) who recorded 39.75 and 46.25% parasitic prevalence in crossbred and local cattle, respectively. These variations might be due to differences in geo-climatic conditions, sample size, breed, age, sex, plan of nutrition, stress, availability of intermediate host, vegetation, grazing pattern, rearing and husbandry measures, anthelmintic therapy and genetic resistance (Khan et al., 2010).

Survival and transmission of eggs and larvae of parasites depend mainly on climatic conditions at natural pasture (Pfukenyi and Mukaratirwa, 2013).

**Table 1.** Association of different variables with overall parasite positive samples.

Variables	Level	Total observation	Samples positive to parasites (%)	Chi-square value	P-value
Breed	Cross	17	12 (71)	0.74	0.68
	Local	22	14 (64)		
	RCC	11	6 (55)		
Sex	Female	28	17 (61)	0.29	0.58
	Male	22	15 (68)		
BCS	Cachectic	8	8 (100)	11.12	<b>0.004*</b>
	Healthy	11	3 (27)		
	Medium	31	21 (68)		
De-worming	Yes	25	12 (48)	5.55	<b>0.01*</b>
	No	25	20 (80)		

\*Significance was determined when  $P \leq 0.05$

**Table 2.** Age-specific prevalence of different genus of gastrointestinal parasite.

Name of the parasites	Calf	Young	Adult	Overall (%)
	( $\leq 1$ -year) N=20	(>1-<2.5-year) N=17	( $\geq 2.5$ -year) N=13	
Total positive (%)				
<i>Paramphistomum</i> spp.	6 (30)	5 (29.41)	4 (30)	15 (30)
<i>Fasciola</i> spp.	1 (5)	3 (17.64)	1 (7.69)	5 (10)
<i>Oesophagostomum</i> spp.	1 (5)	1 (5.88)	2 (15.38)	4 (8)
<i>Trichostrongylus</i> spp.	0 (0)	1 (5.88)	0 (0)	1 (2)
<i>Toxocara</i> spp.	6 (30)	0 (0)	0 (0)	6 (12)
<i>Moniezia</i> spp.	1 (5)	1 (5.88)	1 (7.69)	3 (6)
Oocyst	2 (10)	0 (0)	0 (0)	2 (4)
<b>Total</b>	<b>17 (34)</b>	<b>11 (22)</b>	<b>8 (16)</b>	<b>36 (72)</b>

Different local climatic conditions like humidity, temperature, rainfall, vegetation and management practice have a profound effect on prevalence of gastrointestinal tract (GIT) parasites. Ruminants specially cattle, sheep, goat are susceptible to gastrointestinal parasitic infestation in low lying grazing areas which remains as water filled most of the time. The intermediate hosts are also available in this area. In the study area of this research work, high temperature and humidity may influence the growth of gastrointestinal parasites in ruminants, as reported by [Addisu and Berihu \(2014\)](#) and [Islam et al. \(2015\)](#).

Among all study population, 56% were female and the remaining 44% were male. The samples were collected from three groups of animals on the basis of body condition (cachectic, medium and healthy) of which 16% samples were collected from cachectic animal, 22% from healthy animal, and 62% from medium health animal. The study population were categorized into three sub-groups as calf ( $\leq 1$  year), young (>1-<2.5 years) and adult ( $\geq 2.5$  years) consisting of 40, 34 and

26% of total samples. Among the study population, 50% animals were de-wormed.

The current study revealed that, prevalence of *Paramphistomum* spp. infestation was recorded as the highest (30%;  $n=15/50$ ), followed by *Toxocara* spp. (12%;  $n=6/50$ ), *Fasciola* spp. (10%;  $n=5/50$ ), *Oesophagostomum* spp. (8%;  $n=4/50$ ), *Moniezia* spp. (6%;  $n=3/50$ ) and *Trichostrongylus* spp. (2%;  $n=1/50$ ). The prevalence of mixed parasitic infection such as *Paramphistomum* spp., *Oesophagostomum* spp. and *Paramphistomum* spp., oocyst was almost same.

Prevalence of *Fasciola* spp. of this study was lower than the observation of [Iqbal et al. \(2007\)](#) who recorded 21.42% in Pakistan. The prevalence rate of our study is also higher than the report of [Alim et al. \(2011\)](#) who recorded only 2.54 and 0.92% in indigenous and crossbred cattle in different regions of Chittagong regions, respectively. Higher prevalence of *Fasciola* spp. might be due to geo-climatic condition or poor sample size, as reported by [Kakar et al. \(2008\)](#). However, a

higher prevalence (25%) of Paramphistomiasis was recorded by Raza et al. (2009), which is similar to the results of this study. This occurrence might be due to geo-climatic conditions, age and seasonal variations (Sardar et al., 2006). Alim et al. (2011) reported a higher prevalence of *Toxocara* spp. infection in cattle. Conversely, lower prevalence of *Toxocara* spp. infection was observed by Saravanan et al. (2009). However, the finding of this study was similar to Samad et al. (2004) who recorded 14% infection of *Toxocara* spp. Prevalence of *Moniezia* spp. infection of this study largely differed from a report (1%) in India (Saravanan et al., 2009).

**Table 2** represents that in calf, *Paramphistomum* spp. and *Toxocara* spp. infections were higher (30%) than other species of parasites. In young and adult animals, *Paramphistomum* infection was the highest among all species representing 29.41 and 30%, respectively.

In our study, prevalence of gastrointestinal parasitic infection was found more in young cattle as compared to adults and calves. The high prevalence of *Paramphistomum* spp. found in our study was inclined with the report of Raza et al. (2007) who reported that this parasite is mostly prevalent in young cattle. The cause of this high prevalence in young cattle might be due to sudden exposure to grassland containing huge number of eggs of parasites, and possibly due to lack of necessary protective immunity of the cattle. On the other hand, *Toxocara* spp. infection was mostly found in calves, as reported by Sardar et al. (2006) and Lay et al. (2008). High prevalence of *Toxocara* spp. in calves might be related with prenatal infection with 3<sup>rd</sup> larval stage, and poor hygienic condition during post-natal period (Lay et al., 2008).

In the current study, it was exposed that female cattle showed almost same level of susceptibility to different gastrointestinal parasites like male but it was not statistically significant ( $P>0.05$ ). However, prevalence of *Paramphistomum* spp. infections was the highest in female cattle (35%) than male. Prevalence of *Fasciola* spp. infections (18.18%) along with *Toxocara* spp. (18.18%) were found more in male cattle. *Trichostrongylus* spp. and *Moniezia* spp. infections were only recorded in female cattle in this study.

In the present study, infection caused by *Paramphistomum* spp. was found predominant in female over male cattle. This finding was similar with the reports of Raza et al. (2010). On the other hand, *Fasciola* spp. and *Toxocara* spp. infections were mostly found in male as compared to female. In this study, variation in the occurrence of such helminthes in male

and female cattle might be due to variation in sample size, genetic resistance of host, stress, and lack of nutrition (Samad et al., 2004; Raza et al., 2010).

## CONCLUSION

This study revealed the occurrence of *Paramphistomum* spp., *Fasciola* spp., *Toxocara* spp., *Oesophagostomum* spp., *Trichostrongylus* spp. and *Moniezia* spp. in cattle in Banskhal, Chittagong. It is predicted that the high prevalence of parasitic infestation found in this study may be due to hot and humid climate, poor management, insufficient diet, lack of awareness and irregular de-worming practices in the studied area.

## CONFLICT OF INTERESTS

The authors declare that they have no conflict of interests.

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