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Coprological study of gastrointestinal parasites of cattle at Kotalipara Upazila in Bangladesh

Sohag Talukder[1]*, Md. Saiful Islam Siddiqui[2], Md. Ashraf Ali[3], MD. Abdul Jalil[4], Palash Kumar Das[5], Rajib Bhabuk[6], Md. Mahfuzur Rahman Sajib[1], Amitush Dutta[1]

[1]Internship Doctor, Jhenidah Government Veterinary College, Jhenidah-7300, Bangladesh
[2]Department of Anatomy & Histology, Faculty of Veterinary, Animal & Biomedical Sciences, Sylhet Agricultural University, Sylhet-3100, Bangladesh
[3]Department of Pathology & Parasitology, Jhenidah Government Veterinary College, Jhenidah-7300, Bangladesh
[4]Department of Medicine, Jhenidah Government Veterinary College, Jhenidah-7300, Bangladesh
[5]Department of Livestock Services (DLS), Dhaka, Bangladesh
[6]Faculty of Animal Science and Veterinary Medicine, Patuakhali Science and Technology University, Bangladesh

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Corresponding Author

Sohag Talukder
✉sohagtalukder2@gmail.com

ABSTRACT

This study was conducted to determine the prevalence, intensity and identification of gastrointestinal parasite eggs (except cestode) in cattle of different ages and sex by coprological examination. The study was carried out at Kotalipara Upazila in Gopalganj district of Bangladesh from December 2020 to February 2021. A total number of 65 fecal samples were collected from different cattle of 12 Union (administrative unit) in this study area. Direct fecal samples smear were visually examined under microscope for Trematode and McMaster fecal egg counting technique for others parasites. Results revealed that 90.77% of the samples were found positive with one or more parasite species. The eggs of nematode were predominant (86.15%) followed by trematode (50.77%) and protozoa (21.54%). Overall mean egg per gram (EPG) of feces was 324±21. The highest EPG were found in Ramshil Union of the study area. The study suggests to control gastro-intestinal (GI) parasites by regular dewarming program in order to prevent the losses by parasitic infestation.

INTRODUCTION

The livestock is deliberated to be the back bone of agriculture of Bangladesh, especially for the draft power. The contribution of livestock sector in GDP was 1.43% and growth rate was 3.04% in the year of 2019-2020 (Anon, 2021a). Total investment in this sector was Tk. 1612 crore in the year of 2019-2020 (Anon, 2021b). Livestock sector plays a momentous role in milk and meat production and source of hides and skin. The cattle population in Bangladesh is about 24.3 million and it is estimated that there are about 2 million cattle farms in Bangladesh (Anon, 2021a). The cattle are reared 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, 2011). Domesticated ruminants in Bangladesh are at continuous risk of infection with one or more detrimental helminths and extend of financial losses is calculate between US$ 34.67 million (Taka 2,889 million) and US$ 41.64 million (Taka 3466.83 million) sterling annually (Rahman, 1999). The climate condition of Bangladesh with an average rainfall of 90 mm yearly, humidity of 75%, temperature ranges between 11 ˚C and 35 ˚C are favorable for the appeasement ecology survival of most of the parasites and the intermediate hosts (Rahman, 1999).

In fact, cattle of Bangladesh are affected by several types of helminth parasite (Rahman and Razzak, 1973). The losses due to parasitism take in the form of mortality, poor general health condition, retarded growth, lower output of work,

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decrease in the production of milk and meat, 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 parasites causes impaired digestion and also affect the absorption of minerals particularly the calcium and phosphorus (Speedy, 1992). It is noted that 50% calves up-to 1 year of age died due to GI parasites that cause digestive disturbances and malnutrition leading to calf mortality (Debnath et al. 1995). Therefore, in the present study an attempt has been aching to assess the degree of infection of GI parasites Cattle at Kotalipara Upazila in Gopalganj district of Bangladesh.

MATERIALS AND METHODS

Study area and animal

The study was carried out at Kotalipara Upazila, a small administrative area under Gopalganj district of Bangladesh. Kotalipara is subdivided into Kotalipara Municipality and 12 Union Parishads for easy running of the administrative activities, Amtali, Bandhabari, Ghagar, Hiran, Kalabari, Kandi, Kushla, Pinjuri, Radhaganj, Ramshil, Sadullapur and Suagram. The farming system in the area is Crop-livestock production in a mixed form (Figure 1).

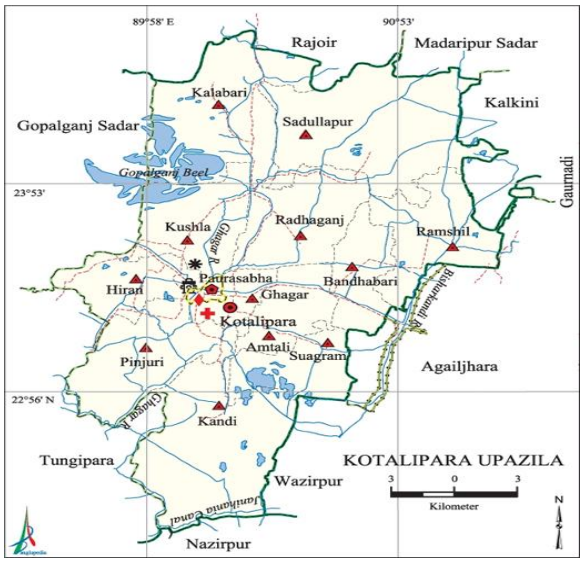

Figure 1: The study area where data was collected

A total of 65 cattle were selected randomly from small administrative area known as Union Parishads in Kotalipara Upazila (Table 1). The age of cattle was calf ≤12 months, Young ≤24 months and adult>24 months. During collection of samples the age and sex of animals were filed.

Fecal sample collection

The fecal samples were collected during winter season (December 2020 to February 2021). The cattle were selected randomly from study area. The age of the animals was determined by interrogating the farmers first and in latter verified by examining teeth and counting the rings of horn. Sexes were detected by examining external genitalia. After taking all the relevant information, the fecal samples were collected directly from the rectum of the animals or immediately defecation. Before collection, the animals were restrained properly and hygienic measures were strictly followed to avoid contamination. Fresh fecal samples were also collected from the ground when the animals were found in the act of defecation. About 20-25 grams of fresh fecal sample from each individual was drawn directly either from the rectum or collected fresh voided feces with aseptic condition. Each sample was kept in separate polythene bag, tied carefully and numbered properly. Each Polybag is marked with the unique identification number and basic demographic information (age and sex). The correctly labeled and properly numbered samples containing the fecal samples with all required information were immediately transferred to the Upazila Livestock Office and Veterinary Hospital and laboratory to keep in refrigerator at 4 °C temperature until further examination.

The collected fecal samples were examined by using Direct smear and McMaster egg counting technique for counting the number of egg per gram-EPG of feces and identification of eggs of different parasites had performed with the help of light compound microscope (x10) (Kabir et al. 2018). The egg's morphology, appearance, size, and color were used to identify the parasites egg (Soulsby, 1986). After the study period all selected animals were treated with anthelmintic.

Table 1: Number of samples from different Unions of Kotalipara Upazila

Union name	No. of sample
Amatli	5
Bandhabari	6
Ghagar	5
Hiran	5
Kalabari	5
Kushla	7
Kandi	5
Pinjuri	5
Sadullapur	6
Radhaganj	6
Suagram	5
Ramshil	5
Total	65

Parasitic investigation

McMaster Egg counting technique was applied for parasitic egg isolation. For this 3gm of feces was taken and mixed with 45ml of water into a plastic jar. The mixture was then shacked for make a homogenize suspension which was filtered through a mesh sieve of 0.15-0.25mm. 15ml of above mixture was taken in a centrifuge tube and centrifuged at 1500rpm for 3 minutes. The supernatant was discarded and the pellet was resuspended in flotation fluid (saturated salt solution) up to 15ml mark. the both chamber of McMaster slide were filled with the resuspension fluid and leaving the slide for 3-5 minutes. The McMaster slide was examined on Microscope and counted the eggs.

Data analysis

The collected data was filed and entered into Microsoft Excel spread sheet. The data were checked for the integrity and then coded and recoded before the analysis. The data were then forwarded to IBM SPSS (version 25) software for further analysis. All categorical outcome were expressed in percentage and 95% confidence interval.

RESULTS

Parasitic Prevalence

The overall prevalence of the parasitic infestation was 90.77%.

Union wise prevalence

Nematode was the most commonly detected GI parasite and mixed parasite egg relatively higher in Ghagar and Ramshil union. Higher Intensity of parasitic infection was detected in Ramshil union. Union wise prevalence and EPG of different parasites is given in (Table 2).

Age wise prevalence

Out of the total sampled calf, young and adult cattle, 21 (91.30%) calf, 20 (90.91%) young and 18 (90%) adult were positive for single or mixed parasite eggs. Prevalence of GI parasites was recorded with respect to age group which showed in (Table 3).

Sex wise prevalence

From the total 28 male and 37 female examined 24 (85.71%) and 35 (94.59%) were found to harbor parasite eggs respectively. Higher prevalence of GI parasitic infection in female was recorded than male (Table 4).

DISCUSSION

During the study period, a total number of 65 cattle were examined through fecal sample examination, of which 59 were found infected with one or more Gastro parasites from 12 union indicating overall prevalence 90.77%. The overall prevalence 90.77% of GI parasites similar with the earlier findings of Rashid et al. (2015), who reported 84.8% cattle infected with various helminths This finding is identical to the earlier finding of (Saifuzzaman, 1996) who recorded similar observation (86.19%) cattle infected with various helminths. However, the study of Ara et al. (2021) reported lower prevalence (65.5%) in cattle in different area of Sylhet division in Bangladesh might be due to the difference in location and other epidemiological factors.

On the other hand, the prevalence of helminths infection 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 infection were 50.77% with trematode, 86.15% with nematode, 21.54% with protozoa and 60% with mixed infection. The present study recorded higher EPG count in Ramshil union 480±40 whereas lower EPG count in Pinjuri Union 190±71 while overall EPG was 324±21.

In this study trematode prevalence were 50.77%, this findings is similar to the earlier findings (Sardar et al. 2006) who recorded *Fasciola spp.* 30.56%, and *Paramphistomum spp.* 51.11% cattle were infected. On the other hand, the prevalence of trematode infections in this study is much higher than the findings (Bista et al. 2018) who recorded 24% cattle were infected with trematode eggs. In this study higher trematode prevalence found in 3 Union Amtali, Kalabari and Ramshil followed by lower in Kushla Union because of management factors.

Prevalence of mixed parasite eggs higher in Ramshil union followed by lower in Pinjuri 20%. From this study, it was observed that the prevalence of nematode 86.15% at this study area. This finding is similar to the earlier findings (Ilyas et al. 2016) who recorded 75.46% cattle infected with nematode. And this study area the prevalence of nematode highest 100% were found from 5 Union, whereas lower in Kandi Union 60% because of selection of samples, management factors and availability of intermediate hosts.

Table 2: Union wise prevalence and EPG of different GI parasites

Union name	No of examined	No of positive	Prevalence					
			Direct Smear technique	McMaster egg counting technique			Overall Prevalence	EPG (Mean ±SE)
			Trematode	Nematode	Protozoa (*Eimeria)*	Mixed		
Amatli	5	5	80%	100%	0%	80%	100%	320±51*
Bandhabari	6	5	33.33%	83.33%	83.33%	83.33%	83.33%	333±81*
Ghagar	5	5	60%	100%	80%	100%	100%	440±36*
Hiran	5	4	40%	80%	0%	40%	80%	230±64*
Kalabari	5	5	80%	80%	20%	40%	100%	390±91*
Kushla	7	6	28.57%	71.43%	14.29%	28.57%	85.71%	264±86*
Kandi	5	3	20%	60%	20%	40%	60%	280±136*
Pinjuri	5	4	20%	80%	0%	20%	80%	190±71*
Sadullapur	6	6	50%	100%	0%	50%	100%	358±43*
Radhaganj	6	6	66.67%	100%	0%	66.67%	100%	275±47*
Suagram	5	5	60%	80%	20%	60%	100%	360±43*
Ramshil	5	5	80%	100%	20%	100%	100%	480±40
Sub-Total	65	59	50.77%	86.15%	21.54%	60%	90.77%	324±21

*= Significant at 5 percent level ($p<0.05$)

Table 3: Prevalence of GI parasites age wise

Age	No. of examined	No. of Positive	Prevalence	EPG (Mean ±SE)
Calf	23	21	91.30%	341±36.61*
Young	22	20	90.91%	327±36.30*
Adult	20	18	90%	303±40.31
Sub Total	65	59	90.77%	324±21

*= Significant at 5 percent level ($p<0.05$)

Table 4: Prevalence of GI parasites sex wise

Sex	No. of examined	No. of Positive	Prevalence	EPG (Mean ±SE)
Male	28	24	85.71%	275±31.44*
Female	37	35	94.59%	362±28.10*
Sub Total	65	59	90.77%	324±21

*= Significant at 5 percent level ($p<0.05$)

In this study 21.54% parasites were *Eimeria* spp which is in accordance with the results of Orjuela et al. (1991) who reported 26.8% of infection in cattle of the North Coast of Colombia. On the other hand, Rashid et al. (2015) found only 9% *Eimeria* spp which is lower than the present study and Pinilla et al. (2018) found high prevalence (77.9%) of *Eimeria spp*. in cattle of Aguachica and Rio de Oro municipalities, Cesar state.

The ideal temperature for the trematode life cycle should be between 10°C and 30°C, with the presence of rain for 3 or more months a year. However, the temperature and humidity determine the seasonality of the disease (Quiroz et al. 2011). The variations in the findings with the formerly reports might be due to the difference in the sample size, selection of samples, period and place of study, climate conditions and management factors. In the current study, impact of age on the prevalence of GI parasitic diseases were observed. The prevalence of GI parasitic infections were found more in calf 91.30% than young and adult, which were not similar to the observation of Regassa et al. (2004), who recorded the higher prevalence of helminth in younger animals than the calf and adult. In this study, the cause 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. In the present study, the infection caused by GI parasites was found predominant in female 94.59% than male cattle. Findings of this study were found in accordance with the reports of Raza et al. (2010) who also reported the higher prevalence of helminthes in female cattle. In this study, variation in occurrence of such helminthes in male and female cattle might be due to variation in sample size (Bachalet al. 2002), stress, genetic resistance of host and insufficient/imbalanced feed against higher needs (Hansen and Perry 1990).

CONCLUSION

Parasitic infection is one of the key problems affecting health and productivity of livestock. By fecal examination, an overall 90.77% GI parasitic infection was detected in cattle at Kotalipara Upazilla, Gopalganj District in Bangladesh. The effects of parasites in production performance of cattle are vital to be studied which would be more beneficial for the farmers. The study suggests to control GI parasites by regular dewarming program in order to prevent the losses by parasitic infestation.

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