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Prevalence of gastrointestinal parasites of buffalo at Mongla, Bagerhat

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ABSTRACT

A study was conducted to determine the prevalence of gastrointestinal (GI) parasites in buffaloes at Mongla in Bagerhat of Bangladesh from July to November, 2014. A total of 213 buffaloes were examined for GI parasites by using Stoll's ova counting technique. The data demonstrated that all animals were found to be infected with one or more gastrointestinal parasites. Five species of gastrointestinal parasites were identified. Among them two species were trematodes, *Fasciola gigantica* (24.41%) and Amphistomes (78.40%); two species were nematodes, *Haemonchus contortus* (29.58) and *Toxocara vitulorum* (18.78%); one species was protozoa, *Balantidium coli* (80.28%). No cestode was detected. Mixed gastrointestinal parasitic infection was common. Prevalence of gastrointestinal parasites in relation to age, sex, nutritional status and season were studied. All age groups of buffaloes were susceptible to infection. Males and females were equally infected with gastro-intestinal parasites. It was also detected that, nutritional status of buffaloes had no significant ($p>0.05$) effect on gastro-intestinal parasitic infection. There was no seasonal variation in case of parasitic infections. In this study, EPG/CPG (Egg/cyst Per Gram of Feces) was determined that ranged from 100-2100 among the identified parasites. The study revealed that the prevalence of gastro-intestinal parasites in buffaloes is very common.

Keywords: Prevalence, gastrointestinal parasites, buffalo, Bagerhat, Bangladesh.

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INTRODUCTION

Bangladesh is an agro based country. Most of the people of this country depend on agricultural works for their livelihood. Livestock plays an important role in the economy of Bangladesh. Buffalo is one of the most important species of livestock as a source of dairy, meat, manure and drought power in Bangladesh. Buffaloes are not only a major source of animal proteins but also their products such as bones, skins and goods made from them are of great economic importance. Both the swamp and river type buffaloes are found in Bangladesh (Latif, 1994). Buffaloes are usually raised in extensive system in the coastal areas where large scale pasture land is available. But there is no ideal management system of buffalo in coastal areas including housing, breeding, de-worming, vaccination, animal identification and record-keeping. Buffalo is considered to be a multipurpose animal and in some parts of the country, especially in the hilly areas and low lying marshy land, the farmers are more dependent on buffaloes than cattle. The working life of buffalo is longer than that of cattle, usually more than 17 years and up to 25 years of age (Cockrill, 1974). But, scientific knowledge concerning this animal has not been commensurate with its increasing numbers and importance.

In Bangladesh, many factors like diseases, genetic makeup, poor nutritional and management practices, environmental stress etc. are major constraints responsible for the low productivity of buffalo. Among many constrains, parasitism is thought to be a major cause that is hindering the development of livestock population including buffaloes in Bangladesh (Jabber and Green, 1983).

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The problem is neglected due to its chronic and insidious nature (Sanyal, 1998). Economic losses are caused by gastrointestinal parasitism in a variety of ways, they cause losses through lowered fertility, reduced working capacity, involuntary culling, a reduction in food intake and lower weight gains, lower milk production, treatment costs and mortality in heavily parasitized animals (Lebbie et al., 1994). The parasitic diseases are very important in buffaloes than other infectious diseases. These mainly include gastro-intestinal helminthiasis, coccidiosis, and mange (Griffiths, 1974) that causing parasitic gastroenteritis (Chowdhury and Tada 1994), watery diarrhea, weakness, weight loss, decreased milk production, reduced product quality, mortality and other secondary infections are caused by trematode parasites (Soulsby, 1982). In excess of helminths, buffaloes suffer from various intestinal protozoan infections (Azam et al., 2002; Nalbantoglu et al., 2008). Moreover, some helminths of buffaloes are also transmissible (directly or indirectly) to humans where they can cause significant clinical diseases, such as schistosomiasis and fascioliasis in a number of countries (Wang et al., 2006; Tum et al., 2007).

In developed countries, the data on epidemiology of various gastro-intestinal parasites are published in an efficient manner as an aid to combat infections more effectively. In contrast, in developing countries, little published information exists and data on the epidemiological aspect of gastro-intestinal parasitic infections. Few research related to gastrointestinal parasites in buffaloes have done in some region of Bangladesh (Mamun et al., 2011; Saha et al., 2013; Biswas et al., 2014). But no epidemiological work on gastrointestinal parasites in buffaloes has been done yet. By considering these points, the objectives of the present study were to determine the prevalence of parasitic infection in buffaloes at Mongla, Bagerhat, Bangladesh.

MATERIALS AND METHODS

Study area

The study was conducted in different areas of Mongla Upazilla under Bagerhat district which are located in between 21°49´ and 22°33´ north latitudes and in between 89°32´ and 89°44´ east longitudes and where majority of buffaloes are reared as free range. Fecal samples collected from the study areas were sent to the Laboratory, Department of Parasitology, Bangladesh Agricultural University, Mymensingh. The study was carried out during the period from July to November, 2014. The study period covered the rainy season and autumn.

Figure 1
Rearing of buffaloes in marshy land (left) and Gher (right).

Collection of samples

Two hundred and thirteen (213) buffaloes were selected randomly from different villages. The age, sex, and nutritional status were carefully recorded. According to age buffaloes were divided into buffalo calves (<2 years), young (2-5 years) and adult (years 5>). Buffaloes were further

grouped into male (n=73) and female (140) and again grouped into poor (n=114) and medium (99) categories according to nutritional status. At last on the basis of season of collection of fecal sample, buffaloes were grouped into rainy (n=140) and autumn (73) categories. The age of the buffaloes was determined by examining the teeth (Samad, 2008).

Most buffaloes were reared in free range system. So, before collection, animals were restrained properly. Samples were collected directly from rectum or immediately after defecation. About 20-25 g of feces was collected from each buffalo. Each sample was kept in separate plastic vial with 10% formalin, tied carefully and numbered properly. The accurately labeled and properly numbered plastic vials containing fecal samples with all required information were brought to the laboratory and examined under microscope.

Examination of fecal samples

The samples were processed and examined in the laboratory. The ova/cyst of different parasites were identified according to the morphology and quantitative estimation was done by modified Stoll's ova dilution technique as described by Soulsby (1982).

Statistical analysis

Statistical analyses were carried out by Statistical Package for Social Science (SPSS) using F test. To compare the prevalence of parasites in both sexes, data were analyzed by using paired sample t-test (Mostafa, 1989).

RESULTS AND DISUCSSION

Overall prevalence of gastro-intestinal parasites

During this study period, a total of 213 fecal samples were examined. All the samples (100%) were found to be infected with one or more species of gastro-intestinal parasites. Five species of gastro-intestinal parasites were detected. Among them, two species were trematode, namely *Fasciola gigantica* (24.41%) and Amphistomes (78.40%); two species were nematode, namely *Haemonchus contortus* (29.58%) and *Toxocara vitulorum* (18.78%) and one species of protozoa, *Balantidium coli* (80.28%). In this study, EPG was calculated. EPG count was the highest in *Toxocara vitulorum* (300-2100) followed by *Haemonchus contortus* (100-2100), *Balantidium coli* (100-1200), Amphistomes (200-1100) and *Fasciola gigantica* (100-500). Mean EPG count was also high in *Toxocara vitulorum (*670.00±74.78) followed by cyst of *B. coli* (601.75±18.92), Amphistomes (568.45±17.24), *Haemonchus contortus* (431.75±48.42) and *Fasciola gigantica* (236.54±17.59) (Table- 1).

In the present study, all buffaloes were found to be infected with one or more species of gastrointestinal parasites. The result is higher than Mamun et al .(2011) and Azam et al. (2002) who reported that 61.02% and 64.41% buffaloes were positive for gastrointestinal parasites in water buffalo of Kurigram district in Bangladesh and in Pakistan, respectively. The present findings is the agreement with the earlier findings of Biswas et al. (2014) who reported that 84.90% buffaloes were infected with gastrointestinal parasites in Bhola district in Bangladesh. Saha et al. (2013), Biswas et al. (2014) and Mamun et al. (2011) reported that fasciolosis in buffaloes was 26.17%, 25.40% and 22.46%, respectively at Barisal, Bhola and Kurigram in Bangladesh, which are approximately similar to the present finding.

In this study, cestode was not detected which is supported by Saha et al. (2013) and Mamun et al. (2011) who reported no cestode in their studies. This is not surprising because cestodes of buffaloes are rare in recent years (Liu et al; 2009) since buffaloes are usually raised in animal houses and seldom accessible to intermediatehosts of cestodes. The present findings is the agreement with the findings of Azam et al. (2002) who reported that 72% of the buffalo calves suffered from intestinal protozoan infection in Pakistan and differ with Biswas et al. (2014) who reported that the prevalence of intestinal protozoa was 37.40% in buffaloes which is lower than present findings. The variations among the findings might be due to the difference in the geographical situation (soil, water), techniques of sample collection, availability of intermediate host, period and place of study, environmental factors and breed of the animals.

Table 1
Overall prevalence of gastrointestinal parasites in buffalo at Mongla, Bagerhat (n=213).

Name of parasites	No. of animal affected	Prevalence (%)	EPG (Egg Per Gram of Feces)	
			Range	Mean ± SE
Fasciola giganitca	52	24.41	100-500	236.54±17.59
Amphistomes	167	78.40	200-1100	568.45±17.24
Toxocara vitulorum	40	18.78	300-2100	670.00±74.78
Haemonchus contortus	63	29.58	100-2100	431.75±48.42
Balantidium coli	171	80.28	100-1200	601.75±18.92
Total	493*	100	100-2100	501.70±35.39

***** = Total no. of animals affected is less than the summation of individual infection because same animal was infected with more than one type of gastro-intestinal parasites.

Table 2
Age related prevalence of gastrointestinal parasites in buffalo at Mongla, Bagerhat (n=213).

Categories	Name of parasites	No. of animal affected	Prevalence (%)	EPG (Egg Per Gram of Feces)	
				Range	Mean ± SE
Buffalo calves <2 years N=35	*Fasciola giganitca*	0	00	-	-
	Amphistomes	35	100.00	300-1000	569.23±36.76
	Toxocara vitulorum	29	82.85	300-2100	655.17±86.61
	Haemonchus contortus	29	82.85	200-2100	434.48±96.91
	B. coli	29	82.85	100-800	506.90±48.86
Sub Total		35	100	100-2100	541.45±67.29
Young (2-5) years N=65	*Fasciola giganitca*	5	7.69	100-500	180.00±80.00
	Amphistomes	41	63.08	200-800	524.39±27.67
	Toxocara vitulorum	1	1.54	300-300	300.00±0.00
	Haemonchus contortus	3	4.62	200-500	366.67±88.19
	B. coli	58	89.23	200-1200	681.03±40.22
Sub Total		65	100	100-1200	410.42±59.02
Adult >5 years N=113	*Fasciola giganitca*	47	41.59	100-500	242.55±17.67
	Amphistomes	87	76.99	300-1100	588.64±25.48
	Toxocara vitulorum	10	8.85	300-2100	750.00±164.15
	Haemonchus contortus	31	24.43	100-1000	435.48±39.77
	B. coli	84	74.34	200-900	579.76±18.77
Sub Total		113	100	100-2100	519.29±53.17
Level of significance					0.507 NS

NS = Not significant P>0.05

Age related prevalence

In this study age related prevalence of gastro-intestinal parasites were insignificant (p>0.05). All age groups were infected with five species of gastrointestinal parasites except buffalo calves (<2 years) where *Fasciola gigantica* was absent. *Fasciola gigantica* (41.59%) was the highest in adult group whereas in young group it was 7.69%. All buffalo calves were infected with Amphistomes (100%) whereas 63.08% and 76.99% prevalence were detected in young and adult group respectively. *Toxocara vitulorum* (82.85%) and *Haemonchus contortus* (82.85%) were the highest in buffalo calves whereas in young and adult they were 1.54% and 8.85%, respectively. So, *Toxocara vitulorum* was lowest in young age group. *Haemonchus contortus* (4.62%) was lowest in young group whereas in adult it was 24.43%. *B. coli* (89.23%) infection was highest in young group which was followed by 82.85% and 74.34% in buffalo calves and adult respectively (Table 2).

it was revealed that, age of the buffaloes had no significant (p>0.05) effect on gastro-intestinal parasitic infection. All age groups were infected with gastrointestinal parasites. The present finding is different from the earlier report of Biswas et al. (2014) who noticed that higher infection rate was in older buffaloes than the young buffaloes in Bhola district in Bangladesh. The present finding is also in support to the previous reports of Alim et al.(2004) who observed that infection rate of fasciolosis was increased with the increase of age in Bangladesh. The cause of variation on the basis of age is difficult to explain but it might be due to immune system. An immunological phenomenon as it was stated by Baily (1971) who suggested that the fascioliasis is not as self limiting in the animals. The cause of this variation also might be due to the difference in pasture and management variation of animals.

Sex related prevalence

It was detected that, there was no significant relationship of gastrointestinal parasites (p>0.05) in sex related prevalence. Both male and female buffaloes were infected with gastrointestinal parasites and every individual was infected with at least one species of parasite. In case of males, the highest prevalence was in *B. coli* (91.78%) followed by Amphistomes (71.23%), *Haemonchus contortus* (34.25%), *Toxocara vitulorum* (19.18%) and *Fasciola gigantica* (13.70%). In case of female, the highest prevalence was in Amphistomes (82.14%) followed by *B. coli* (74.29%), *Fasciola gigantica* (30.00%), *Haemonchus contortus* (27.14%) and *Toxocara vitulorum* (18.57%) (Table 3).

It was detected that, there was no significant relationship of gastrointestinal parasites (p>0.05) in relation to sex. Both male and female buffaloes were infected with gastrointestinal parasites and every individual infected with at least one species of parasite. This finding supported by Azhar et al. (2002) who reported that no sex variation in gastrointestinal parasitic infection in Pakistan. Authors noticed that buffaloes of either sex were equally affected.

Nutritional status related to prevalence

It was revealed that nutritional status of buffaloes had no significant (p>0.05) effect on gastro-intestinal parasitic infection. Both medium and poor body conditioned buffaloes were infected with gastrointestinal parasites and every individual was infected with at least one species of parasite. In poor body conditioned buffaloes the highest infection was with Amphistomes (87.71%), followed by *B. coli* (80.70%), *Haemonchus contortus* (47.36%), *Fasciola gigantica* (32.46%) and *Toxocara vitulorum* (31.57%). In medium body conditioned buffalo, the prevalence was highest in *B. coli* (79.79%) followed by Amphistomes (67.67%), *Fasciola gigantica* (15.15%), *Haemonchus contortus* (9.09%) and *Toxocara vitulorum* (4.04%) (Table 4).

It is observed that, the nutritional status of buffaloes had no significant (p>0.01) effect on gastrointestinal parasitism. Both poor and medium body conditioned animal were infected with at least one parasite. This finding disagrees with the findings of Biswas et al. (2014) who reported that parasitic infection higher in poor body conditioned animal than medium in Bhola district, Bangladesh. The cause of this variation also might be due to the difference in pasture, fodder, grazing system, food

habit, immune status rearing system and environmental factors.

Seasonal prevalence

It is observed that, the seasonal effect on gastrointestinal parasitism in buffaloes was insignificant (p>0.05). The highest infection in both seasons was with *B. coli* (82.85%, 75.34%) followed by Amphistomes (80.71%, 73.97%), *Haemonchus contortus* (37.14%, 15.06%), *Fasciola gigantica* (27.14%, 19.17%) and *Toxocara vitulorum* (22.85%, 10.95%), respectively in rainy and autumn season. All parasites were present in both seasons. But the prevalence of individual parasites were higher in rainy than autumn (Table 5).

In the present study, the seasonal effect of gastrointestinal parasitism in buffalo was insignificant (p>0.01).The present finding is approximately near to the previous reports of Biswas et al. (2014) who reported that the highest prevalence was in summer (84.62%), followed by rainy season (83.62%) and in winter season (81.16%) in Bhola district, Bangladesh. But the present result disagreed with the report of Azhar et al. (2002) who reported that, the highest prevalence in autumn (24.0%) followed by spring (20.0%), winter (13.0%), while the lowest (9.0%) was recorded during summer in Pakistan. In this present finding the prevalence of *Fasciola giganitca* infection was 27.14% in rainy season which is similar to the reports of Biswas et al. (2014) who reported that, *Fasciola giganitca* infection was 29.23% in rainy season, 25.00% summer season and 21.42% in winter season. The contrast in between the present and earlier findings can be explained by the fact of variation in the geographical location of the study area, season of survey and also the methods of study. Moreover, this study period covers two seasons of the year and in other parts of the world there were four seasons. So, this difference in the division of seasons had made some over lapping of months and seasons. Therefore, that might have created some contradictions.

Table 3
Sex related prevalence of gastrointestinal parasites in buffalo at Mongla, Bagerhat (n=213).

Categories	Name of parasites	No. of animal affected	Prevalence (%)	EPG (Egg Per Gram of Feces)	
				Range	Mean ± SE
Male 73	*Fasciola giganitca*	10	13.70	100-500	230.00±42.30
	Amphistomes	52	71.23	200-1000	590.38±32.98
	Toxocara vitulorum	14	19.18	300-1800	678.57±128.89
	Haemonchus contortus	25	34.25	100-1000	420.00±50.33
	B. coli	67	91.78	100-1200	641.79±41.57
Sub Total		73	100	100-1800	512.15±59.22
Female 140	*Fasciola giganitca*	42	30	100-500	238.10±19.56
	Amphistomes	115	82.14	300-1100	558.62±20.16
	Toxocara vitulorum	26	18.57	300-2100	665.38±93.63
	Haemonchus contortus	38	27.14	100-2100	439.47±73.67
	B. coli	104	74.29	300-900	575.96±15.55
Sub Total		140	100	100-2100	495.51±44.52
Level of significance					0.334 NS

NS = Not significant P>0.05

Table 4
Nutritional status related prevalence of gastrointestinal parasites in buffalo at Mongla, Bagerhat (n=213).
NS = Not significant P>0.05

Categories	Name of parasites	No. of animal affected	Prevalence (%)	EPG (Egg Per Gram of Feces)	
				Range	Mean ± SE
Poor 114	*Fasciola giganitca*	37	32.46	100-500	229.73±20.45
	Amphistomes	100	87.71	200-1100	567.00±23.49
	Toxocara vitulorum	36	31.57	300-2100	694.44±81.64
	Haemonchus contortus	54	47.36	100-2100	424.07±54.62
	B. coli	92	80.70	100-1200	593.48±23.28
Sub Total		114	100	100-2100	501.75±40.70
Medium 99	*Fasciola giganitca*	15	15.15	100-500	253.33±35.01
	Amphistomes	67	67.67	300-1000	570.59±25.15
	Toxocara vitulorum	4	4.04	300-700	450.00±95.74
	Haemonchus contortus	9	9.09	200-1000	477.78±90.95
	B. coli	79	79.79	100-1200	611.39±30.84
Sub Total		99	100	100-1200	472.62±55.54
Level of significance					0.632 NS

Table 5
Seasonal status related prevalence of gastrointestinal parasites in buffalo at Mongla, Bagerhat (n=213).

Categories	Name of parasites	No. of animal affected	Prevalence (%)	EPG (Egg Per Gram of Feces)	
				Range	Mean ± SE
Rainy 140	*Fasciola giganitca*	38	27.14	100-500	239.47±21.18
	Amphistomes	113	80.71	200-1100	555.75±20.31
	Toxocara vitulorum	32	22.85	300-2100	706.25±91.57
	Haemonchus contortus	52	37.14	100-2100	400.00±43.42
	B. coli	116	82.85	100-1200	612.07±22.91
Sub Total		140	100	100-2100	502.71±39.88
Autumn 73	*Fasciola giganitca*	14	19.17	100-500	228.57±32.19
	Amphistomes	54	73.97	300-1100	594.55±32.14
	Toxocara vitulorum	8	10.95	300-700	525.00±59.01
	Haemonchus contortus	11	15.06	100-2100	581.82±187.24
	B. coli	55	75.34	100-1200	580.00±33.68
Sub Total		73	100	100-2100	501.99±68.85
Level of significance					0.992 NS

NS = Not significant P>0.05

In this study, the prevalence of *Fasciola gigantica* in female was found 30% which was the agreement with the reports of Biswas et al. (2014) who reported that, the prevalence of *Fasciola gigantica* in female was 27.59% in Bhola district, Bangladesh. But this report is in contrast to Mamun et al. (2011) who reported the prevalence of *Fasciola gigantica* in females (14.29%) in Kurigram district in Bangladesh. The variations among the findings might be due to the difference in geographical situation, immune status, food habit, rearing system, availability of intermediate host and environmental factors.

The findings of the present investigation indicated that the prevalence of gastrointestinal parasites in buffaloes is very common and quite severe irrespective of age, sex, nutritional status of the buffaloes and seasons of the year.

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