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# STUDY OF GASTROINTESTINAL PARASITES OF DEER AT CHAR KUKRI MUKRI IN BHOLA DISTRICT

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## ABSTRACT

To study the prevalence of gastrointestinal parasites of deer, 127 fecal samples were collected from Char Kukri Mukri upazilla of Bhola district of Bangladesh during the period from January to May, 2013. Eighty eight samples were found to be infected with gastrointestinal parasites and overall prevalence rate was 69.29%. *Fasciola* sp. (8.66%), *Paramphistomum* sp. (20.47%), stomach worm (18.11%), hook worm (20.47%), *Strongyloides* sp. (1.57%), *Oesophagostomum* sp. (1.57%), *Eimeria* sp. (6.30%) and *Balantidium coli* (1.57%) were found. The overall prevalence of nematode, trematode, protozoan and mixed infection were 29.13%, 25.19%, 5.51% and 9.45% respectively. Seasonal prevalence of gastrointestinal parasites in summer and winter were 70.59% and 66.67% respectively. The range of EPG/CPG/OPG varied from 100 to 300 among the parasites and highest count was found in *Paramphistomum* sp. (300), hook worm (300) and stomach worm (300). This study provided a first overview on parasites in deer in the vicinity of villages, but to evaluate parasite transmission dynamics much more studies were required on livestock and on wild herbivores.

**Key Words**: Deer, Gastrointestinal parasites, Prevalence

## INTRODUCTION

Deer is the ruminant wildlife having economic value worldwide. In Bangladesh, deer are mostly available in Sundarban, Chittagong Hill tracts and different areas of Bhola and Noakhali district. Disease monitoring in wild animals has recently become a necessary component for preventing nature and human being. The presence of parasites in an animal, particularly in young animals resulting lowered condition, reduced body weight gains and reproductive disorders; in addition, the parasites affect the quality of animal products (meat, skin, antlers) and ultimately death (Fox, 2000). Infections with helminthes are a major health issue in captive and wild deer (Goossens *et al.*, 2005) mainly where herds of animals are kept in relatively small enclosures. These wild animals live in nature in large areas and have consequently a low genetic resistance against parasitic infections. A few studies have addressed on captive areas in Bangladesh have shown that helminthes harbored by different species of deer are not so distinct from those of feral and domestic livestock (Islam *et al*., 2003). Although a number of researches have been performed on the parasitism in livestock and poultry in Bangladesh, but rarely any attempt was made to conduct study exploring the prevalence and the effects of parasitism in the deer. Deer are hosts to a wide range of endoparasites such as helminths, insect larvae and certain protozoa (Rehbein *et al*., 2001; Vengust, 2003) cestodes (Chapman and Chapman, 1997) and other ectoparasites. Outbreaks of parasitic diseases among farmed deer in a limited space and intensive management practices mean that they are more heavily infested with parasites than wild deer (Vengust, 2003). Application of existing knowledge of disease control and prevention would significantly reduce economic losses due to gastrointestinal helminthiasis. In addition, investment to improve technology for disease diagnosis, control, prevention and/or eradication, along with adoption of that technology should yield significant dividends for deer industry (Mackintosh and Wilson, 2003). Although outbreaks of parasitic diseases in deer are not so deadly but it is out most important to keep the deer free from parasite. In captive deer, parasites such as gastrointestinal nematodes, *Dictyocaulus viviparous* and *Elaphostrongylus cervi* are common (Fletcher, 1982; Mason and Gladen, 1983; Mason, 1994) and often cause mortality and morbidity in deer (Fletcher, 1982). Some research has done by the scientist to determine the prevalence of captive deer but no detail work have done in deer at wild condition. Therefore, this present study attempts to identify the gastrointestinal parasites and to determine the prevalence and intensity of parasitic infection in deer at wild condition.

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## MATERIALS AND METHODS

### Study area

The study was conducted in different areas of Bhola district such as Char Kukri Mukri, Charpatila and Dhal char. Fecal samples were examined in the laboratory, Department of Parasitology, Bangladesh Agricultural University (BAU), Mymensingh.

### Selection of animals

The study covered the all ages and sexes of deer found in Char Kukri Mukri. One hundred and twenty seven (127) deers were selected randomly.

### Collection of fecal samples

Fecal samples were collected from the ground after defecation at morning of the day. Proper care was taken when fecal sample was collected from the ground to prevent contamination. After collection of fecal sample, about 20-25 grams of feces were placed in a polythene bag. Each sample was kept in separate polythene bag with 10% formalin to identify the eggs of parasite then tied carefully and numbered properly. The correctly labeled and properly numbered polythene bags containing the fecal samples with all required information were brought to the laboratory and refrigerated at $4^0$C and examined.

### Examination of fecal samples

All samples were examined in the laboratory of the Department of Parasitology, BAU, Mymensingh. The samples were processed for microscopic examination. The ova/cysts/oocyst/larvae of different parasites were identified according to the morphology and quantitative estimation was done by applying Modified Stoll's ova dilution technique to determine eggs per gram (EPG) or cyst per gram (CPG) or oocyst per gram (OPG) of feces as described by Soulsby (1982).

### Statistical analysis

Data were analyzed by using Statistical Package for Social Science (SPSS). 'F' Test were performed and the result were expressed in percentage with P-value and significance was determined when $P<0.05$.

## RESULTS AND DISCUSSION

### Overall prevalence of gastrointestinal parasites in deer at Char Kukri Mukri

During this study, a total of 127 fecal sample in deer were examined, of which 88 (69.29%) were found to be infected with one or more species of gastrointestinal parasites. These findings support the earlier reports of (Pilarczyk *et al*., 2005; Pacon, 1994; Cisek *et al*., 2004 and Santin *et al*., 2004). A total of eight species of gastrointestinal parasites (ova/cyst/oocyst) were identified, namely, *Fasciola* sp. (8.66%), *Paramphistomum* sp. (20.47%), stomach worm (18.11%), hook worm (20.47%), *Strongyloides* sp. (1.57%), *Oesophagostomum* sp. (1.57%), *Eimeria* sp. (6.30%) and *Balantidium coli* (1.57%). *Paramphistomum* sp. and *Haemonchus* sp. were common but earlier report (Kanungo *et al.*, 2010) showed *Fasciola* sp. was found only in Dhaka zoo and Safari Park.

The *Fasciola* sp. was recorded 8.66% which was less than reported by (Kanungo *et al*., 2010). They reported strong infection of *Fasciola* sp. were 20% and 12.5% in spotted deer and sambar deer in Dhaka zoo and 19.05%, 25% and 36.36% in spotted deer, sambar deer and para deer respectively in Safari park. It was evident from these results that deer was susceptible to *Fasciola sp*. The infection with *Fasciola* sp. was found similar to the findings of (Vengust, 2003; Novobilsky *et al*., 2007; Chroust and Chroustova, 2004; Maia, 2001). The probable cause of higher infection rate *Fasciola* sp. was strongly connected with mud snails that live on the edges of drain and act as intermediate host (Vengust, 2003).

*Paramphistomum* sp. and hook worm were highly prevalent in deer and the rates of prevalence were 20.47%. *Strongyloides* sp., *Oesophagostomum* sp. and *B. coli* were found less in prevalent. It appeared from the results that stomach worm (18.11%) was found most frequently in feces. More or less similar prevalence rates of stomach worm have been reported earlier by (Cook *et al*., 1979; Mckenzie and Davidson, 1989; Mason, 1994). *Paramphistomum* sp. (20.47%) was highly prevalent as observed in this study was supported by the previous reports of (Islam *et al.*, 2003; Banerjee *et al.*, 2005).

The study recorded an overall prevalence of both *Strongyloides* sp. *Oesophagostromum* sp. were 1.57% each, hook worm was 20.47%. More or less similar prevalence rate of gastrointestinal nematodiasis have been reported earlier by Shibashi *et al*. (2003), Santin *et al.* (2004), Maia (2001), Islam *et al.* (2003), Cook *et al*. (1979). However, some variation on the prevalence rate of helminthes were exist which might be due to topographic variation of the study area, environment, season and duration of study which influence the prevalence of the infection.

The overall prevalence of parasitic infection was 69.29% (88/127), where nematode, trematode and protozoan were 29.13% (37/127), 25.19% (32/127) and 5.51% (7/127), respectively (Table 1). Results indicated that helminth infections were more common than protozoan infection in deer. In this study the prevalence of helminth infection (54.32%) was found higher than protozoan infection (5.51%). This was more or less similar with the report of Parasani *et al*. (2001) who revealed that 50% animals positive for helminth infections and 18.8% with protozoa in Rajkot Municipal Corporation zoo. Lim *et al.* (2008) reported 34.5% positive with helminthes and 21.8% positive with protozoa which are much lower than the present study in case of helminth infections but higher in case of protozoan infection. This may be happened due to local climatic conditions, method of sample collection and use of anthelmintic in captive animal helminths (82.2%) than protozoa (17.8%).

In this study, EPG/CPG/OPG (eggs/cysts/oocysts per gram of feces) was also determined. The range of EPG/CPG/OPG varied among the parasites and ranged from 100 to 300. The highest EPG/CPG/OPG was counted in case of *Paramphistomum* sp. (300), hook worm (300) and stomach worm (300) followed by *Balantidium coli* (200), *Eimeria* sp. (200), *Fasciola* sp., *Oesophagostomum* sp. and *Strongyloides* sp. had the same range (100). Mean EPG count was highest in case of *B. coli* (200±0) followed by that of *Eimeria* sp. (150±18.898), *Paramphistomum* sp. (119.23±9.638), stomach worm (117.39±10.239) and hook worm (115.38±9.102). A low parasitic burden was found in case of *Fasciola* sp. (100±00), *Oesophagostomum* sp. (100±00) and *Strongyloides* sp. (100±00).

Table 1. Overall prevalence of gastrointestinal parasites in deer at Char Kukri Mukri

| Name of Parasites | No. Infected (Total No = 127) | Prevalence (%) | EPG | |
|---|---|---|---|---|
| | | | Range | Mean±SE |
| *Fasciola* sp. | 11 | 8.66 | 100 | 100±00 |
| *Paramphistomum* sp. | 26 | 20.47 | 100-300 | 119.23±9.638 |
| Hook worm | 26 | 20.47 | 100-300 | 115.38±9.102 |
| *Oesophagostomum* sp. | 2 | 1.57 | 100 | 100±00 |
| Stomach worm | 23 | 18.11 | 100-300 | 117.39±10.239 |
| *Strongyloides* sp. | 2 | 1.57 | 100 | 100±00 |
| *Eimeria* sp. | 8 | 6.3 | 100-200 | 150±18.898 |
| *Balantidium coli* | 2 | 1.57 | 200 | 200±00 |
| **Sub total** | **88** | **69.29** | **100-300** | **136.05±6.802** |

**Prevalence of mixed infection in deer at Char Kukri Mukri**

Overall prevalence of mixed infection was 9.45% (12/127). Type of mixed infection detected in this study were *Oesophagostomum* sp. and hook worm (1), stomach worm and hook worm (3), *Paramphistomum* sp. and hook worm (1), *Paramphistomum* sp. and stomach worm (3), *Fasciola* sp. and stomach worm(1), *Eimeria* sp. and hook worm(2), *Eimeria* sp. and stomach worm (2). Their prevalence rate were 0.78%, 2.36%, 0.78%, 2.36%, 0.78%, 1.57% and 0.78%, respectively (Table 2). In this study, mixed infection was observed in twelve deer. The mixed infection in zoo animal was recorded by Kanungo *et al. (*2010) and in monkeys by Mutani *et al.* (2003) who commented that 58.5% of all monkeys examined had at least three parasite species and only 34.0% had between one and two parasite species.

Table 2. Prevalence of mixed infection in deer at Char Kukri Mukri

| Name of parasite | No. of case | Prevalence (%) |
|---|---|---|
| *Oesophagostomum* sp. and hook worm | 01 | 0.78 |
| Hook worm and stomach worm | 03 | 2.36 |
| *Paramphistomum* sp. and hook worm | 01 | 0.78 |
| *Paramphistomum* sp. and stomach worm | 03 | 2.36 |
| *Fasciola* sp. and stomach worm | 01 | 0.78 |
| *Eimeria* sp. and hook worm | 02 | 1.57 |
| *Eimeria* sp. and stomach worm | 01 | 0.78 |
| **Sub total** | **12** | **9.5** |

**Seasonal prevalence of gastrointestinal parasites in deer at Char Kukri Mukri**

Seasonal fluctuation of the year had a significant ($p<0.05$) effect on the prevalence of gastrointestinal parasitic infection in deer. A relatively higher infection with gastrointestinal parasites were observed in summer (70.59%) than in winter (66.67%) (Table 3). The present finding is much higher than the previous reports of Azhar *et al.* (2002) who reported 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. 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 and also the methods used in the study.

Table 3. Seasonal prevalence of gastrointestinal parasites in deer at Char Kukri Mukri

| Name of parasite | Summer (N=67) | | | | Winter (N=60) | | | |
|---|---|---|---|---|---|---|---|---|
| | No. infected | Prevalence (%) | EPG | | No. of infected | Prevalence (%) | EPG | |
| | | | Range | Mean±SE | | | Range | Mean±SE |
| *Fasciola* sp. | 5 | 7.35 | 100 | 100±00 | 6 | 10 | 100 | 100±00 |
| *Paramphistomum* sp. | 15 | 22.06 | 100-300 | 133.33±15.936 | 11 | 18.33 | 100 | 100±00 |
| *Strongyloides* sp. | 1 | 1.47 | 100 | 100±00 | 1 | 1.67 | 100 | 100±00 |
| *Oesophagostomum* sp. | 2 | 2.94 | 100 | 100±00 | - | - | - | - |
| Stomach worm | 12 | 17.65 | 100-300 | 125±17.944 | 11 | 18.33 | 100-200 | 109.09±9.091 |
| Hook worm | 14 | 20.59 | 100-300 | 128.57±16.336 | 12 | 20 | 100 | 100±00 |
| *B. coli* | 1 | 1.47 | 200 | 200±00 | 1 | 1.67 | 200 | 200±00 |
| *Eimeria* sp. | 5 | 7.35 | 100-200 | 180±20.00 | 3 | 5 | 100-200 | 166.67±33.33 |
| Sub total | 48 | 70.59 | 100-300 | 150±10.314 | 40 | 66.67 | 100-300 | 122.5±7.585 |

Plate 1. Egg of *Paramphistomum* sp. (720X)

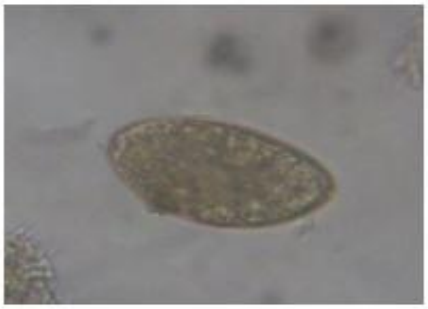

Plate 2. Egg of *Fasciola* sp. (720X)

Plate 3. Egg of *Strongyloides* sp. (720X)

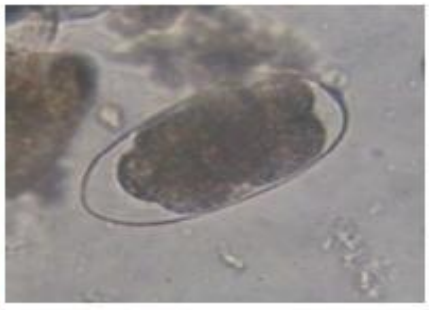

Plate 4. Egg of Stomach worm (720X)

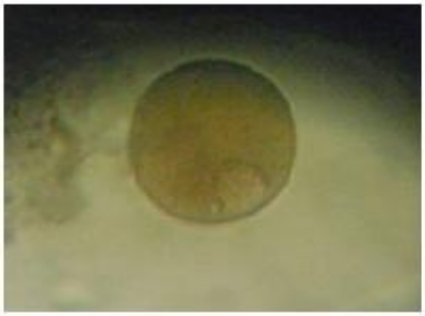

Plate 5. Cyst of *Balantidium coli* (720X)

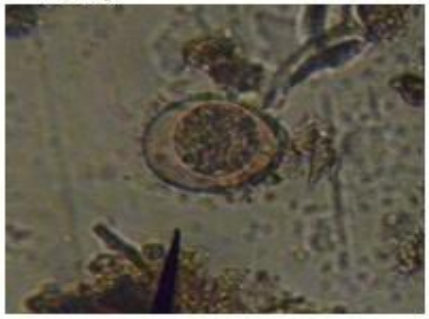

Plate 6. Oocyst of *Eimeria* sp. (720X)

Moreover, in this study, year was divided into two seasons but 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.

In summer, prevalence were relatively higher in case of *Paramphistomum* sp. (22.06%) followed by that of hook worm (20.59%), stomach worm (17.65%), *Eimeria* sp. (7.35%), *Fasciola* sp. (7.35%), *Oesophagostomum* sp. (2.94%) and *B. coli* (1.47%). In winter, prevalence was somewhat higher in case of hookworm (20%) followed by *Paramphistomum* sp. (18.33%), stomach worm (18.33%), *Fasciola* sp. (10%), *Eimeria* sp. (5%), *Strongyloides* sp. (1.67%) and *B. coli* (1.67%).

In conclusion, it can be said that gastrointestinal parasites are highly prevalent (69.29%) in the deer at Char Kukri Mukri, Bhola. The present study has shown both prevalence and load of gastrointestinal parasites of deer at Char Kukri Mukri. Our study provides a first overview on parasites in deer in the vicinity of villages, but to evaluate parasite transmission dynamics, much more studies are required on livestock in the area and on wild

herbivores. So, further study may also be conducted to keep restores the ecological balance as well as to assess the losses on economic point of view, due to parasitic diseases of deer.

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