

Prevalence of Gastrointestinal Parasitic Infestation in Cattle, at Netrakona Sadar Upazilla



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Abstract

A four month long (5th January to 30 April, 2021) prevalence study was conducted to determine the common gastrointestinal parasitism in cattle at Upazilla Veterinary Hospital (UVH), Netrokona sadar, Mymensing district of Bangladesh. A total of 48 fecal samples were collected randomly from different cattle breed (Red Chittagong Cattle, local breed and crossbred of HF) and about 113 in number of seven different types of gastro-intestinal parasite were present. Samples were examined by routine coproscopical methods. The investigation revealed that, the overall prevalence of gastrointestinal parasitic infestation was 81.25% in the study population. Among different single gastrointestinal parasitic infections, the overall prevalence of *Paramphistomum spp* infection was the highest (33.63%) followed by *Coccidia spp* infection (27.44%), *Haemonchus spp* (11.50%), *Balantidium spp* (7.97%), *Schistosoma spp* (3.54%). The lowest overall prevalence was recorded in *Moneizia spp* infection (2.65%). Age specific prevalence was found higher in young cattle than adult. In young and adult animal, Paramphistomum infection is highest 31.75% and 36% respectively. Sex specific prevalence exposed female cattle showed almost same susceptibility to different gastrointestinal parasites like male but it was not statistically significant. However, prevalence of *Paramphistomum spp* infections was the highest in male cattle (41.86%) than female. Prevalence of *Fasciola spp* infections (18.57%) along with *Moneizia spp* and *Schistosoma spp* (4.29%) were found more in female cattle. *Moniezia spp* infection was only recorded in female cattle of this study. It could be stated that the current investigation was a limited study as topographical variation, seasonal pattern of the diseases, short study period and small number of study population. Hence, it can be recommended further extensive investigation on gastrointestinal parasitism to overcome the limitation of the current studies which will assist to determine the important predictors related to such diseases.

Keywords: Prevalence, coproscopy, age, gastrointestinal- parasite, investigation

Chapter I

Introduction

Bangladesh is an agricultural-based country with high population density and per capita income is very low. Livestock in Bangladesh is an essential component of crop cultivation and post-harvest operations. About 98% of livestock reared by landless and marginal farmers in rural areas to provide income (Alom, 1993). There are about 20% production losses due to animal diseases worldwide, but in Bangladesh production losses up to 35-50%. Parasitism claims to be one of the main obstacles in livestock rearing in Bangladesh (Jabbar et al., 1983; khokhon et al., 2017). In Bangladesh, parasitic infestation is the major cause of hindering the development of livestock population (Jabber and Green, 1983). The hot humid climatic condition in Bangladesh greatly favors the development and survival of ecto- parasite and endo- parasite that makes violence of parasitism. Parasitic diseases are of great economic importance in livestock (Islam, 1985). Asian development bank (1984) estimated the loss of productivity of animals in terms of mortality loss of milk and meat, generation loss and loss of reproductive rate due to animal parasites to the extent of 50% in Bangladesh. Gastrointestinal parasitic infections may be considered as one of the major constraints in cattle production. In Bangladesh, disease problems specially related to parasitism constitute a serious threat. Gastrointestinal parasitism is a world-wide problem (Regassa et al., 2006). The losses caused by parasitic infections are in the form of lowered general health condition, retarded growth rate, diminishing working efficiency, decrease milk and meat production, abortion; the cost associated with preventive measures and reduces disease resistance capability, which may ultimately lead to higher mortality (Silvestre et al., 2000).

Parasitism is one of the major constraints that hinder the development of the livestock population and also adversely affects the health and productivity of animals (Radostits et al., 1994). In addition, helminths lower resistance of the animals and predispose them to the secondary infections like bacterial, viral and etc. which lead to heavy economic losses (Soulsby, 1982; Floate et al., 2005) Gastro-intestinal parasitic infections are widely prevalent in Bangladesh and produce a substantial economic loss. Some Gastrointestinal parasites may cause death in calves in heavy infestations. Prevalence of helminths parasitic infestation in cattle in some areas of Bangladesh has been reported earlier (Rahman et al., 1971; Rahman and Razzak, 1973). Gastro-intestinal parasites like

Fasciola, *Paramphistomum*, *Bunostomum*, *Strongyloids* are most common in Bangladesh. The infection rates are variable depending upon the different intrinsic and extrinsic epidemiological and biological factors (Sardar et al., 2006). Most cattle population in Bangladesh comes from primitive and low productive breeds. Most animals are reared in house under the age-old traditional husbandry practices. Many cattle are over worked and most of them under fed or half fed during most of the time of the years. They are not supplied with adequate balanced ration. As a result the general nutritional status of most of the cattle is in subnormal level, which greatly increases susceptibility to parasitic diseases (Blood et al., 1990).

Most of the earlier reports of cattle diseases in Bangladesh have been confined on general morbidity and mortality rates based on hospital with farm recorders clinical and sub clinical parasitic infections. (Hossain et al., 1988). Gastrointestinal parasite lives inside its host. It feeds off the host either taking nutrients or blood. It can prevent the animal from absorbing nutrients. Internal parasites are responsible for considerable productivity losses through a heavy infestation in livestock. As a result to control both losses of health and economy of livestock and human it is important to identify the gastrointestinal parasites.

Upazilla Veterinary Hospital, Netrokona Sadar of Mymensing district in Bangladesh is one the most vulnerable Upazilla of parasitic infestation for its low land area, climatic condition as well as weather of that region. This study will be helpful to epidemiologist for the control as well treatment of parasitic infection of animals and improve the health of livestock and demand of meat, milk and draught activity.

The present study was designed with the following objective:

- To determine the prevalence of gastrointestinal parasitic infestation in cattle at Netrokona sadar Upazilla, Mymensing.

CHAPTER II

MATERIALS AND METHODS

2.1 Study area and duration:

The present study was conducted in Upazilla Veterinary Hospital, Netrokona sadar, Mymensing, Bangladesh. Most of the cattle in this area are reared by farmers at their homestead and are managed under the rural husbandry practice. A cross sectional study was designed which was performed in Upazilla Veterinary Hospital on randomly selected samples of animal. The timeline of this study was from 5th January 2021 to 30th April 2021.

2.2 Study population and sampling:

At first the cattle are included in this study by observing clinical signs of parasitic infestation (Off feed, rough coat, poor body condition, chronic diarrhea with foul odor, sub mandibular edema, inappetence, pale and oedema of the mucosa and conjunctiva). The study was conducted with 48 cattle which were selected randomly from Upazilla Veterinary Hospital, Netrokona Sadar.

2.3 Study design:

The breed characteristics were determined by inspecting the phenotypic characters of the animal or by carefully questioning to the owner. In this study the animals were grouped into two according to age and sex. The age of animals of groups A(1-3year) and B (>3-5 year)

2.4 Data collection:

At the time of study period all the data regarding to animals are directly collected from animal owner by cross-question. A present questionnaire was designed to collect information on the sex, age, farm size, parity, nutritional status, health condition, general management and disease problem etc. of cattle. All the data are incorporated into data collection sheet.

2.5 Examination of fecal sample:

For confirmation of the infection fecal sample of each of the cattle were collected directly from the rectum and immediate after voiding. Immediately after collection of fecal samples both the gross and qualitative examinations were done during this study period. Gross examination of the feces was done at the time of collection which include color, odor and consistency of feces. The qualitative examination was done in the hospital to detect the eggs of parasite in the fecal sample under low power magnification (10 x 10; 40 x10) by using microscope. Samples were tested by direct smear, simple sedimentation method and floatation techniques: (Hansen and Perry, 1994).

Examination techniques:

1. Physical examination.
2. Microscopic examination.
 - a) Direct smear method.
 - b) Sedimentation method.
 - c) Floatation techniques

Physical examination:

A presumptive diagnosis of parasitic infestation in cattle can be made on history of enzootic area and showing sign and symptoms.

Microscopic examination:

a) Direct smear method:

A drop of fecal sample was taken on a glass slide, thoroughly diluted with few drops of water, covered with cover slip and examined under microscope using both low and high power of magnification (10x and 40x) for the identification of *Fasciola*, *Paramphistomum* and *Bunostomum* egg.

b) Sedimentation method:

5gm of fecal sample was diluted with 20ml of water in a cylinder, after which the cylinder was kept standing for one hour. After this, supernatant fluid was decanted off, examined under microscope for the presence of *Fasciola*, *Paramphistomum* & *Bunostomum* egg.

The *Fasciola* eggs were identified on the basis of their morphological feature as described by (Soulsby, 1982).

c) Floatation technique:

Put 3gm feces into container 1 and pour 50 ml floatation fluid into container 1. Mix the content with a stirring device. Pour the resultant fecal suspension through a tea strainer or double layer of cheese cloth into container 2. Leave the container to stand for 10 minutes. Press a test tube to the bottom of the filtrate, lift it quickly & transfer a few drops adhering to the surface to a micro slide. Finally mount the cover slip on the micro slide for microscope examination.

2.6 Morphology of parasite egg:

Fasciolosis-Eggs are oval, operculated, yellow-brown color and measure 130 to 150 by 60 to 90 μm (Hendrix, 1998).

Paramphistomiasis- Presence of posterior knob, distinct operculum and measure 114 to 176 μm by 73 to 100 μm (Foreyt, 2001).

Oocyst of coccidiosis: Sporulated oocysts are subspherical, with a rough bi-layered oocyst wall (0.8 μm thick). Oocyst residuum, polar granule and the micropyle were absent. Sporocysts are elongate-ovoid. A thin convex Stieda body and indistinct substieda bodies were present and the sporocyst residuum was composed of numerous small granules less than 1.0 μm in diameter dispersed randomly. Each sporocyst contained 2 sausage-shaped sporozoites in head-to-tail arrangement (The Merck Veterinary Manual, 2006).

Haemonchosis: The ova is yellowish in color. The egg is about 70–85 μm long by 44 μm wide, and the early stages of cleavage contain between 16 and 32 cells (The Merck Veterinary Manual, 2006).

Balantidiasis: oocysts are round, 40-60 μm in size. Surrounded by a cyst wall and presence of two nuclei (The Merck Veterinary Manual, 2006).

Schistosomiasis: Eggs are large (114 to 180 μm long by 45-70 μm wide) and have a characteristic shape, with a prominent lateral spine near the posterior end. The anterior end is tapered and slightly curved. When the eggs are excreted in stool, they contain a mature miracidium (The Merck Veterinary Manual, 2006).

Monieziasis: The eggs have a thick envelope. Those of *Moniezia expansa* have a triangular shape and measure ~55 x 65 micrometers, those of *Moniezia benedeni* are cube-shaped and measure about 80 micrometers (The Merck Veterinary Manual, 2006).

CHAPTER III

RESULTS AND DISCUSSION

3.1 Prevalence of gastro-intestinal parasites

Clinico-parasitological examination of 48 cattle in four months period, there 39 (81.25%) cattle were found to be positive and rest of negative. About 113 in number of seven different types of gastro-intestinal parasite were present. They are *Fasciola*, *Paramphistomum*, *Coccidia*, *Haemonchus*, *Schistosoma*, *Balantidium* and *Monezia* spp.

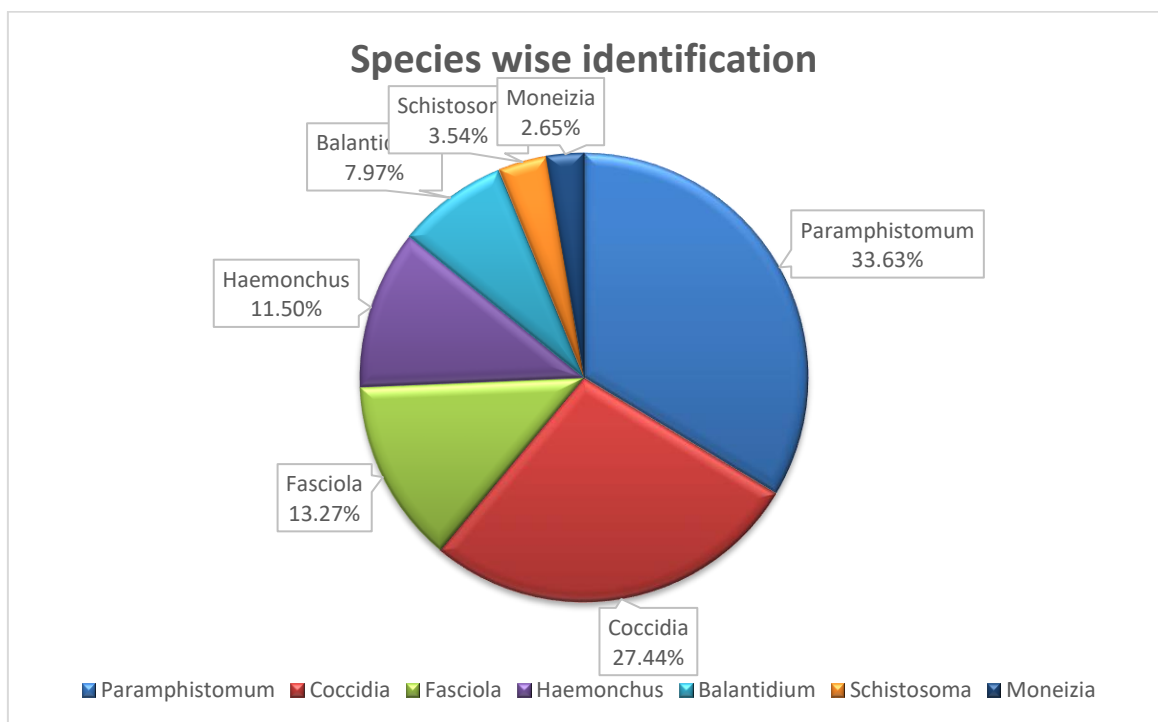
Table-1: Prevalence of Gastro-intestinal Parasites

Helminthes	Number	Prevalence
<i>Fasciola</i> spp	15	13.27%
<i>Paramphistomum</i> spp	38	33.63%
<i>Coccidia</i> spp	31	27.44%
<i>Haemonchus</i> spp	13	11.50%
<i>Schistosoma</i> spp	4	3.54%
<i>Monezia</i> spp	3	2.65%
<i>Balantidium</i> spp	9	7.97%
Total	113	100%

The highest percentage of parasitic infection was *Paramphistomum* 33.63% followed by *Fasciola* 13.27%, *Coccidia* 27.44%, *Haemonchus* 11.50%, *Schistosoma* 3.54%, *Balantidium* 7.97%, *Monezia* 2.65%. (Howlader, 1990) observed highest incidence of

Paramphistomum infection 46% followed by *Fasciola* 21% and *Schistosoma* 8% at Savar area of Dhaka district. On the other hand, (Garrels, 1975) recorded *Paramphistomum*, *Trichostrongyles* and *Fasciola* infection is 64.40%, 34% and 22.40% in cattle respectively in Dhaka and Tangail district. The highest incidence of *Paramphistomum* infection as recorded in this study is correlated with Garrels, (1975) and Howlader et al., (1990).

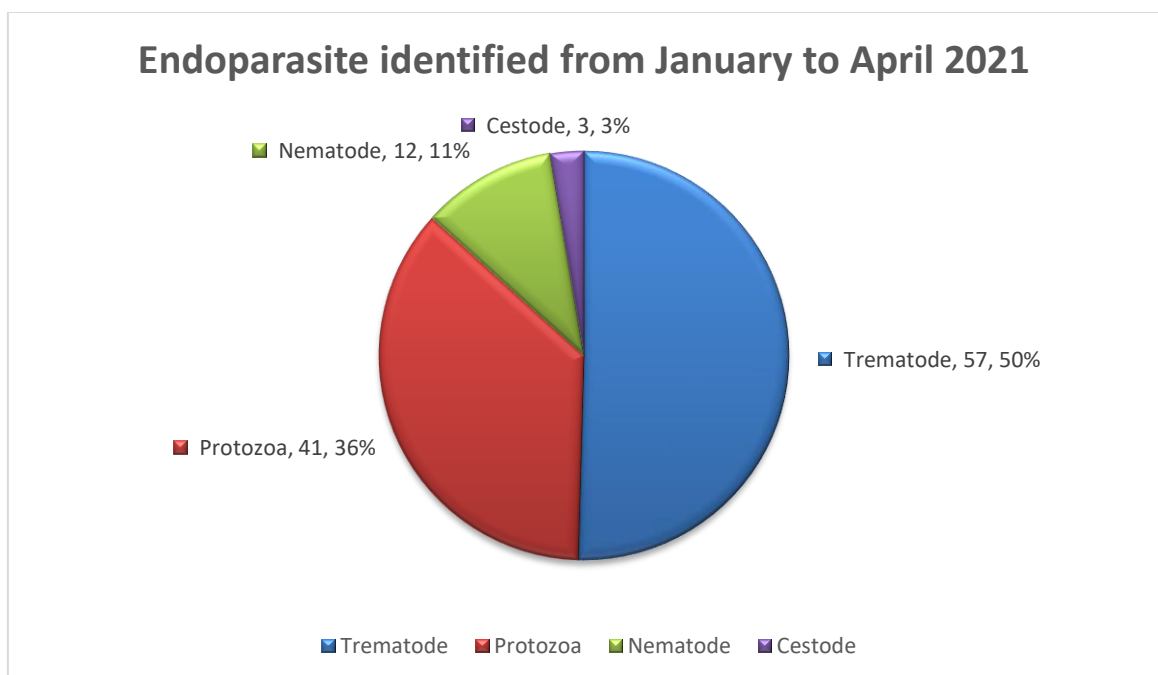
Graph 1: Endoparasite identified from January to April 2021



3.2 Overall endoparasite infestation

Among the tested samples in endoparasite section in January to April 2021, 50% trematode, 36% protozoa, 11% nematode, 3% cestode. The highest number of Trematode was identified in the section. Dairy cattle were highly infected by fluke worms (eg- Paramphistomum species, Fasciola species) than other worms. Fluke disease is most common and widespread form in sheep and cattle (Elsheikha and Khan, 2011).

Graph-2: Overall endoparasite infestation



3.3 Sex –wise prevalence of gastrointestinal parasite of cattle

Table -2: Sex –wise prevalence of gastrointestinal parasite of cattle

Sex	Number of positive of cattle	Number of parasites	P	F	C	H	B	S	M
Male	29	43 (38.05%)	18 (41.86%)	2 (4.65%)	13 (30.23%)	5 (11.63%)	4 (9.30%)	1 (2.33%)	0 (0%)
Female	20	70 (61.95%)	20 (28.57%)	13 (18.57%)	18 (25.71%)	8 (11.43%)	5 (7.14%)	3 (4.29%)	3 (4.29%)
Total	39	113	38	15	31	13	9	4	3

P = Paramphistomum, F = Fasciola, C = Coccidia, H = Haemonchus, B = Balantidium, S = Schistosoma, M = Monezia

According to the table-2 the occurrence of parasitic infection was higher in female (61.95%) than male (38.05%). In case of female Fasciolosis (18.57%) Paramphistomiosis (28.57%), Coccidiosis (25.71%), Haemonchosis (11.43%), Schistosomiasis and Moneziasis (4.29%) and male Fasciolosis (4.65%), Paramphistomiosis (41.86%), Coccidiosis (30.23%), Haemonchosis (11.63%), Schistosomiasis (2.33%) and *Balantidium* (9.30%). But in case of Paramphistomiasis (41.86%) male was more prone to the infection than the female (28.75%) and incase of female Fasciolosis (18.57%) was more prone to infection than male (4.65%). In accordance with the reports of Davila et al., (2010), Raza et al., (2010), and Al-Shaibani et al., (2008) who reported that parasitic infestation is higher in female than male. More parasitism in females might be due to physiological stress like pregnancy, lactation etc. and the occurrence of variation in male and female cattle might be due to variation of sample size (Bachal et al., 2002).

3.4 Age –wise prevalence of gastrointestinal parasite of cattle

Table -3: Age –wise prevalence of gastrointestinal parasite of cattle

Age (year)	Number of positive of cattle	Number of parasites	P	F	C	H	B	S	M
1-3	24	63 (55.75%)	20 (31.75%)	12 (19.04%)	16 (25.40%)	9 (14.29%)	4 (6.35%)	2 (3.17%)	0 (0%)
>3-5	15	50 (44.25%)	18 (36%)	3 (6%)	15 (30%)	5 (10%)	4 (8%)	2 (4%)	3 (6%)
Total	39	113	38	15	31	14	8	4	3

P = *Paramphistomum*, F = *Fasciola*, C = *Coccidia*, H = *Haemonchus*, B = *Balantidium*, S = *Schistosoma*, M = *Monezia*

(Chowdhury, 1993) recorded that the highest occurrence of parasitic infection from at day one to one year aged group. But in this study the tendency of parasitic infections was found higher in 1 to 3 year aged group 55.75%. It indicated that the occurrence of gastrointestinal parasitic infection increased with the increase of age of cattle which was probably proportional to the period of exposure of infection and incubation period of the parasitic diseases. It might be due to the breed of animal, place of study and season of examination was different. Fasciolosis (19.04%), Haemonchosis (14.29%) was highest in one to three years age group. The prevalence of *Paramphistomum* spp (31.75%) found more in young cattle than adult which were same as observation of Reza et al., (2007), Regassa et al., (2006) and Shah Fischer et al., (1989) who recorded parasitic infestation is higher in younger than adult.

CHAPTER IV

CONCLUSION

As cattle is an indigenous breed, it should be conserved. Most of the people are not aware about parasitic infections. The study revealed a significant occurrence of gastrointestinal parasitic infections in cattle. The higher magnitude of infections were found at one to three years of aged cattle. The female were more susceptible to the parasitic infection than the male. However, poor management, unavailability of drugs, lack of awareness of the farmers also enhances the high incidence of infections. Preventive measure should be undertaken. Animals should be dewormed at regular interval with an appropriate anthelmintic. Management system and overall hygiene conditions should be improved for better growth rate of cattle and to improve overall production performances.

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LIMITATIONS OF THE STUDY

- The study period was short.
- Small sample size.
- Undetermined worm load.
- Owners were not so co-operative.

RECOMMENDATIONS

- Further study should be needed with proper time.
- Proper epidemiological study should be done.
- Proper dose and regular deworming schedule should be maintained.

Biography

The author Md. Mozammel Hasan Chowdhury, son of Md. Sarwar Alam Chowdhury and Ripa Chowdhury passed his Secondary School Certificate (SSC) examination from Mohammadpur Govt. High School, Dhaka in 2012 and Higher School Certificate (HSC) examination from Government Science College, Dhaka in 2014. Thereafter he enrolled for Doctor of Veterinary Medicine (DVM) degree in Chattogram Veterinary and Animal Sciences University (CVASU), Bangladesh and now is an intern student in this university.