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Epidemiological Investigation of Gastrointestinal (GI) Parasite at BAPARD Cattle Farm, Gopalganj in Bangladesh

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Abstract— *The aim of the study was to investigate the prevalence and associated risk factors of Gastrointestinal (GI) parasite in Cattle through semi-intensive rearing system at BAPARD campus during the period from July 2019 to June, 2020. A total of 156 samples from 39 cattle among these, 29 Bulls and 10 heifers were collected at the time of defecation or just after defecation. Samples were collected every three months of a year to find out the effect of season. All cattle are Holstein crossbred. The collected Feces samples were examined by direct smear method followed by McMaster counting technique under microscope for detection the morphology of egg at BAPARD Parasitology Lab on the day of collection. The overall prevalence of GI parasite was 26.72% and more frequent in more frequent in rainy season (57.14%) followed by summer (28.57%) and winter season (14.29%). The parasitic prevalence load was low in winter season. In endoparasitic infection, the higher prevalence of Paramphistomum spp. (19.05%) was found in rainy season followed by Haemonchus spp. (9.52%); Fasciola spp.(4.76%), Schistosoma spp. (4.76%) and Toxocara spp. (4.76%). In cattle, prevalence of Paramphistomum spp. (15.38%), Schistososma spp (3.85%) and Haemonchus spp. (7.69%) was higher in adult cattle (above 2 year) comparatively growing and young, whereas prevalence of Toxocara spp. (3.33%) was higher in young (1-1.5 year) than growing and adult cattle. In other case Female (27.5%) are slightly higher than male (26.72%) cattle. So, the investigation indicates low prevalence rate of GI parasite at semi-intensive care management system in BAPARD, Gopalganj,Bangladesh.*

Keywords— ***Epidemiological investigation, GI Parasite, BAPARD, Cattle.***

I. INTRODUCTION

Gastrointestinal (GI) parasitism is a disease caused by different genera of parasites that inhabit the digestive tract of animals, causing inappetence, anemia, diarrhea, poor growth, and economic losses in the herds. Basically, GI parasitism in livestock is caused by helminths and protozoa (Pinilla León *et al.*, 2019). Gastrointestinal (GI) parasitic infections may be considered as one of the major constraints in cattle production. The infection causes productivity losses through reduced feed intake and decreased efficiency in feed utilization due to subclinical or chronic infections that are responsible for economic losses (Renaldi *et al*., 2011; Bary *et al*., 2018). Parasitism is one of the major constraints that hinder the development of livestock population and also adversely affects the health and productivity of animals worldwide including Bangladesh (Kakar *et al*., 2008; Radostits *et al*., 1994). The losses caused by parasitic infections are in the form of lowered general health condition, retarded growth rate, diminishing the working efficiency, decrease milk and

meat production, abortion; cost associated with preventive measures and reduces the disease resistance capability, which may ultimately lead to higher mortality (Silvestre *et al*., 2000; Radostits *et al.* 1994). However, their effects are usually characterized by reduced livestock productivity as indicated by a slower growth rate, low milk production, low body condition score (BCS) as well as additional therapeutic cost (Charlier *et al.*, 2015). The productivity losses through reduced feed intake and decreased efficiency in feed utilization due to subclinical or chronic infections are also hindering profitable livestock industry (Akanda *et al.*, 2014). In addition, these infections enhance susceptibility to secondary infections and losses resulting from condemnation of carcasses and organs (Hendawy, 2018; Gunathilaka *et al.*, 2018). 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). In Bangladesh, disease problems specially related to parasitism constitute a serious threat. Parasitic diseases are of great economic importance in livestock (Islam, 1985). Gastrointestinal parasitism is a world-wide problem (Regassa *et al.*, 2006). 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 encestors. The farmers usually rear their cattle under traditional husbandry practices. Nutritional status of the animas in general is not satisfactory as they are over-worked but under-fed or half-fed, which makes the animals susceptibile to diseases including different parasitic diseases. About 50% calves until 1-year of age die due to gastrointestinal parasitism (Debnath *et al*., 1995). On the other hand, the adult cattle are also severely affected by parasitism as they are kept for a longer period of time in breeding or milk production purposes and often supply insufficient feed against their high demand (Sardar *et al.*, 2006) resulting enormous economic losses. Despite significant losses by gastrointestinal parasitism, the problems are often neglected and overlooked as majority of the infected animals show a number of little obvious clinical signs during their productive life and their effects are gradual and chronic (Raza *et al.*, 2010). Therefore, the objective of this study was to investigate the prevalence of Gastrointestinal parasitic infestation in Bapard cattle farm, Gopalganj.

II. MATERIALS AND METHODS

Study area and duration

This study was conducted during the period July, 2019 to June, 2020 in BAPARD. A total no. of 30 samples were collected from BAPARD cattle farm repeatedly in every 3 months. The samples were examined at BAPARD Parasitology Laboratory on the day of collection. Study population was divided into three age groups i.e. 1 year to 1 year 6 month, 1 year 6 month to 2 year and above 2 year. Faecal samples were in every season summer (March to June), rainy (July to October) and winter (November to February.

The necessary information for this study like age, sex, breed with history was prerecorded in our registrar book. Physical examination was done for each cattle before collecting sample. Fecal sample was collected from all cattle for confirmatory diagnosis by coprological examination.

Coprological Examination

Fecal samples were collected directly from the rectum of the cattle or immediately after defecation or from the ground when the animals were found in the act of defecation basically during morning. About 15-25 grams of feces were collected from each animal. Each fecal sample were transferred immediately to parasitology laboratory labeled properly with tag number on the day of collection. The fecal sample was examined using both standard direct smear method and McMaster technique described by Urquhart *et al*., (1996).

Laboratory examination of fecal sample

For McMaster counting technique super saturated flotation fluid was prepared through mixing 400g Sodium Chloride (NaCl) with 1000ml of tap water. In case of direct smear, small amount of fresh fecal sample (1 drop) was mixed with 1 to 2 drop of tap water thoroughly in a glass slide and large and worse particle were avoided by a cotton strip. Covered the smear was done with cover slip and examination was done under microscope at 10×objective and also gone through 40×objective. In case of McMaster technique, 3 gm homogenized fresh fecal sample mixed with 42 ml of super saturated floatation fluid and double sieved filtration was done. This solution was remaining for 30-40 minutes in a glass beaker.

III. RESULT and DISCUSSION:

Table 1: Overall prevalence of Gastrointestinal parasites

SL No	**Parasitic spp**	**Number of sample n=156**	**prevalence**
01	*Paramphistomum spp*	15	9.62%
02	*Fasciola spp.*	03	1.92%
03	*Haemonchus spp.*	07	4.49%
04	*Toxocara spp.*	04	2.56%
05	*Schistosoma spp .*	02	1.28%
06	*Fasciola spp. + Paramphistomum spp.*	06	3.85%
07	*Toxocara spp.+ Haemonchus spp.+ Paramphistomum spp.*	05	3.21%
Overall prevalence		**42**	**26.92%**

Table 2: Prevalence of Gastrointestinal parasites according to age

SL No	**Parasitic spp**	Age group					
		1-1.5 year (Young) n=60	prevalence	1.5-2 year (Growing) n=44	prevalence	Abov 2 year (Adult) n=52	prevalence
01	*Paramphistomum spp*	2	3.33%	5	11.36%	8	15.38%
02	*Fasciola spp.*	1	1.67%	0	0	2	3.85%
03	*Haemonchus spp.*	1	1.67%	2	4.55%	4	7.69%
04	*Toxocara spp.*	2	3.33%	1	2.27%	1	1.92%
05	*Schistosoma spp .*	0	0	0	0	2	3.85%
06	*Fasciola spp. + Paramphistomum spp.*	1	1.67%	2	4.55%	3	5.77%
07	*Toxocara spp.+ Haemonchus spp.+ Paramphistomum spp.*	0	0	1	2.27%	4	7.69%
Total prevalence		07	11.67%	11	25%	24	46.15%

Table 3: Season wise prevalence Gastrointestinal parasite.

SL No	**Parasitic spp**	**Number of infection n=156**	**Season**		
			Rainy	**Summer**	**Winter**
01	*Paramphistomum spp*	15	**8 (19.05%)**	5 (11.9%)	**2 (4.76%)**
02	*Fasciola spp.*	03	2(4.76%)	1 (2.38%)	0
03	*Haemonchus spp.*	07	4(9.52%)	2(4.76%)	1(2.38%)
04	*Toxocara spp.*	04	2(4.76%)	1(2.38%)	1(2.38%)
05	*Schistosoma spp .*	02	2(4.76%)	0	0

06	*Fasciola spp. + Paramphistomum spp.*	06	3(7.14%)	2(4.76%)	1(2.38%)
07	*Toxocara spp.+ Haemonchus spp.+ Paramphistomum spp.*	05	3(7.14%)	1(2.38%)	1(2.38%)
	Total positive case	**42**	24 (57.14%)	12 (28.57 %)	6 (14.29%)

Table 4: Sex wise prevalence Gastrointestinal parasite.

SL No	Parasitic spp	Male cattle (n=116)	Prevalence (n=400)	Female cattle (n=40)	Prevalence (n=200)
01	*Paramphistomum spp*	11	9.48%	4	10%
02	*Fasciola spp.*	2	1.72%	1	2.5%
03	*Haemonchus spp.*	5	4.31%	2	5%
04	*Toxocara spp.*	2	1.72%	2	5%
05	*Schistosoma spp .*	1	0.86%	1	2.5%
06	*Fasciola spp. + Paramphistomum spp.*	5	4.31%	1	2.5%
07	*Toxocara spp.+ Haemonchus spp.+ Paramphistomum spp.*	5	4.31%	0	0
Total prevalence		31	26.72%	11	27.5%

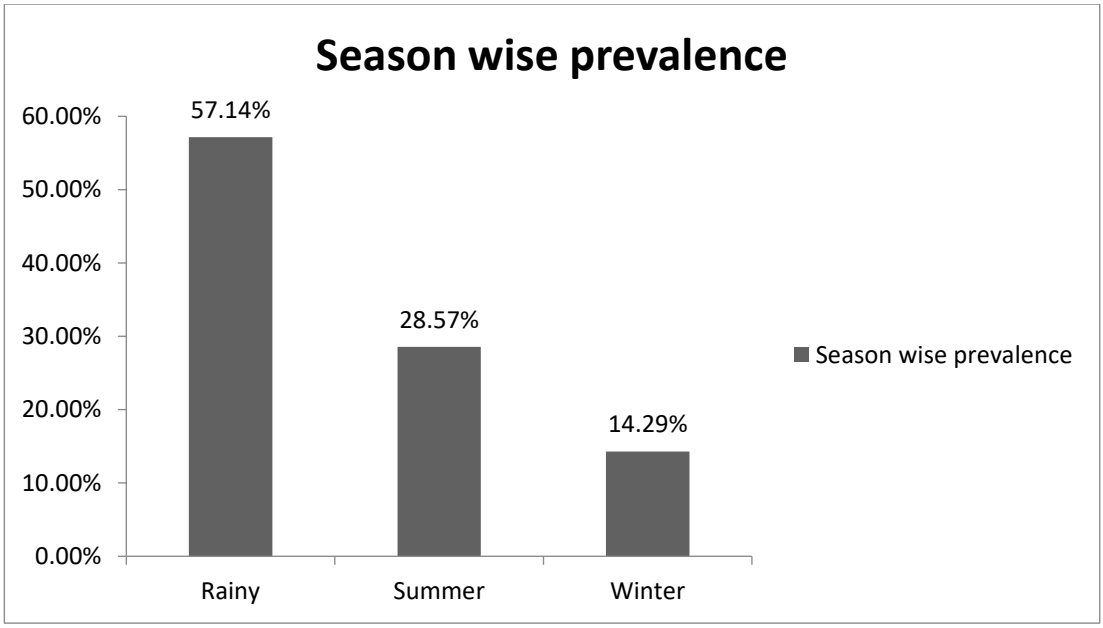

Fig: 1 Season wise prevalence of Gastrointestinal parasite.

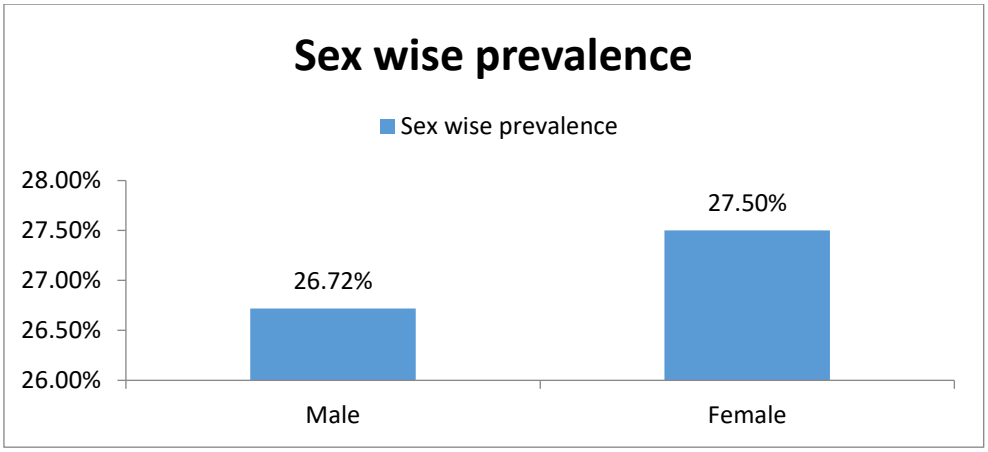

Fig: 2 Sex wise prevalence Gastrointestinal parasite.

From the above Tables and Figures which are shown in results are discussed having references below:

Seasonal prevalence of gastrointestinal parasitism

The climate plays an important role in the transmission of parasitic infections (Moyo *et al.*, 1996). In this study, prevalence of gastrointestinal parasitic infections were more in rainy season (Table 3 & Fig. 1) which was in agreement with the reports of Jeyathilakan *et al.* (2008) and Chavhan *et al.* (2008). It might be due to adequate moisture and optimum temperature which favuored the growth and survival of infective stages in the pasture (Shirale *et al.*, 2008 and Regassa *et al.*, 2006). On the other hand, subsequent occurrence of gastrointestinal parasitic infections were observed in winter followed by summer season which showed consistency with the observation of Shirale *et al.* (2008) and Chavhan *et al.* (2008). It might be due to hot humid climate in summer and low temperature in winter season provides unfavourable environment for the survival and development of parasitic larvae (Pfukenyi *et al.*, 2007) which decreased the availability of infective larvae in the pasture (Moyo *et al.*, 1996). In all seasons, improved husbandry measures along with irregular anthelmintic or sometimes strategic anthelmintic therapy contributed less parasitic infection in cattle. *Paramphistomum* spp infection showed seasonal variation in rainy season which was supported by the reports of Jeyathilakan *et al.* (2008) and Chavhan *et al.* (2008). On the other hand, higher prevalence of *Schistosoma* spp, *Fasciola* spp and *Toxocara* spp infections in rainy season in both local and crossbred cattle might be due to the rainfall and temperature which favours the growth and development of infective stages leading to more contamination of the pasture or feed (Radostits *et al.*, 1994) .1999).

Age specific prevalence of gastrointestinal parasitism

Age specific prevalence (Table 2) of gastrointestinal parasitic infections especially, *Paramphistomum* spp, *Schistosoma* spp, *Haemonchus* spp and *Fasciola* spp were found more in adult cattle which supported the observation of Sardar *et al.* (2006) who reported that *Fasciola*, *Paramphistomum*, *Trichuris* and *Schistosoma* were highest in the age group greater than 36 months and lowest in age group less than 12 months. Findings of Fritsche *et al.* (1993) also supported the findings of this study. The earlier findings of this investigation showed disagreement with Raza *et al.* (2007) and Regassa *et al.* (2006) who recorded significantly higher worm burden in younger animals than adult. Higher prevalence of parasitic infection in adult cattle might be due to keeping them for a longer period of time in breeding and milk production purposes or supply inadequate feed against their high demand (Sardar *et al.*, 2006). Moreover, stress like lactation, pregnancy, nutritional deficiency which might be accounted for higher prevalence in adult cattle (Radostits, 1994). On the other hand, the highest prevalence of *Toxocara* spp infection in calf was supported by the reports of Sarder *et al.* (2006) and Bachal *et al.* (2002) who recorded such infection in early months of life. *Toxocara* spp infection in local calf of this study partially supported the findings of Avcioglu and Balkaya (2011) who recorded higher prevalence at 0-12 month of age. Higher prevalence of such infection might be due to prenatal infection through transfer of 3rd larval stage (L3) and post-natal infection by poor hygienic condition (Urquhart *et al.*, 1996 and Soulsby, 1982).

Sex-specific prevalence of gastrointestinal parasitism

Sex-specific prevalence (Table 4& Fig 2) of gastrointestinal parasitic infections showed that infection caused by *Paramphistomum spp*, *Schistosoma spp*, *Toxocara spp*, *Fasciola spp*, *Haemonchus spp*. were found slightly high in female than male cattle. Findings of this study was found in accordance with the reports of Raza *et*

al. (2007, 2010) who also reported higher worm burden in female cattle compared to male cattle. Variation in occurrence of such helminth infections in male and female animals might be due to the variation in sample size (Bachal *et al.*, 2002), lowered resistance of female animals or temporary loss of acquired immunity near parturition (Garcia *et al.*, 2007), stress, genetic resistance of host and insufficient feed supply against their higher needs (Raza *et al.*, 2010 and Hansen and Perry, 1993).

IV. CONCLUSION

The study was performed to examine the prevalence of gastrointestinal parasitic cattle reared in semi-intensive system at BAPARD Farm considering age, sex and season. It will give an overall idea about the distribution of gastrointestinal parasitic infections among the research place. It will also provide some epidemiological ideas in the occurrence of such diseases in cattle. The variations of different factors for parasitic prevalence statistically not significant ($p<0.005$). However, this study indicates the overall performance of BAPARD cattle farm is better due to below 56.3% of Global status. The result also suggests to treat the pasture land and rinsing the grass before offering to Cattle. The anthelmintics should administered regularly in right dose and the snail presence in surrounding of pasture land should eradicated for better prevention of Cattle Husbandry Practices.

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