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PREVALENCE OF ECTO AND ENDO PARASITIC INFECTIONS AMONG BAPARD CATTLE FARM AND GOPALGANJ DISTRICT OF BANGLADESH

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ABSTRACT

Surveillance was conducted to investigate the ecto-and endo-parasitic (gastrointestinal) infections of bapard cattle farm from July 2020 to June 2021 at the Laboratories of BAPARD and Department of Parasitology, BAU. In the study area, a total number of 600 fecal samples and 250 ectoparasites were collected and investigated. Fecal samples were examined by direct smear method followed by McMaster counting technique under microscope. The overall prevalence of endoparasitic (gastrointestinal) infections was 67.5% and ectoparasitic infection was 56%. Prevalence of endoparasite was more frequent in rainy season (52.35%) followed by summer (26.91%) and winter season (20.74%) whereas prevalence of ectoparasite was more prevalent in summer (34.00%) followed by rainy (12.00%) and winter (8.00%) season. Among the endoparasitic infections,high prevalence of *Paramphistomum* spp. (20.00%) was found in rainy season whereas *Haemonchus* spp. (11.67%) and *Toxocara spp*. (10.83%) were higher in summer season. In cattle, prevalence of *Paramphistomum* spp. (24.00%) and *Haemonchus* spp. (15.00%) was higher in adult cattle whereas prevalence of *Toxocara spp*. (25.00%) and coccidian parasitic infection (17.5%) was higher in calf than adult animal. The overall prevalence of ectoparasite was 56% and tick infestation was highest prevalent (20.00%) followed by lice (16.00%), mange (12.00%) and maggot infestations (8.00%). High humidity (above 70%) and temperature provoke high endo and ectoparasitic infections among cattle populations indicate reduced farm productivity and profitability in the study area. Therefore, training of the cattle farmers on the knowledge and appropriate implementation and use of anthelmintic will help to reduce the morbidity of ecto and endoparasitic infections among cattle populations.

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INTRODUCTION

Bangladesh is an agri-economy based country where 21% GDP comes from the agricultural sector like crops, livestock, fisheries and forestry. There are about 24.54 million cattle, 1.9 million buffalo, 3.68 million sheep and 26.6 million goat populations in Bangladesh. In case of poultry, there are 304.11 million chickens and 61.75 million ducks population present in Bangladesh. So, the total livestock population is about 422.18 million in Bangladesh. Livestock are contributing about 1.44% GDP to the national economy and the growth rate of GDP is 3.80. About 20% people are directly and 50% partially employed in livestock production whereas 50% people are engaged in cultivation of land by livestock and 25% people are in fuel supply from livestock and poultry. The employment status on livestock is 20% directly, 50% partially; cultivation of land by livestock 50% and fuel supply from livestock and poultry 25% (Livestock Economy, 2020-21). Livestock also share 13.1% GDP to the agricultural sector. In this way, livestock contributes significantly in the national economy of Bangladesh (Baset et al., 2002 & 2003; Begum et al., 2007; Mustafa et al., 2020 & 2021). Low productivity of livestock is a common feature in Bangladesh which may be due to the supply of low nutrition and prevalent parasitic diseases (Barman et al 2017; Hashem et al., 2020; Islam et al., 2022; Kawsar et al 2006; Mazed et al 2004; Mustafa et al., 2022; Rahman et al., 1997, 1999 & 2002; Mustafa MMH 2022., Sarkar et al., 2008). In the world, there are about 20% production losses of livestock occurred due to prevalent animal diseases but in Bangladesh it is up to 35-50% (Khokan *et al*., 2017, Badran et al., 2012). Parasitism is thought one of the main obstacles of livestock production in Bangladesh (Jabbar *et al*., 1983; Khokan *et al*., 2017). The hot humid climatic condition in Bangladesh greatly favors the development and survival of ecto- and end parasites. Parasitic diseases are of great economic importance in livestock (Islam,et al 1985; Rahman, A 1975) and attributed the economic loss of animals in terms of morbidity and mortality, loss of milk and meat production, retarded growth, generation loss and loss of reproductive performance due to parasites to the extent of 50% in Bangladesh (ADB 1984).

Gastrointestinal (GI) parasitic infections causes production losses through reduced feed intake and decreased efficiency in feed utilization due to subclinical or chronic infections (Renaldi *et al*., 2011; Bary *et al*., 2018 ;Tariq et al., 2010) . In Bangladesh, disease problems specially related to parasitism constitute a serious threat. GI parasitism is a world-wide problem (Regassa *et al.*, 2006,Kakar et al.,2008). Parasitic problems are often neglected and overlooked as majority of the infected animals show a number of minor obvious clinical signs during their productive life and their effects are gradual and chronic (Raza *et al*., 2010; Rahman et al.,2012). Gopalgonj is a low land and riverine region and there is no field study on these parasitic problems and after of BAPARD is working closely to train the livestock farmers to improve farm productivity. Therefore, the objective of this study was to investigate the prevalence of ecto- and endo- parasitic infections in Gopalganj area.

MATERIALS AND METHODS

Study Area and period

The study was conducted to investigate the prevalence of ecto and endo parasitic infections of cattle at five upzila of Gopalganj district and BAPARD cattle farm from July 2020 to June 2021. The laboratories works were performed in the Bangabandhu Academy for Poverty Alleviation and Rural Development (BAPARD) and Department of Parasitology, Bangladesh Agricultural University (BAU), Mymensingh.

Sample collection and preservation

A total of 600 fecal samples and 250 ectoparasites were collected from BAPARD cattle irrespective of age, sex, breed, BCS (body condition scored) and seasons like rainy, summer and winter. In this study, age of cattle are categorized into three groups, viz calf aged ≤ 6 months, young aged > 6 months to ≤ 2 years and adult aged > 2 and above. During sample collection, the biometric data of each animal like, age, sex breed, and general body condition were recorded. Approximately 10 gm of fecal samples were collected directly from the rectum of the cattle and kept into a small plastic container and stored in ice containing cool box and labeled properly. After collection, the fecal samples were preserved with 10% formalin and transferred immediately to the Laboratory of the BAPARD and stored at 4°C temperature until further examination. Fecal samples were examined using the direct smear method followed by the McMaster technique and eggs were identified under microscope with the previously described morphological characteristics (Urquhart *et al*., 1996). Ectoparasites were also collected from different parts of the body of the individual cattle by hand picking and precautions were taken to preserve the mouthparts and appendages of the ectoparasites during collection. Ectoparasites were preserved in 70% alcohol in a clean and well stopper glass vials which were labeled properly.

Laboratory examination of fecal samples and ectoparasites

In case of direct smear method, a small amount of fresh fecal sample was taken into a clean and grease free glass slide and mixed thoroughly by adding 1 to 2 drop of tap water. The large and coarse particle were avoided by using a cotton strip and covered with cover slip and examined under microscope at low power objective (10X) followed by higher magnification (40X objectives). The positive samples in the direct smear method were subjected to EPG counting to determine the number of eggs per gram of feces. For McMaster counting technique, a saturated salt solution (floatation fluid) was prepared through mixing of 400g of sodium chloride (NaCl) with 1000 ml of tap water. 5 gm of homogenized fresh fecal sample were thoroughly suspended in a 50 ml of flotation fluid (saturated salt solution, specific gravity 1.200). The suspension was then thoroughly stirred and allowed to pass through a sieve to remove the coarse particles. The chambers of McMaster slide were filled with the suspension with the help of pasture pipette and allowed to stand for 5 min to float all the parasitic eggs. Then, the slide was examined under microscope using low power objective (10X) and all eggs were counted inside of the both McMaster chambers. Eggs were identified according to the previously described morphological characteristic by Soulsby (Soulsby, 1982). The EPG (egg per gram of feces) were calculated by multiplying the total numbers of identified eggs in two chambers with the dilution factor 50.. The parasitic load was considered as light (egg counts from 1 to 500), moderate (egg counts above 500 to 1000) and heavy or severe infection respectively when eggs counts were found >1000 per gram of feces and ectoparasites were identified under light microscopy based on their morphological characters (Sweeny *et al*., 2011).

RESULTS

Out of 600 fecal samples, 405 samples were found positive with one or more species of endo-parasites indicating an overall prevalence of 67.5% (Table 1). In this study, five genera of GI parasites and one genus of protozoa were identified. The identified parasites were *Paramphistomum* spp. (20.0%), *Fasciola* spp. (8.33%), *Schistosoma* spp (4.17%), *Haemonchus* spp. (11.67%), *Toxocara* spp. (10.83%) and coccidian parasites (7.5%), respectively (Table 1). Among the identified parasites, high prevalence was recorded in case of *Paramphistomum* spp. (20.0%) and lowest prevalence was found in case of *Schistosoma* spp. (4.17%) (Table 1). High prevalence of *Paramphistomum* spp. (24%) and *Haemonchus* spp. (15%) was recorded in adult cattle whereas the prevalence of *Toxocara* spp. (25%) and coccidian parasites (17.5%) was found higher in calf compared to that of adult cattle (Table 2). In case of seasons, fhe highest endoparasitic infestation were found in rainy season (52.35%) followed by the summer (26.91%) and winter season (20.74%). High prevalence of *Paramphistomum* spp. (14.81%) was found in rainy season followed by summer (8.64%) and winter season (6.17%). In case of winter season, the highest prevalence was found of *Schistosoma* spp (3.7%) and *Paramphistomum* spp. (6.17%) (Table 3). The overall prevalence of ectoparasites was 56% (Table 4). The high prevalence of tick infestation was (20.00 %) followed by lice (16.00 %), mange (12.00 %) and maggot fly (8.00 %) (Table 4). The prevalence of ectoparasites was the highest in summer (34.00 %) followed by rainy (14.00 %) and winter season (8.00 %) (Table 4).

Table1. Overall prevalence of endoparasites in cattle of Gopalganj district

Identified parasites	**Number of infected cattle (n=600)**	**Prevalence**
Paramphistomum spp	120	20.00%
Fasciola spp.	50	8.33%
Haemonchus spp.	70	11.67%
Toxocara spp.	65	10.83%
Coccidial oocyst	45	7.5%
Schistosoma spp.	25	4.17%
Fasciola spp. + *Paramphistomum* spp.	20	3.33%
Toxocara spp. + Coccidial oocyst	10	1.67%
Overall prevalence	**405**	**67.5%**

Table 2. Age-wise prevalence of endoparasites in cattle of Gopalganj district

Identified parasites	No. of infection in adult cattle (n=400)	Prevalence (n=400)	Number of infection in calf (n=200)	Prevalence (n=200)
Paramphistomum spp	96	24.0%	24	12.0%
Fasciola spp.	30	7.5%	20	10.0%
Haemonchus spp.	60	15.0%	10	5.0%
Toxocara spp.	15	3.75%	50	25.0%
Coccidial oocyst	10	2.5%	35	17.5%
Schistosoma spp	20	5.0%	5	2.5%
Fasciola spp + *Paramphistomum* spp.	18	4.5%	2	1.0%
Toxocara spp. + Coccidial oocyst	2	0.5%	8	4.0%
Total prevalence	**249**	**62.25%**	**156**	**78.0%**

Table 3. Season wise prevalence of endoparasites in cattle in of Gopalganj district

Identified Parasite	Number of infection (n=600)	Seasons		
		Rainy	Summer	Winter
Paramphistomum spp	120	**60 (14.81%)**	35 (8.64%)	**25 (6.17%)**
Fasciola spp.	50	30 (7.41%)	10 (2.47%)	10 (2.47%)
Haemonchus spp.	70	40 (9.88%)	20 (4.94%)	10 (2.47%)
Toxocara spp.	65	30 (7.41%)	15 (3.70%)	10 (2.47%)
Coccidial oocyst	45	25 (6.17%)	15 (3.70%)	5 (1.23%)
Schistosoma spp	25	6 (1.48%)	4 (0.99%)	15 (3.7%)
Fasciola spp. + *Paramphistomum* spp.	20	15 (3.70%)	3 (0.74%)	2 (0.49%)
Toxocara spp. + Coccidial oocyst	10	06 (1.48%)	2 (0.49%)	2 (0.49%)
Total positive case	**405**	**212 (52.35%)**	**109 (26.91%)**	**84 (20.74%)**

Table 4. Prevalence of ectoparasite infestation in cattle of Gopalganj district

Type of ecto parasites n=250	Number of Positive case	Prevalence	Seasons		
			Rainy	Summer	Winter
Tick	50	20.00%	10 (4.00%)	35 (14.00%)	5 (2.00%)
Lice	40	16.00%	10 (4.00%)	25 (10.00%)	5 (2.00%)
Manage	30	12.00%	10 (4.00%)	15 (6.00%)	5 (2.00%)
Maggot Fly	20	8.00%	5 (2.00%)	10 (4.00%)	5 (2.00%)
Total prevalence	140	56.00%	35 (14.00%)	85 (34.00%)	20 (8.00%)

DISCUSSION

The overall prevalence of GI parasitic infections of cattle in this study was recorded 67.5%. The present results are lower than the previously reported results where overall 72.65% and 76.9% cattle infected with various helminthes parasites at Sylhet and Sirajgonj district of Bangladesh (Paul et al., 2016, Aktaruzzaman et al., 2013, Abed et al., 2001). The prevalence from this study is higher than the findings reported previously in cattle different regions of Bangladesh like Chattogram and Bandorban districts such as 39.75% and 46.25% (Ashrafuzzaman, 2012, Alim et al., 2012). The differences in prevalence of GI helminthes infection may be due to geographical regions, methods of sampling and examinations, farm management system and husbandry practices of cattle. The prevalence of *Paramphistomum spp*. was higher in adult cattle (20%) and *Toxocara* spp. (25%) in calf. The present findings are supported by the previous reported findings where higher prevalence of *Paramphistomum spp*. found in adult cattle and *Toxocara spp*. in calf (Akanda *et al*. 2014). Prevalence of *Paramphistomum spp.*, *Fasciola spp.*, *Haemonchus spp*. were found more in adult cattle that supported the observations of Sardar *et al.*, 2006; Bellam et al., 2001), where it has been reported that *Paramphistomum spp*., *Fasciola spp.*, *Haemonchus spp*. were more prevalent in adult animal than the young cattle. The prevalence of *Toxocara spp*. (10.83%) followed by Coccidian oocyst (7.5%) in calf that support the report of Bachal *et al*. (2002),Kamaruddin et al (2003) ,Mustafa et al (2022) where reported that such type of infection was found in early in life of animal Bachal *et al*. 2002, Mustafa *et al.* 2022). The cause of higher prevalence of parasitic infection in adult cattle may be due to longer period of production time (Sardar *et al*., 2006; Mazid et al., 2006; Murthy et al., 2014).

Animal stress condition like lactation, pregnancy, malnutrition is also accounted for higher prevalence of parasitic infection in adult animals (Radostits *et al*., 1994). The prevalence of endo-parasites are found more in rainy season (52.35%) followed by summer (26.91%) and winter season (20.74%). The present findings are in agreement with the previously reported findings where it has been stated that GI parasitism were more in rainy season followed by summer and winter season (Shiale *et al*. 2008;Silvestre et al .,2008). The cause of variations may be due to adequate moisture and optimum temperature that favores the growth and survival of parasitic infective stage (Shiale *et al*. 2008) . Hot humid climate in the summer and lower temperature in the winter season may provide the unfavorable condition of parasitic growth and development (Pfukenyi *et al*., 2007). The overall prevalence of ectoparasites was 56% and highest prevalence was found in tick infestation (20.00%) followed by lice (16.00%) and mange (12.00%). The present findings are in consistent with the earlier findings (Rahman *et al*. 2012). The prevalence of ectoparasites was higher in summer season (34.00%) followed by rainy (12.00%) and winter season (8.00%). This result also favors finding of Islam *et al*. (1985), where it is stated that hot humid climatic condition in Bangladesh greatly favors the development and survivability of ecto- and endo- parasites (Islam *et al*. 1985).

CONCLUSION

This surveillance work gives an outline about the high prevalence of endo and ecto-parasitic infections among cattle population in Gopalganj District and BAPARD cattle farm as indicated in the results and discussion. This study will be helpful to design a training module of the cattle farmers with a layout for controlling the parasitic infestation in this area and it will lead to implement the parasite free compost and BAPARD Livestock training program.

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CONFLICT OF INTEREST

The authors declare no competing interests regarding the submitted manuscript and the research works.

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