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EPIDEMIOLOGICAL INVESTIGATION OF GASTROINTESTINAL PARASITES OF LIVESTOCK POPULATION AT MIRZAPUR UPAZILA IN TANGAIL BANGLADESH

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ABSTRACT

The objective of this study was to investigate the nutritional status of livestock and correlate it with the prevalence of gastrointestinal parasites (GP) at Mirzapurupazila in Tangail district. A total 150 questionnaires were prepared to assess the nutritional status of livestock in this study. Total 170 beef cattle, 63 dairy cow, 11 Goat/sheep and 23 chicken history and fecal samples were collected and evaluated. About 76% animals were reared in traditional rearing system and 24% animals were reared in intensive rearing system. Among the population 12% cattle, 10% dairy cow, 8% goat/sheep and 6% chicken where found diseased condition. Only 18% cattle, 22% dairy cow, 14% goat/sheep & 10% chicken were vaccinated. 50% cattle, 50% dairy cow, 14% goat/sheep were de-wormed routinely. Dairy cow was supplied the highest amount of green grass (9.7 kg/day). Only 76% farmers followed the method of processing rice straw to feed their animals. Overall prevalence of GP infestation was 76%. Prevalence of *Paramphistomum* spp. infestation was found to be the highest (24%) followed by *Fasciola* spp. 16%, *Trichostrongylus* spp. 4%, *Eimeria* spp. 14%, *Isospora* spp. 8%, *Trichuris* spp. 4%, *Strongyloides* spp. 6%. The findings of this study provide an epidemiological forecast showing the prevalence of gastrointestinal parasites in cattle, which can be helpful for the clinician in diagnosis of such infections. The study revealed that nutritional status, health condition and gastrointestinal parasites results variation in productivity of animals.

Key Words: gastrointestinal parasites, infection, livestock, nutritional status, prevalence

INTRODUCTION

Agriculture remains the most important sector of Bangladesh economy, contributing 14.23% to the national GDP and providing employment for 63% of the population.The contribution of livestock in GDP is 1.47% & GDP growth rate of livestock is 3.47% (BBS, 2016).The livestock sector plays a crucial role in the social and economic development of a country, especially in low and middle-income countries. It directly supports the livelihoods of 600 million poor smallholder farmers in the developing world (Thornton *et al*., 2006; HLPE, 2016). Livestock are a direct and indirect source of food for rural and urban households. It is estimated that livestock-derived foods, or animal-source foods (ASF), contribute 18% of global food energy consumption and 34% of global protein consumption (FAOSTAT, 2016). Animal-source foods are unique source of high-quality proteins and bio-available essential vitamins and minerals. Livestock are also a powerful safety net for the poor, particularly women and pastoralist groups. Livestock population in Bangladesh is currently estimated to comprise 25.7 million cattle, 0.83 million buffaloes, 14.8 million goats, 1.9 million sheep, 118.7 million chicken and 34.1 million ducks. The density of livestock population per acre of cultivable land is 7.37 (Banglapedia, 2015). There are several factors such as breed, age, nutritional status, feeding and rearing system, health status, environment which influences the production and performance of livestock.

Cattle, sheep, goat and poultry are the major source of protein for human consumption. There is huge demand of milk, meat and egg to local dairy and poultry industries and livestock plays a vital role to meet up these demand. For greater production, the nutritional status of livestock is an important factor. Nourished animal produces more milk, meat for human consumption, which are very rich source in nutrient contents. Optimum productive and reproductive efficiency could be achieved only if the animals fed with the required quantity of feedstuffs and all nutrients in proper proportion (NRC, 2001).

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Accurate determination of nutritional and health status of animals is invaluable in modern animal agriculture. Body weights and body condition scoring are the commonly used methods of assessing nutritional status of animals. Combining body weights, body condition scores and blood metabolites increase accuracy of assessing the nutritional state and welfare of beef cattle.

The nutritional status depends on feed ingredients, feeding system, rearing system, health condition. Balanced diet and proper feeding is a key for profitable and sustainable farming. Feeding has a direct impact on growth rate, production capacity and health status of animals. Animals know how to auto regulate and they stop eating once they feel satisfied. However, if the nutrient content of the feed is very low, the consumed feed will not be enough to meet their requirements and they can suffer from malnutrition, even if fed ad libitum. Without proper feed, i.e. ration, animals cannot grow well, cannot keep good health, nor can they produce products and young ones properly. That is why we have to feed animals with nutritionally balanced and adequate quantity of rations. Hence, the need to feed livestock scientifically according to their body needs. Proper housing and rearing of animal is as much important as feeding of livestock to keep animal healthy, productive and free from any infectious or parasitic diseases.

In Bangladesh, parasitism has been contemplated as one of the important constraints of livestock production.Gastrointestinal parasitism (GP) adversely affects the health and productivity of animal worldwide including Bangladesh (Kakar *et al*., 2008). 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). Previous studies in Bangladesh revealed that gastrointestinal parasitic infections are widely prevalent in the country (Siddiki *et al.,* 2009; Alim *et al*., 2011). In Bangladesh, 80% people in rural areas rearindigenous cattle (Siddiki *et al.,* 2009), and most of the cattle have been originated from primitive and low productive ancestors. The farmers usually rear their cattle under traditional husbandry practices. Nutritional status of the animals in general is not satisfactory as they are over-worked but under-fed or half-fed, which makes the animals susceptible to diseases including different parasitic diseases. About 50% calves until 1-year of age die due to GP. Besides, adult cattle are severely affected by parasitism with parasites (Raza *et al.,* 2010; Alim *et al.,* 2011), resulting enormous economic losses in Bangladesh (Sardar *et al.,* 2006). Unfortunately, in Bangladesh these problems are neglected or overlooked sometimes as the animals show little or no clinical signs after infected with parasites (Raza *et al*., 2010; Alim *et al.,* 2011). There are several factors such as breed, age, nutritional status, environment, ecology and pathogenesity of the parasites that influence the occurences of GP (Pfukenyi and Mukaratirwa, 2013).

Mirzapur is an upazila of Tangail District in the division of Dhaka, Bangladesh. Mirzapur is located at 24.1083°N 90.0917°E. It has 61479 households and a total area of 373.89 km². The main occupation of the people is agriculture 62%, business 11%, job 10%, unemployed 10%, others 6%. The total land measures 92,390 acres of which 71,809 acres' cultivable land & 20,581 acres' fallow land. Livestock remains as an integral part of agriculture system at Mirzapur Upazila since the time immemorial though the role of livestock has transformed a lot over time. Livestock sector was considered as a support sector of crop agriculture until recent situation. Over time the role of livestock has been changed dramatically. The present status of livestock at Mirzapur upazila is: Cow - 62,573, Buffalo – 512, Goat - 20,510; Sheep-4,120; Duck-51,400; Chicken-7, 62,450; Pigeon-35,142. (Data source-Upazila Veterinary Hospital, Mirzapur, Tangail).Various risk factors related to host, environment nutritional condition play an important role in the onset of GI parasitic infections. Environmental factors include agro-ecological conditions, animal husbandry practices such as housing system, de-worming intervals and pasture management; these largely determine the type, incidence and severity of various parasitic diseases (Badran *et al.,* 2012). Other risk factors such as the host, species, sex of the animal, age, body condition, breed/genotype, parasite species and intensity of the worm population, have an effect on the development of gastrointestinal parasitic infections (Tariq *et al*., 2010). The environmental conditions such ashumidity, environmental temperature of Mirzapur upazilais suitable for growth and survivable of parasites and their intermediate hosts.

The present study was conducted to investigate the nutritional status of livestock & GI parasites prevalent in livestock at Mirzapur upazila of Tangail district and identify associated factors such as age, breed, feeding & rearing system, health condition, vaccination and nutritional condition. The research was conducted in a particular manner to get right information with an organized way.

MATERIALS AND METHODS

Study area and period

The study was conducted at Mirzapur Upazila in Tangail district by visiting commercial and backyard livestock farms for a period of one year starting from June 2020 to June 2021.

Data and sample collection

Total 170 beef cattle, 63 dairy cow, 11 Goat/sheep and 23 chicken histories were collected and evaluated (Table 1). A total 150 fecal sample was collected from 50 cattle. Samples were collected in plastic bags containing 10% formalin & transported to the upazila livestock office, Mirzapur. Total 150 questionnaires were prepared for the study. Information was collected using a structured questionnaire by face to face interview. The information was characterized according to the basic information about farmer and farm such as number of animals, milk yield, breed, age, body weight, disease condition, vaccination, de-worming, rearing system, type of housing, feeding system, amount of feed supplied, way of feeding, problems in rearing and suggestions or comments.

Table 1. Survey of livestock population at Mirzapur upazila

Species/Type of Animals	Population
Beef cattle	170
Dairy cattle	63
Goat/Sheep	11
Chicken	23

Examination of samples

The samples were examined by sedimentation technique. Sedimentation technique was performed by adding 5gm feces with 10-20 times of its volume of water. Then it was allowed to settle down in a beaker for 1-2 hour. This process was repeated till supernatant fluid is clear. Sediment at the bottom was taken & examined under a microscope.

Statistical analysis

The data were imported; stored & coded using Microsoft Excel 2007. Descriptive analysis of data was performed using Microsoft Excel2007.

RESULTS AND DISCUSSIONS

Livestock presents at Mirzapur upazila

At Mirzapur upazila the percentage of rearing of local/indigenous breed was higher (56%) than cross bred (44%) (Fig. 1). Holstein Friesian (20%) and Sindhi/Sahiwal (24%) cross were the two main cross breds of this upazila (Fig. 1). Holstein Friesian was mostly found in case of dairy cow because of their huge milk production. In case of goat the Black Bengal goat was mostly found.There are so many breeds of cattle but mainly they are categorized into two main groups: Indigenous and cross bred.In Bangladesh availableindigenous/deshi cattle breeds are: Pabna Cattle, Red Chittagong, Munshiganj Cattle, and North Bengal Grey Cattle etc.Exotic /Cross breds are: Holstein-Friesian, Jersey, Sahiwal, Hariana, Sindhi, Australian, Sahiwal-Friesian and improved. The two main goat breed of Bangladesh is

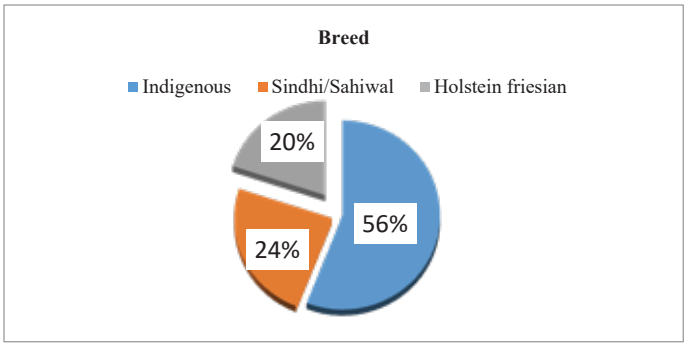

Fig. 1. Percentage of cattle breeds at Mirzapur upazila.

Black Bengal goat and Jamunapari goat. Quddus and Amin (2010) found crossbred cattle farming a profitable enterprise. Average milk production of dairy cows at Mirzapur upazila was 8.76 liter per day as shown in Table 2. Hossain *et al.* (2015) observed daily milk yield in crossbred was 12.90 ± 0.72 liter/cow. Milk was mainly collected by hand milking 2 times a day, morning and afternoon. Besides, milk production recorded at present study was similar with Rokunuzzaman (2006), who found average milk yield 2.38 ± 0.728 (deshi cows) liters per day in Jessore district. Sadullah (2001) said that Holstein crossbred and Sahiwal cattle are very popular and contribute a major portion of milk in profitable way. On Average, a Bangladeshi cow is reported to produce around 200 kg/year, which is below 30 percent the production of an Indian cow. This low milk yield is mainly due to poor feed resources and low milk productivity of the most common types of animals (Hemme *et al*., 2005).

Table 2. Average milk production of dairy cows at Mirzapur upazila.

No. of dairy cows	Total milk production (liter/day)	Average milk production (liter/day)
63	552	8.76

Health status of livestock at Mirzapur upazila

The health status (disease condition, vaccination percentage, and de-worming percentage) of livestock at Mirzapur upazila represented in Table 3. Among them 12% were cattle, 10% were dairy cow, 8% were goat/sheep and chicken were 6 %. In contrary with the results higher disease condition reported

Table 3. Health status of livestock at Mirzapur upazila

Health status	Animal (%)			
	Cattle	Dairy cow	Goat/Sheep	Chicken
Diseased condition (%)	12	10	8	6
Vaccination (%)	18	22	14	10
Anthelmintic (%)	50	50	14	0

(Islam *et al.,* 2013; Subir and Islam, 2011; Rahman *et al*., 2011) described 50.27% in Patuakhali, 20.57% in Rajshahi, 55% in Mymensingh. This variation might be due to different geographical location, seasonal variation during research period and different management practices. The main diseases were FMD, lumpy skin disease, mastitis, milk fever, PPR, new castle disease etc. In this study most of the animals were not vaccinated. Only 18% beef cattle, 22% dairy cow, 14% goat/sheep and 10% chicken were vaccinated. At Mirzapur upazila vaccination was mainly done for FMD, LSD, PPR, anthrax, RDV etc. 50% cattle, 50% dairy cow, 14% goat/sheep, none of the chicken were de-wormed routinely. Major anthelmintics used at Mirzapur upazila for de-worming were Bol. Tremacid, Bol. Almex vet, Bol. Helmex vet, Bol. Benazol, Bol. LT vet, Inj. Vermic, Pulv. Avinex etc. Majority of the household owners did not use vaccine and anthelmintic for their livestock. Similarly, Rahman *et al.*

(2014) reported that 68% farmers in Sylhet, Faridpur, Pirozpur and Kishorgonj region did not use vaccine.

Rearing system of livestock at Mirzapur upazila

The present survey data revealed that 76% animals were reared in traditional system and 24% animals were reared in intensive system (Fig. 2). In traditional system, animals were kept in house at night and day time they were allowed to graze in the land. In intensive system animals were kept in house at day and night and provided proper feed supplements at 3 times a day. Cattle and sheep/goat are mainly reared in 3 types of rearing systems. Almost all the housing system was head to head. These are: extensive, intensive and semi-intensive. In Bangladesh most animals are reared in traditional rearing system. Intensive rearing system is suitable for crossbred cattle and dairy cow for better performance. In case of intensive system, there are face-in and face-out system should be practiced for cattle rearing. Traditional system is used to targeted grazing involving application of a specific kind of livestock at a determined season, duration, and intensity to accomplish defined vegetation or landscape goals (Launchbaugh and Walker 2006).Reduction of invasive annual grasses (Diamond *et al*., 2010), invasive weeds (Goehring *et al.,* 2010) and fuel (Davison 1996; Clark *et al.,* 2013); due to insufficient cultivable land. Gradually it was difficult to grazing animal in the pasture land. That's why commercial farming is increasing day by day, where semi-intensive or intensive rearing system used. About 63% farmers provided intensive rearing system and 37% farmers used extensive rearing system in Bangladesh (Hossain *et al.,* 2004).

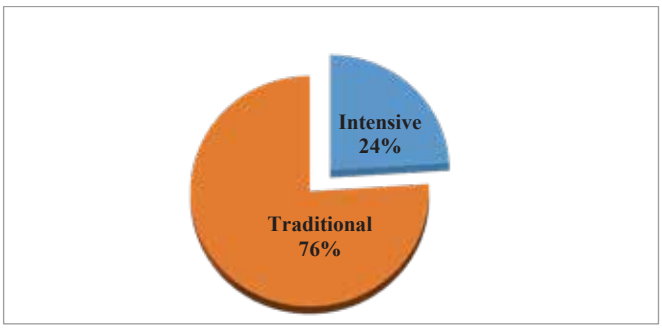

Fig. 2. Rearing system of livestock at Mirzapur upazila.

Feeding of livestock at Mirzapur upazila

The survey data represents that 76% animals were fed in commercial feeding method (Fig. 3). Only 4% animals were fed using both traditional and commercial method. The average amount of feed supplied per day to the animal at Mirzapur upazila are shown in Table 4, where beef cattle was supplied with 9.64 kg green grass per day, 4.22 kg rice straw per day and 2.53 kg concentrate per day; dairy cow was supplied with 9.7 kg green grass per day, 1.78 kg rice straw per day and 2.18 kg concentrate per day; goat/sheep was supplied with 0.13 kg green grass per day, 0.02 kg rice straw per day and 0.15 kg concentrate per day, chicken was supplied 0.015 kg concentrate per day. List of available feed /feed ingredients: crop residue- rice straw, wheat straw, maize straw, potato leaves; oil seed cakes/meals, pulses; grains-rice, wheat, maize and other cereals; by products- rice polish, rice bran, wheat bran, broken rice, pulse bran, sugarcane top, sugarcane bagasse, banana leaves, molasses; grasses-napier, pakchong, german, para, alfalfa etc. Paddy is the most important cereal crops grown in the country, which occupies 80% of the total cropped area and by products, are led to the livestock. Rice straw is the main roughage for cattle and dairy cow, which is low in nutritive value and palatability but it contributes 90% of the roughage feed to animals. The amount of green fodder fed to the cattle each day depends on the time given by the farmers to collect the crop fields. Green grass is the main roughage for small ruminants like sheep/goat. Most of the year, the cattle, dairy cow, and goat/sheep did not get adequate green grass. Besides, dairy farmers are recommended to fed 1kg concentrate for 2-3 kg of

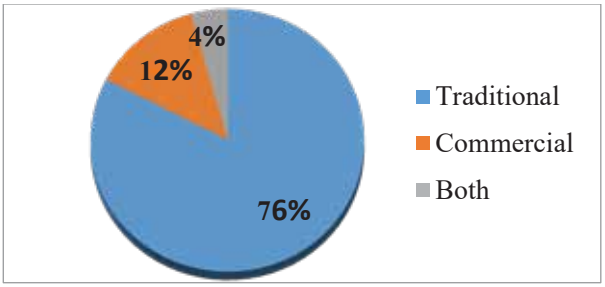

Fig. 3. Feeding system of livestock at Mirzapur upazila.

Table 4. Feeds of livestock at Mirzapur upazila.

Feed Ingredients	Average amount supplied to animal (kg/day)			
	Beef cattle	Dairy cattle	Goat/Sheep	Chicken
Green grass	9.64	9.7	0.13	-
Rice straw	4.22	1.78	0.02	-
Concentrate	2.53	2.18	0.15	0.015

milk that's why crossbred dairy cow need more than 3 kg concentrates feed. Different countries have evolved their own standard based on experiments conducted with farm animals in the agro-climatic and economic condition prevailing in the country (De Boer and Bickel, 1988). In U.K. as per recommendation of technical committee set up by Agricultural Research Council has been publishing updates of these requirements (Rock, 1991). Recently, tables with nutrient values and requirements are published in Srilanka, Malaysia and Indonesia (Ibrahim, 1988; Devendra, 1979 and Hartadi *et al*., 1980). The percentage of feeding processed straw to the animal was only 24% at Mirzapur upazila where 76% rice straw was fed without any processing (Fig. 4). There are mainly 3 processing methods of rice straw. These are: physical, chemical and biological. The farmers of Mirzapur upazila processed the rice straw by only physical and chemical methods. In physical method rice straw were chopped into small pieces and fed to the cattle. In chemical method rice straw were treated by urea and molasses.

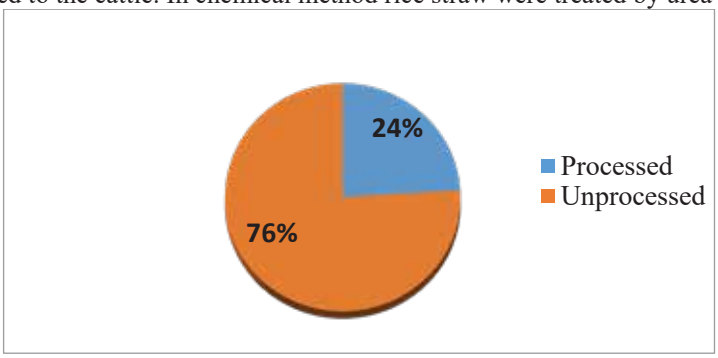

Fig. 4. Rice straw feeding system in ruminants.

That urea molasses treated straw is called Urea Molasses Straw (UMS) and Urea Molasses Block (UMB). In some areas of Bangladesh rice straw constituting over 90% of dry matter intake due to lack of alternative feed resources (Mamun *et al*, 2002). Actually, rice straw has low protein content ranging from 3% to 6%. It has high dry matter (DM) contents of 92-96% but with a low CP content ranging from 3% to 7% (Shen *et al*., 1998). Unprocessed rice straw contains 80% substances which are potentially degradable and a source of energy and primarily serves as bulk or filler to meet the dry matter requirement of ruminants. The nutritional status of rice straw should be enhanced through physical, chemical and biological processing methods and combinations of these (Ibrahim, 1983).

Parasitic prevalence at Mirzapur upazila

The present study revealed the overall prevalence of gastrointestinal parasitic infection (single/mixed) was 76% (n =38/50) (Fig. 5) in this study population. Seven different helminthes species were found in livestock population of the studied area. Table 5 represents association of different variables with overall parasite positive samples. The prevalence of parasitic infection was significantly high in local

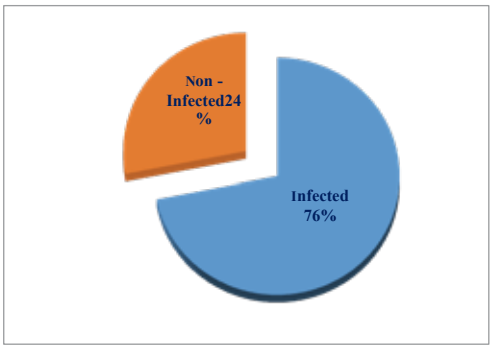

Fig. 5. Parasitic prevalence.

breed (95.45%) than cross bred (55.57%) animals. De-wormed animal showed significantly lower prevalence of gastrointestinal infection (60%) than animal, which were not de-wormed. The overall prevalence of GP infections found in this study inclined with the report of Samad *et al.,* (2004) who recorded 63.32% cattle in Bangladesh had infested with parasites. However, these observations markedly varied from the report of Alim *et al.,* (2011) who recorded 39.75% and 46.25% parasitic prevalence in crossbred and local cattle, respectively. These variations might be due to differences in

Table 5. Association of different variables with overall parasite positive samples.

Variables	Level	Total observation	Samples positive to parasites (%)
Breed	Cross	22	21 (95.45)
	Local	28	16 (55.57)
De-worming	Yes	25	15 (60.0)
	NO	25	18 (72.0)

geo-climatic conditions, sample size, breed, age, sex, plan of nutrition, stress, availability of intermediate host, vegetation, grazing pattern, rearing and husbandry measures, anthelmintic therapy and genetic resistance (Khan *et al.,* 2010). Survival and transmission of eggs and larvae of parasites depend mainly on climatic conditions at natural pasture (Pfukenyi and Mukaratirwa, 2013). Domestic animals raised on pasture are mostly infested by gastrointestinal helminthes. The parasitic infection is a serious constrain to health and productivity of the livestock in cattle, sheep and goats. The negative impact of helminthic infections on livestock productivity in some countries has been established. In dairy cattle, parasitic infections reduce milk yield by 1.2 to 2.2 kg milk/cow/day (Moussouni *et al,* 2018). In addition, reproductive performances, loss in body weight and digestive disturbances have been reported. (Moussouni *et al.,* 2017). The *Paramphistomum* spp., *Fasciola* spp., *Trichostringylus* spp., *Eimeria* spp., *Isospora* spp., *Trichuris* spp., *Strongyloides* spp. identified based on the characteristics reported by Souls (1982) and Zajac *et al*. (2006) and Taylor *et al.* (2016).

Body weight specific prevalence of parasites

The samples were categorized into five groups of animals on the basis of body condition (≥100 kg, >100-<200 kg, ≥200-≤300 kg, >300-<400 kg, ≥400 kg) of which 30% samples were collected from ≤100 kg animals, 18% from >100-<200 kg animals, and 16% from ≥200-≤300 kg animals, 4% from

>300-<400 kg animals and 8% from ≥400 kg animals (Table 6). Prevalence was relatively higher in animals with poor body weight than animals which were healthy. This finding is consistent with that of Biswas *et al.* (2014) who reported that parasitic infection is usually higher in animals with poor body condition. The present study also accedes with Etter *et al*. (1999) who reported that in immune compromised animals, fecundity of parasites is usually increased. It appears that malnutrition in animals increases their susceptibility to the parasitic infection. It may also happen that, the animals becoming poor and weak due to any other causes are not able to resist the challenge of infection and subsequently become weaker and lose condition.

Table 6. Body weight specific prevalence of different genera of gastrointestinal parasite

Species	Weight of cattle (Kg)				
	≤100 n=19	>100-<200 n=21	≥200-≤300 n=6	>300-<400 n=2	≥400 n=2
Paramphistomum spp.	6	4	1		1
Fasciola spp.	1	3	3		1
Trichostrongylus spp.	1			1	
Eimeria spp.	3	1	2		1
Isospora spp.	2		1	1	
Trichuris spp.	1		1		
Strongyloides spp.	1	1			1
Total (%)	15 (30)	9 (18)	8 (16)	2 (4)	4 (8)

Age specific prevalence of parasites

The study population were categorized into three sub-groups as calf (≤1 year), young (>1-<2.5 year) and adult (≥2.5 year) consisting of 18%, 24% & 34% of total samples respectively. Age-wise analysis exposed higher infection in adult (34%) than young animals (Table 7). Biu *et al.* (2009); Uddin *et al*. (2006) and Soulsby *et al.* (1982) reported that small ruminants of more than 2 years of age showed

Table 7. Age specific prevalence of different genera of gastrointestinal parasite

Name of the parasites	Calf (≤1-year) n= 10	Young (>1-<2.5year) n= 20	Adult (≥2.5- year) n=20	Overall %
Total positive %				
Paramphistomum spp.	4 (40)	2 (10)	6 (30)	12 (24)
Fasciola spp.	*2 (20)*	2 (10)	4 (8)	8 (16)
Trichostrongylus spp.	0 (0)	0 (0)	2 (8)	2 (4)
Eimeria spp.	2 (20)	3 (15)	2 (10)	7 (14)
Isospora Spp.	1 (10)	2 (10)	1 (5)	4 (8)
Trichuris spp.	0 (0)	1 (5)	1 (5)	2 (4)
Strongyloides spp.	-	2 (10)	1 (5)	3(6)
Total	9 (18)	12 (24)	17 (34)	38 (76)

more susceptibility to endoparasitism, which showed consistency with the result of this study. Uddin *et al.,* (2006) also observed that gastrointestinal parasitism was significantly influenced by the age of the small ruminants. Hassan *et al.* (2011) also observed age as a risk factor where older small ruminants (>24 months) were more susceptible to gastro-intestinal parasites than younger ones (<24 months), which supports the findings of the study. The high prevalence of *Paramphistomum* spp. found in our study was inclined with the report of Raza *et al.* (2007) who reported that this parasite is mostly prevalent in young cattle. The cause of this high prevalence in young cattle might be due to sudden exposure to grassland containing huge number of eggs of parasites, and possibly due to lack of necessary protective immunity of the cattle. Age had a significant effect the prevalence of gastrointestinal parasitism animals. Commonly young animals are shown less prone to parasitic attack due to their high immunity than adult animal.

The study revealed that Prevalence of *Paramphistomum* spp. infestation was found to be the highest (24%; n=12/50) followed by *Fasciola* spp. (16%; n=8/50), *Trichostrongylus* spp. (4%; n=2/50), *Eimeria* spp. (14%; n=7/50), *Isospora* spp. (8%; n=4/50); *Trichuris* spp. (4%; n=2/50), *Strongyloides*spp. (6%; n=3/50). The high prevalence of *Paramphistomum* spp. may be due to overall distribution of the parasite & its intermediate host. Also the environmental factors such as humidity, temperature & rainfall support the high prevalence of this parasite. The prevalence of *Paramphistomum* spp. was only 1.93% on the observation of Moussouni *et al*. (2017). The eggs of *Eimeria* spp. were predominant (43.87%) followed by *Strongylus* spp. (30.32%) and *Fasciola hepatica* (12.25%). Prevalence of *Fasciola* spp. of this study was lower than the observation of Iqbal *et al*. (2007) who recorded 21.42% in Pakistan. The prevalence rate of our study is higher than the report of Alim *et al.* (2011) who recorded only 2.54 and 0.92% in indigenous and crossbred cattle in different Chittagong regions, respectively. Higher prevalence of *Fasciola* spp. might be due to geo-climatic condition or poor sample size, as reported by Kakar *et al.* (2008). However, a higher prevalence (25%) of Paramphistomiasis was recorded by Raza *et al.* (2009), which is similar to the results of this study. This occurrence might be due to geo-climatic conditions, age and seasonal variations (Sardar *et al*. 2006). Alim *et al.* (2011) reported a higher prevalence of *Toxocara* spp. infection in cattle. Conversely, lower prevalence of *Toxocara* spp. infection was observed by Saravanan *et al.* (2009).

Problems and suggestions in rearing livestock at Mirzapur upazila

From this study, it was perceived that farmers are facing several types of problems in rearing livestock. Many of householders were observed that main constraints of livestock rearing at homestead were lack of grass land, high feed cost, vaccination worker not available, lack of credit/cash, insufficient veterinary and AI services, unhygienic rearing condition, improper de-worming programmed and backdated traditional housing system. There are lack of veterinarian and medical support. When animals suffers from various diseases they do not get proper treatment. There is no sufficient grazing land for animals. Animal always suffers from shortage of green grass. The condition of marketing channel is very poor. The farmers have to always depend on middle man. There is no practice of routine vaccination and de-worming of animals. As a result, animals always suffer from various bacterial, viral, parasitic and infectious diseases. Livestock are mostly affected by various ectoparasites and endoparasites. Among them gastrointestinal helminthes attack is most serious problem which adversely affects the overall production & health of animals, even causes death to animals.

Almost all the farmers of our country are unaware about new technologies of farming. If they are trained properly by arranging various training program under local Govt., then it can help them to improve their farming. Sufficient veterinary support should be provided to the farmers. The farmers should cultivate grasses in their free land. The improved variety of grasses like Pak Chong, Napier, Para etc. can be cultivated in house premises. Farmers should be encouraged to timely vaccinate and de-worm their livestock. Besides, the farmers should maintain proper hygienic measures and proper feeding system for optimum production from their livestock.

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