Volume: 26, Issue: 1
Page: 22-34
2023

International Journal of Science and Business

Journal homepage: ijsab.com/ijsb

Epidemiological investigation and Factors affecting the Gastrointestinal parasitism in Cattle at selected areas of kotalipara upazila of Gopalganj district in Bangladesh

Md. Rafiul Islam

Abstract

The investigation of the GI parasite's epidemiology and associated risk factors in cattle was the study's main goal. A total of 211 fecal samples from 92 bulls and 119 cows were collected from Pinjuri and Hiron unions of Kotalipara upazila of Gopalganj district from February, 2023 to April, 2023. Fecal samples were collected directly from the ground when the animals were found in the act of defecation or immediately after defecation. On the day of collection, the samples were evaluated at the BAPARD Laboratory using conventional coprological methods. A pretested questionnaire was utilised to capture the essential animal data during sample collection. The cattle were separated into three age groups, including 0 to 1 year, 1 to 2 years, and 2 years; various sex groups, including male and female; different health status groups, including poor and normal; and different breeds, including indigenous non-descriptive and crossbred. The total incidence of gastrointestinal parasitism was 45.49% (n=96/211), with Toxocara spp. (19.90%), Strongyloides spp. (3.79%), and Haemonchus spp. being the most frequently found parasites. and *Bunostomum spp.* (8.06%), *Paramphistomum spp*. (10.43%), *Paramphistomum spp*. and *Fasciola sp*. (1.42%) and *Moniezia spp.* (1.89%). The parasitic prevalence load was higher in crossbred (50.36%) than non-descriptive indigenous breed (36.48%). In another instance, female cattle (47.05%) slightly outnumber male cattle (43.47%). The parasitic load was higher in young (≥1 year) comparatively growing (<1 to ≥2 year) and adult (< 2 years) cattle. In this study areas, prevalence of gastrointestinal parasite shows slightly higher in Hiron union (45.87%) comparatively Pinjuri union (45.09%). So, the study indicates high percentage of infection found in crossbred, female and young animals.

IJSB
Accepted 17 June 2023
Published 22 June 2023
DOI: 10.58970/IJSB.2153

ISSN: 2520-4750 (Online) 2521-3040 (Print)

Keywords: *Gastrointestinal parasite, Epidemiological investigation, Selected area, Kotalipara, BAPARD, Cattle.*

About Author (s)

Md. Rafiul Islam, Bangabandhu Academy for Poverty Alleviation and Rural Development (BAPARD), Kotalipara, Gopalganj, Bangladesh.

1. Introduction

One of the main obstacles to the production of cattle may be gastrointestinal (GI) parasite diseases. Due to subclinical or chronic infections that result in economic losses, the infection reduces feed intake and decreases feed utilization efficiency, which results in productivity losses (Renaldi et al., 2011; Bary et al., 2018). Parasitic illness is one of the main factors limiting cattle output (Jabber and Green, 1983). According to Chavhan et al. (2008), 10% of animals worldwide are thought to perish each year as a result of parasite diseases. However, these infections are rarely linked to high mortality. Disease issues, particularly those connected to parasitism, pose a severe threat to Bangladesh. According to Regassa et al. (2006), intestinal parasitism affects people all over the world. In general, helminths and protozoa are the culprits behind GI parasitism in livestock (Pinilla León et al., 2019). It is a significant barrier to the growth of the livestock population and has a negative impact on the wellbeing and production of animals (Kakar et al., 2008; Radostits et al., 1994). Losses from parasitic infections include decreased general health, slowed growth, decreased productivity, decreased milk and meat production, abortion, cost of preventive measures, and decreased disease resistance, which may ultimately result in higher mortality (Silvestre et al., 2000). Additionally, according to Hendawy (2018) and Gunathilaka et al. (2018), these illnesses increase susceptibility to secondary infections and losses brought on by the condemnation of carcasses and organs. According to Hossain et al. (2004), the ecology, geography, and climate of Bangladesh all influence the prevalence of parasitic infection. The farmers often raise their livestock using customary husbandry techniques. Animals' nutritional status is generally unsatisfactory because they are overworked but underfed or only partially nourished, which leaves them vulnerable to illnesses such various parasite diseases. Different parasites and their intermediate hosts can grow, develop, and survive in Bangladesh due to the country's favorable climate. In Bangladesh, gastro-intestinal parasite infections are very common, according to earlier studies (Siddiki et al., 2009; Alim et al., 2012). According to Siddiki et al. (2009), 80% of Bangladesh's population lives in rural areas and raises indigenous cattle, the majority of which are descended from lowly, primordial ancestors. Additionally, adult cattle in Bangladesh suffer substantial economic losses as a result of parasitism (Rahman et al. 1998; Sardar et al. 2006). Breed, age, nutritional state, environment, ecology, and the pathogenesity of the parasites are just a few of the variables that affect the incidence of GP (Pfukenyi and Mukaratirwa, 2013). Unfortunately, parasitic issues are frequently neglected and disregarded since most infected animals exhibit a variety of subtle clinical symptoms throughout their productive lives and because their impacts are chronic and gradual (Raza et al., 2010).

For this study, we chose the unions of Hiron and Pinjuri in the Kotalipara upazila of the Gopalganj district. It is anticipated that the waterlogging and low lying places of these unions' geo-climate will support the growth, development, and survival of different parasites or their hosts. In addition, there are other variables that may affect the frequency of GI parasite infections, including breed, age, sex, nutrition, and immune condition (Pfukenyi and Mukaratirwa, 2013). Although earlier research (Paul et al., 2016; Ahmed et al., 2015; Islam et al., 2014) in a few chosen locations of Bangladesh demonstrated a high incidence of GI parasitism in livestock, there is no accurate information on the infections in cattle from these places. In light of this, the current study was conducted to ascertain the prevalence of GI parasite infections in cattle in two unions of the Kotalipara upazila in the Gopalganj district and to assess the impact of environmental factors such as location, breed, age, and nutritional condition on the occurrence of GI parasitism.

2. Materials and Methods

2.1 Study area and design

The study was carried out between February 2023 and April 2023 in various areas of the Hiron union and Pinjuri union of the Kotalipara upazila of the Gopalganj district (Fig. 1). The low-lying location is ideal for the growth and development of parasites.

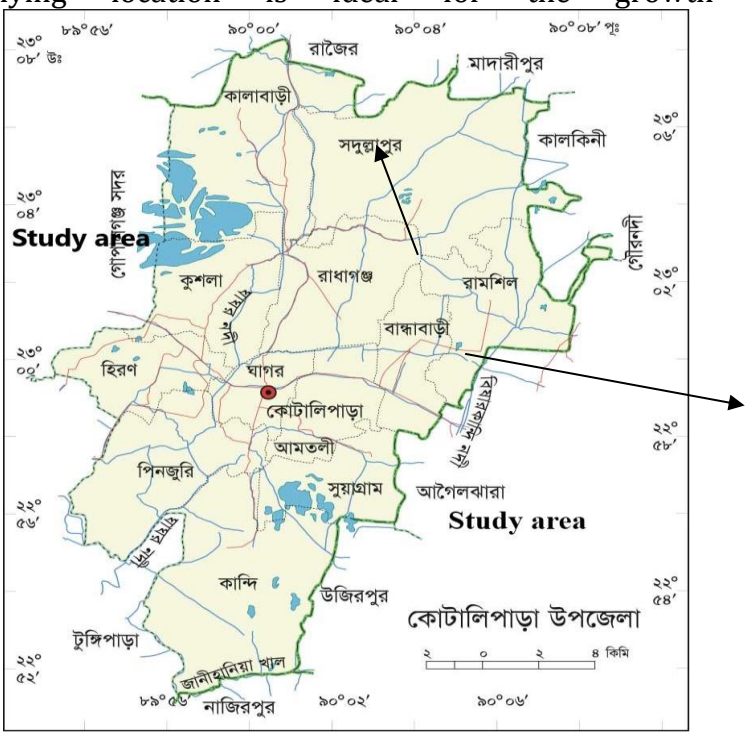


Fig. 1: Study area: Two unions of Kotalipara upazila of Gopalganj district

The rectums of 92 bulls and 119 cows were used to collect a total of 211 fecal samples, which were also taken from the ground when the animals were discovered in the act of urinating. Using disposable gloves that were appropriately labeled with the age, sex, and breed of the animals as well as sterile stool containers containing SAAF solution (Sodium Acetic Acid Formalin), around 15–25 grams of feces were collected from the animals. On the day of collection, the samples were analysed at the BAPARD Laboratory using common coprological techniques like sedimentation and flotation. A pretested questionnaire was utilized to record the age, sex, breed, and state of health of the cattle during sample collection. The cattle were separated into three age groups, including 0 to 1 year, 1 to 2 years, and 2 years; various sex groups, including male and female; different health status groups, including poor and normal; and different breeds, including indigenous non-descriptive and crossbred. By speaking with the farmers or looking at the cattle's teeth, the ages of the cattle were ascertained. The health of the livestock was assessed through visual inspection. Cattle deemed to be in good health were well fleshed, with little bony protrusion and a shiny coat. According to Pinilla et al. (2018), cattle with externally evident ribs and other bony prominences as well as a rough hair coat were assessed to be in poor health.

2.2 Fecal sample collection and preservation

Each cattle's fecal sample was taken in sterile, labeled containers filled with SAAF solution (Sodium Acetic Acid Formalin). Using disposable gloves, the fecal samples were collected either directly from the rectum of the animals or from the ground just after defecation. The animals were adequately restrained before collecting, and all hygienic precautions, such as donning an apron, hand gloves, and gumboots, were taken to prevent contamination. Each cattle had about

20–25 grams of feces taken from them, which were then transferred to the lab in an ice box and tested as soon as possible.

2.3 Examination of fecal samples

To find the eggs, cysts, and oocysts of parasites in the fecal samples, standard parasitological screening methods sedimentation and floatation were used (Taylor et al., 2016). Using a 10x and 40x light optical microscope, the morphological characteristics of the eggs, cysts, and oocysts of parasites were discovered.

2.4 Simple Sedimentation Technique

A glass cylinder was filled with 10 grams of faces and 100 cc of saline solution. To ensure that the fecal particles were suspended consistently, the fluid was vigorously agitated. After passing through a sieve with 30–50 meshes per inch into another glass cylinder, the suspension was left to stand for 30 minutes. With the use of a medical dropper, a small amount of sediment was carefully extracted from the supernatant fluid and deposited on a glass slide. It was covered with a coverslip, and care was made to prevent the creation of bubbles between the coverslip and the glass slide. The slide was then positioned beneath a compound microscope for a 10x low power examination.

2.5 Flotation technique

Sheather's Sucrose solution was utilized during the flotation technique. The fecal pellet was carefully mixed with 10 ml of Sheather's solution (1.27 g/ml specific gravity) before being resuspended. The combination was boosted to the top of the centrifuge tube and spun at 4000 rpm for 10 minutes. The centrifugal force increased the eggs' buoyancy in the viscous fluid, pushed them to the surface meniscus where they were concentrated, and improved parasite recovery as a result. The eggs and oocysts/cysts were visible when a few drops of the fluid from the topmost layer were examined (Dryden et al., 2005).

2.6 Statistical analysis

The Microsoft Office 2007 Program processed, compiled, and estimated the prevalence % from all of the data. The data were analyzed descriptively to determine their meaning.

3. Results and Discussion

3.1 Overall prevalence of GI parasitic infections

*3T*In this study, overall prevalence of gastrointestinal parasitic infections (single/mixed) in cattle was 45.49% (n=96/211) (Table 1, Fig 2) in this selected population and commonly identified parasites were four species of nematodes, namely, *Toxocara* spp. (19.90%), *Strongyloides* spp. (3.79%) and mixed *Haemonchus spp*. and *Bunostomum spp.* (8.06%) The snail-borne trematode, namely, *Paramphistomum spp*. (10.43%) and mixed *Paramphistomum spp*. and *Fasciola* sp. (1.42%) and one species of cestode, *Moniezia* spp. (1.89%). (Fig 3).

Table 1. Overall prevalence of GI parasitic infection in cattle

Types of Parasite	Name of Parasites	No. Infected (N=211)	Prevalence (%)
Nematode	*Toxocara spp.*	42	19.9
	Strongyloides spp.	8	3.79
	Mixed (*Haemonchus sp.* and *Bunostomum spp.*)	17	8.06
Trematode	*Paramphistomum spp.*	22	10.43
	Mixed *(Paramphistomum spp. and Fasciola spp.)*	3	1.42
Cestode	*Moniezia spp.*	4	1.89
Overall		96	45.49

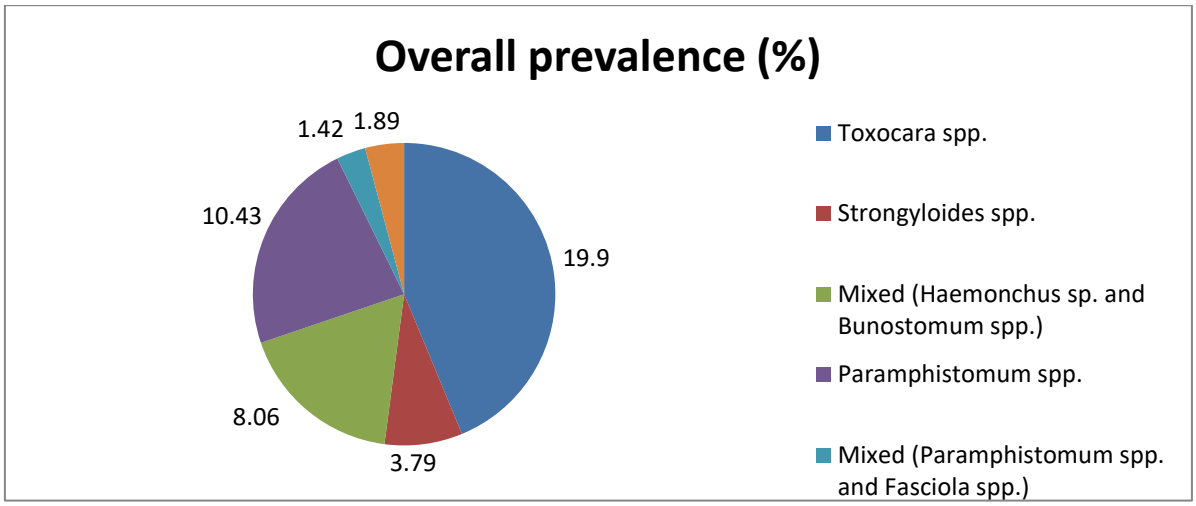
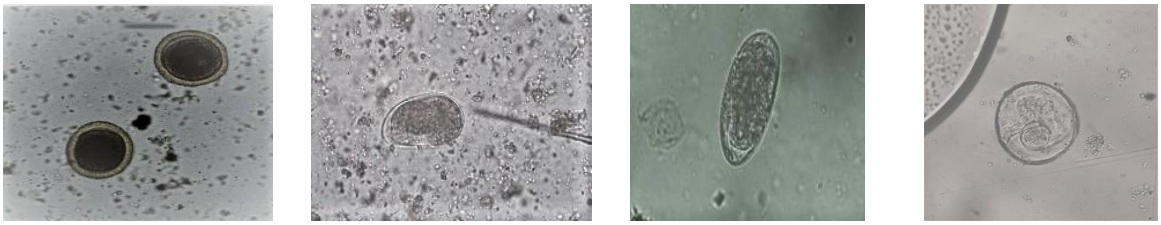
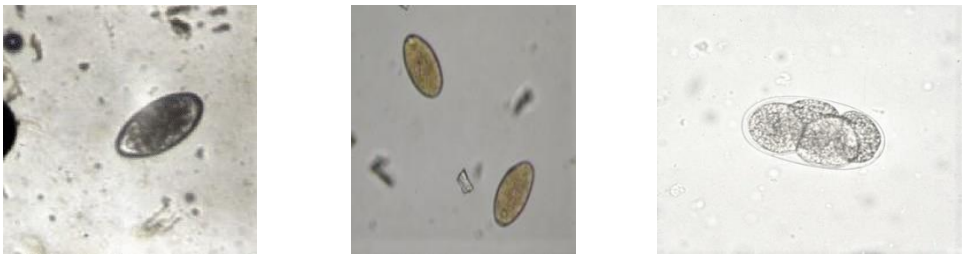


Fig 2: Overall prevalence of GI parasitism in cattle



A. Egg of *T. vitulorum* *B. Egg of Strongyloides* *C. Egg of Paramphistomun* *E. Egg of Moniezia sp.*



D. Egg of *Hemonchus sp.* E. Egg of *Fasciola sp.* F. Egg of *Bunostomum sp.*

Fig 3: Various eggs of Identified parasite

The overall prevalence of GI parasitism was comparable to the findings of Karim et al. (2019) and Islam et al. (2022), who showed that 45.3% and 45.54% of cattle in a designated area of Sirajganj and the coastline region were infected with different helminthes, respectively. However, the frequency of GI parasitism was lower than that reported by Paul et al. (2016) and Aktaruzzaman et al. (2013), who found that, in Sylhet and Sirajgonj, respectively, in Bangladesh, 72.65% and 76.9% of cattle were infected with different helminths. Similar findings were made by Bhattacharyya and Ahmed (2005) and Singh et al. (2008) about the incidence of gastrointestinal helminthes in cattle in India, which was 65.2% and 80.0%, respectively. The differences between the current findings and earlier findings could be attributed to the study areas' diverse geographies, climatic conditions, management practices, feeding practices, genetic variations in host resistance, as well as a gradual rise in farmer awareness of the importance of routine deworming in the study areas. Similar to this study, cattle were primarily infected with Toxocara species, and the prevalence of infection may be

linked to prenatal infection with the third larval stage and poor post-natal hygiene conditions (Miller et al., 2013). However, several researchers have found comparable parasite species to those described in this work in various locations with varying rates of infection (Ahmed et al., 2015; Islam et al., 2014; Fayer, 2010; Xiao, 2010). Most calves in Bangladesh's rural areas are raised using a scavenging or semi-scavenging approach, which involves letting them graze on the fields. This kind of behavior might encourage cattle parasite outbreaks.

3.2 GI parasite infection according to study location

In the research locations, the prevalence of various GI parasite illnesses ranged from 45.87 to 45.09%. The Pinjuri union had the lowest parasitic infection rate (45.09%) while being infected by many parasite species. Comparative investigation (Table 2, Fig. 4) showed that Pinjuri and Hiroi were more susceptible to gastrointestinal parasites than other regions. The small variance in the prevalence of GI parasite infections may be brought on by changes in the geoclimate or insufficient sample collection in certain study regions.

Table 2. GI parasitism in cattle in selected study areas

Name of the Parasites	Study area	
	Hiron (%) (N=109)	Pinjuri (%) N=(102)
Toxocara spp.	23 (21.1)	19 (18.63)
Strongyloides spp.	3 (2.75)	5 (4.9)
Mixed (*Haemonchus sp.* and *Bunostomum spp.*)	9 (8.26)	8 (7.84)
Paramphistomum spp.	12 (11.01)	10 (9.8)
Mixed *(Paramphistomum spp. and Fasciola spp.)*	2 (1.83)	1 (0.98)
Moniezia spp.	1 (0.92)	3 (2.94)
Total	50 (45.87)	46 (45.09)

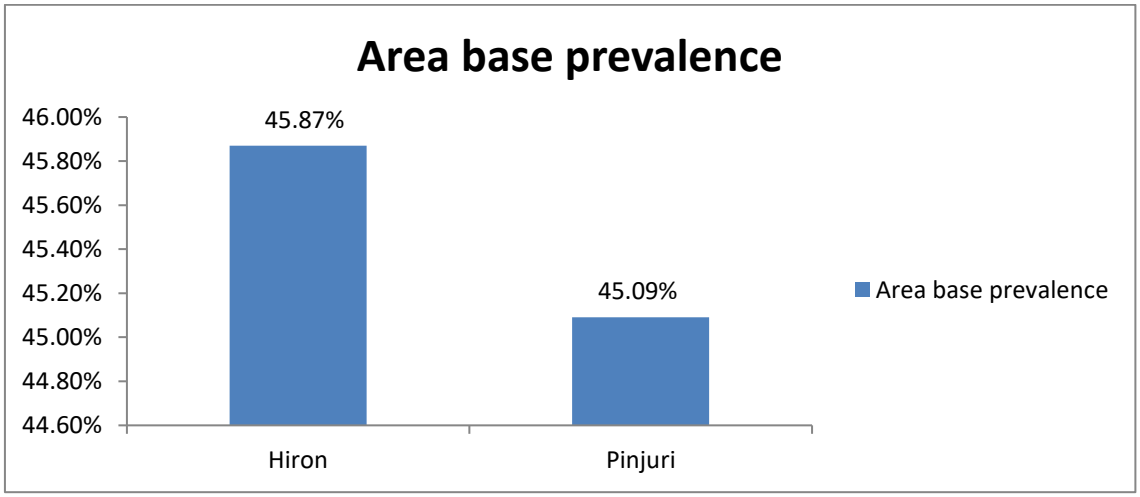


Fig 4: Area wise prevalence

3.3 Prevalence of GI parasitic infections in relation to age

Calves of various ages varied in their age-specific prevalence of gastrointestinal parasite infections, with calves under one year old (54.02%) and calves under two years old (35.55%) having the greatest and lowest infection rates, respectively (Table 3). The prevalence of *Toxocara* spp. infection and mixed infection of Haemonchus spp. & Bunostomum spp. were the highest in cattle of ≥1year (22.99%) and (9.19%) and the lowest in of <1 to> 2 years (17.72%) and (7.6%). The other infection by *Strongyloides* sp. was the highest in the cattle of <2 years (4.44%) and lowest in ≥ 1 year (3.45%). The prevalence of infection with the snail-borne trematode Paramphistomum spp. was observed to rise with decreasing age and to be lowest at

2 years (3.7%) and greatest at 1 year (16.09%). Cattle older than 2 years old have not been reported to have Fasciola sp. In cattle aged between one and two years, the cestode Moniezia spp. prevalence was highest (2.53%) (Table 3, Fig. 5).

Table 3. Prevalence of GI parasitic infections in relation to Age

Name of Parasite	Age category		
	≥1 year (%) N=87	< 1 to >2 year (%) N=79	< 2 years (%) N=45
Toxocara spp.	20 (22.99)	14 (17.72)	8 (17.78)
Strongyloides spp.	3 (3.45)	3 (3.8)	2 (4.44)
Mixed (*Haemonchus sp.* and *Bunostomum spp.*)	8 (9.19)	6 (7.6)	3 (6.67)
Paramphistomum spp.	14 (16.09)	6 (7.6)	2 (4.44)
Mixed *(Paramphistomum spp. and Fasciola spp.)*	2 (2.3)	1 (1.26)	0
Moniezia spp.	1 (1.15)	2 (2.53)	1 (2.22)
Total	48 (54.02)	32 (40.51)	16 (35.55)

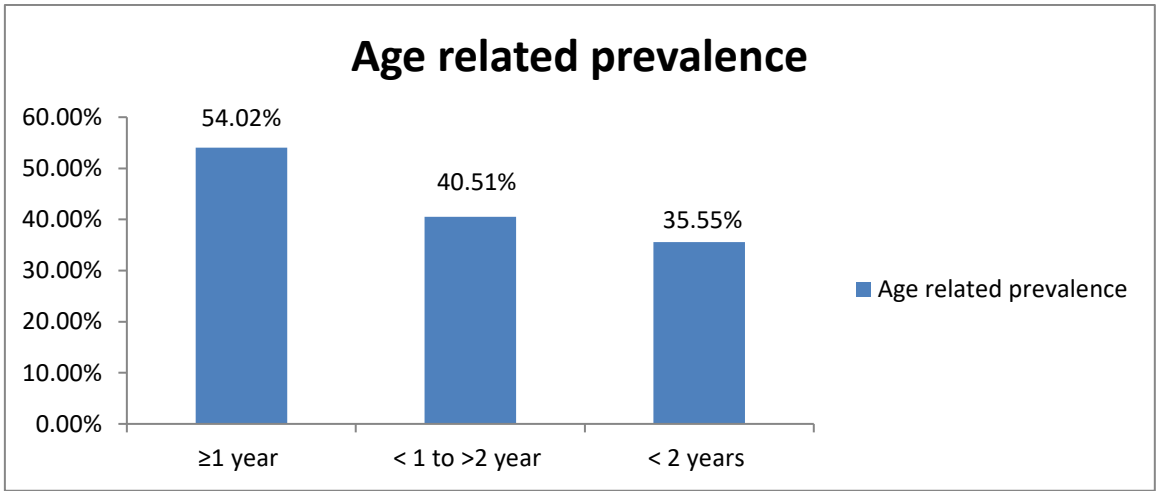


Fig 5: Age related prevalence of cattle

The study's findings were consistent with those of Karim et al. (2019) and Islam et al. (2022), who noted that the lowest infection rate (35.55%) and maximum infection rate (54.02%) were both found in children under the age of two. However, this finding differs from that of Raza et al. (2010) and Samad et al. (2004), who found that these parasites are most common in children. This high prevalence in young cattle may be caused by sudden exposure to grassland that contains a large number of parasite eggs, or it may be because the cattle lack the required immune defenses. Cattle older than 2 years old were not found to have Fasciola spp., while Moniezia spp. were shown to be less common in those cattle. This could be a result of how cattle feed and the length of time needed for these parasites to complete their life cycle. Rahman and Mondal (1983) discovered that older cattle had more Fasciola spp. infection than younger animals did.

3.4 Prevalence of GI parasitic infections in relation to Sex

In this study, male cattle (43.47%) had a greater prevalence of GI parasite infection than female cattle (47.05%) (Table 4, Fig 6). Strongyloides spp. (3.26%), Moniezia spp. (2.17%), mixed Paramphistomum spp. and Fasciola spp. (1.09%), mixed Haemonchus sp. and Bunostomum spp. (8.69%), and Toxocara spp. (18.48%) were the parasites with the highest prevalence in males. Toxocara species had the highest prevalence in female cattle (21.01%), while moniezia species (0.8%), mixed Paramphistomum species (1.68%), and Fasciola species (1.68%) had the lowest prevalences (Table 4). The results of this study were consistent with those of Raza et al.

(2007, 2010), who also noted that female cattle had a greater worm burden than male cattle. It has also been noted that female animals had a higher rate of parasite infection than male animals (Das et al., 2010; Islam and Taimur, 2008). On the other hand, some additional research in Bangladesh, Pakistan, and Ethiopia (Islam et al. 2022; Karim et al. 2019; Paul et al. 2016; Hailu et al. 2011; Ibrahim et al. 2008) revealed a higher incidence in male animals than in females.Siddiki et al. (2010), however, noted that Red Chittagong males and females both exhibit Animals of both cattle breeds and crossbreeds were prone to parasite infestations. The difference in the frequency of these helminth infections between male and female animals may be related to sample size variation (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 the host, and inadequate feed supply compared to their higher needs (Raza et al., 2010 and Hansen and Perry, 1993).

Table 4. Prevalence of GI parasitic infections in relation to Sex

Name of Parasite	Age category	
	Male (%) N=92	Female (%) N=119
Toxocara spp.	17 (18.48)	25 (21.01)
Strongyloides spp.	3 (3.26)	5 (4.2)
Mixed (*Haemonchus sp.* and *Bunostomum spp.*)	8 (8.69)	9 (7.56)
Paramphistomum spp.	9 (9.78)	13 (10.92)
Mixed *(Paramphistomum spp. and Fasciola spp.)*	1 (1.09)	2 (1.68)
Moniezia spp.	2 (2.17)	2 (1.68)
Total	40 (43.47)	56 (47.05)

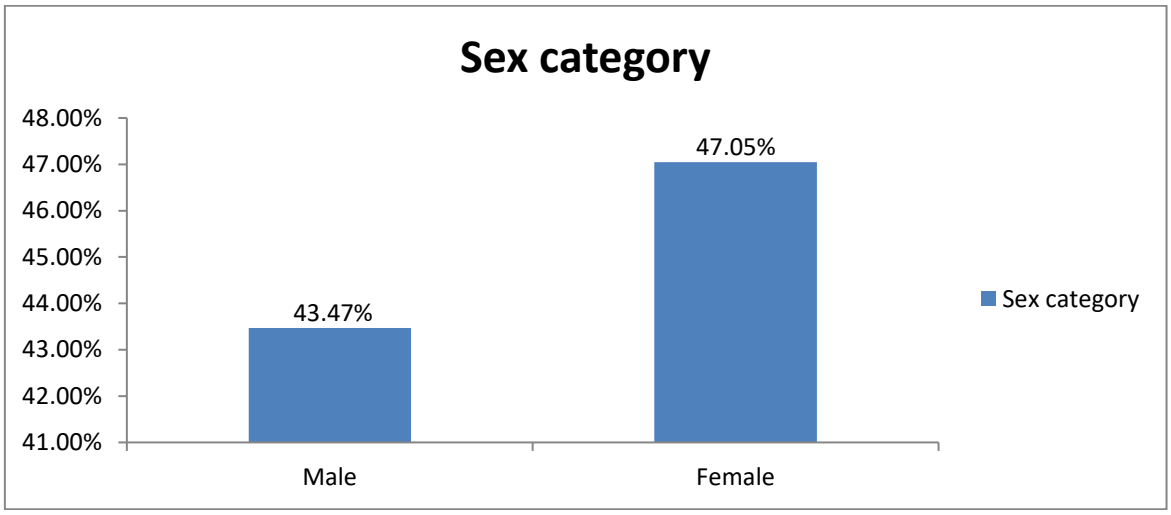


Fig 6: Sex wise prevalence of cattle

3.5 Prevalence of GI parasitic infections in relation to Breed

In this finding, cross-breed cattle (50.36%) had a higher frequency of parasite infection than indigenous cattle (36.48%). However, the difference (Table 5, Fig. 7) was slightly larger. Toxocara spp. had the highest incidence of GI parasite infection in both breeds (22.63%, 14.86%), and Moniezia sp. had the lowest prevalence (1.35%, 2.19%). Similar findings had been reported by Islam et al. (2022), Gadre (2007), and Karim et al. (2019), who found that cross-bred cattle had relatively higher GI parasite infection rates than local dairy animals. The earlier reports by Roy et al. (2010), Karim et al. (2019), and Islam et al. (2022) are almost identical to this study's report. Crossbred animals are typically adapted in regions with moderate temperatures and few opportunities for parasite exposure. The ecology and

reproduction of parasites are intimately tied to an ideal environment, which is not typically present in these nations. Bangladesh, meanwhile, is a tropical nation with a hot, humid climate that is ideal for parasite reproduction. Due to this, crossbred animals in Bangladesh are more likely to contract parasites, and various risk factors, such as handling the animals in an area with a high parasite burden, make the situation even worse.

Table 5. Prevalence of GI parasitic infections in relation to Breed

Name of Parasite	Breed category	
	Indigenous (%) N=74	Crossbred (%) N=137
Toxocara spp.	11 (14.86)	31 (22.63)
Strongyloides spp.	2 (2.7)	6 (4.38)
Mixed (*Haemonchus sp.* and *Bunostomum spp.*)	5 (6.76)	12 (8.75)
Paramphistomum spp.	7 (9.46)	15 (10.95)
Mixed *(Paramphistomum spp. and Fasciola spp.)*	1 (1.35)	2 (1.46)
Moniezia spp.	1 (1.35)	3 (2.19)
Total	27 (36.48)	69 (50.36)

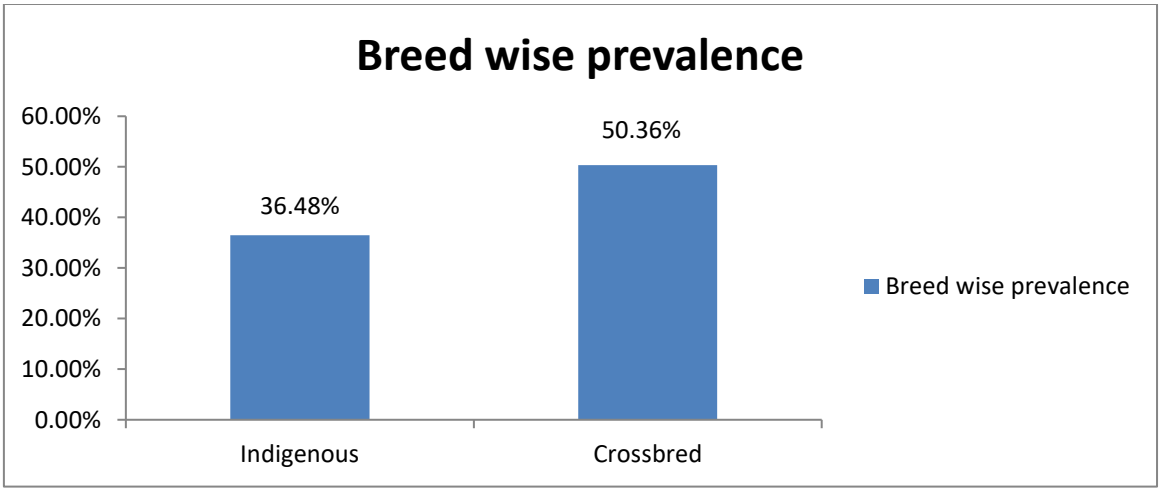


Fig 7: Breed wise prevalence of cattle

3.6 Prevalence of GI parasitic infections in relation to Health status

Health status of cattle played a great role in the occurrence of GI parasitic infection in cattle. In the present study, poor health conditioned animal show higher infection (47.05%) in comparison to normal health conditioned (29.22%) (Table 6 & Fig 8). The prevalence of GI parasitism in poor health animal indicates highest infection in *Toxocara spp*. (40.35%) followed by *Paramohistomum spp*. (21.05%), Mixed (*Haemonchus sp*. and *Bunostomum spp*.) (14.03%), *Strongyloides spp. (7.02%) Moniezia spp* (3.51%). This finding is in agreement with findings from Islam et al. (2022), Karim et al. (2019), Mustafa et al. (2022), Ilyas et al. (2016), and Alim et al. (2012). Animals that are malnourished have weakened immune systems, making them more vulnerable to infection. According to Biswas et al. (2014), starvation in animals may make them more vulnerable to contracting a parasite.

Table 6. Prevalence of GI parasitic infections in relation to Health status

Name of Parasite	Health status	
	Normal (%) N=154	Poor (%) N=57
Toxocara spp.	19 (12.34)	23 (40.35)
Strongyloides spp.	4 (2.5)	4 (7.02)
Mixed (*Haemonchus sp.* and *Bunostomum spp.*)	9 (5.84)	8 (14.03)
Paramphistomum spp.	10 (6.5)	12 (21.05)
Mixed *(Paramphistomum spp. and Fasciola spp.)*	1 (0.65)	2 (3.51)
Moniezia spp.	2 (1.3)	2 (3.51)
Total	45 (29.22)	51 (47.05)

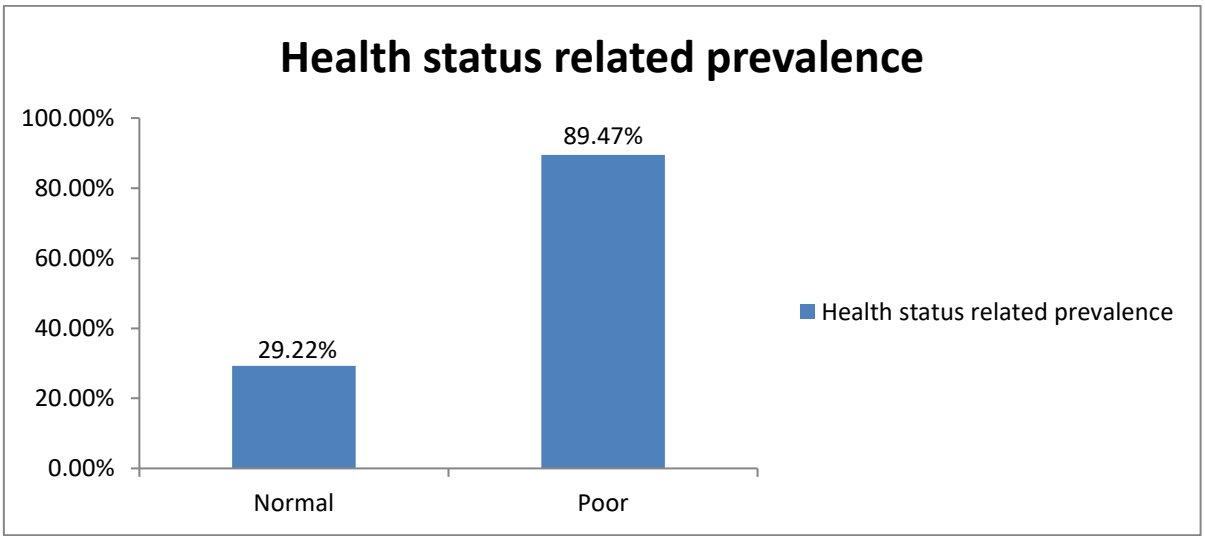


Fig 8: Health related prevalence of cattle

4. Conclusion:

In Bangladesh, GI parasitism is a widespread issue. The study was conducted in two unions (Hiron & Pinjuri) of the Kotalipara upazila of the Gopalganj district to ascertain the prevalence of gastrointestinal parasite illnesses in cattle taking into account age, sex, breed, and nutritional status. There is no distinct data of GI parasitism in the selected area before this study. The common people are not much conscious about parasitic effect to animal body. It will provide a generalized picture of how common gastrointestinal parasite infections are throughout the research area. Additionally, it will offer some epidemiological insights on the incidence of these illnesses in cattle. The research data will be well introduced to the Beneficiaries through livestock training of BAPARD. Further research may be used to estimate the annual economic losses in Bangladesh resulting from subpar productivity and production loss. However, this analysis will assist the two unions' beneficiaries in taking the proper preventive and control measures.

Acknowledgements

The Bangabandhu Academy for Poverty Alleviation and Rural Development (BAPARD), Ministry of LGRD and Co-operatives, Gopalganj, Bangladesh, is thanked by the author for supporting the study.

Conflict of interest

None to declare.

Data availability

The article contains the information that was utilized to support the study's conclusions.

References

Ahmed, R., P. K. Biswas, M. Barua, M. A. Alim, K. Islam and M. Z. Islam. (2015). Prevalence of gastrointestinal parasitism of cattle in Banskhali upazilla, Chittagong, Bangladesh. *J. Adv. Vet. Anim. Res.,* 2(4), 484-488.

Aktaruzzaman, M., S. A. Rony, M. A. Islam, M. G. Yasin and A. K. M. A. Rahman. (2013). Concurrent infection and seasonal distribution of gastrointestinal parasites in cross-bred cattle of Sirajganj district in Bangladesh. *Vet. World.,* 6(10), 720-724.

Alim, M. A., S. Das, K. Roy, S. Sikder, Mohiuddin, M. Masuduzzaman and M. A. Hossain. (2012). Prevalence of gastrointestinal parasites in cattle of Chittagong division, Bangladesh. *Wayamba J. Animal Sci.,* 4, 1-8.

Bachal, B., Phullan, M.S., Rind, R., Soomro, A.H. (2002). Prevalence of Gastrointestinal Helminths in Buffalo Calves. Journal of Biological Sciences, 2(1),43-45.

Bary, M.A., Ali, M.Z., Chowdhury, S., Mannan, A., Azam, M.N.E., Moula, M.M., Bhuiyan Z.A., Shaon, M.T.W., Hossain, M.A. (2018). Prevalence and Molecular Identification of Haemoprotozoan Diseases of Cattle in Bangladesh. Advances in Animal and Veterinary Sciences. 6(4): 176-182.

Bhattacharyya, D. K. and K. Ahmed. 2005. Prevalence of helminthic infection in cattle and buffaloes. *Indian Vet. J.,* 82, 900-901.

Biswas, H., A. R. Dey, N. Begum and P. M. Das. (2014). Epidemiological aspects of gastrointestinal parasites in buffaloes in Bhola, Bangladesh. *Indian J Anim Sci.,* 84, 245–250.

Chavhan, P. B., L. A. Khan, P. A. Raut, D. K. Maske, S. Rahman, K. S. Podchalwar, and M. F. Siddiqui. (2008). Prevalence of nematode parasites of ruminants at Nagpur. *Vet. World.,* 1, 140.

Das, S., A. K. F. H. Bhuiyan, N. Begum, M. A. Habib and T. Arefin. (2010). Fertility and parasitic infestation of Red Chittagong cattle. *Bangladesh Vet.,* 27(2), 74-81.

Dryden, M. W., P. A. Payne, R. Ridley and V. Smith. (2015). Comparison of common fecal flotation techniques for the recovery of parasite eggs and oocysts.*Vet. Therapeut.,* 6 (1), 15-28.

Fayer, R., M. Santin and D. Macarisin. (2010). *Cryptosporidium ubiquitum* n. sp. in animals and humans. *Vet. Parasitol.,* 172, 23-32.

Gadre, S.K. and H. Harada. (2007). Surface water pollution in three urban territories of Nepal, India, and Bangladesh. *Environ. Manage.,* 28, 483-496.

Garcia, J.A., Rodriguez-Diego, J.G., Torres- Hernandez, G., Mahieu, M., Garcia, E.G. andGonzalez-Garduno, R. (2007). The epizootiology of ovine gastrointestinal strongyles inprovince of Matanzas. Small Rumin Res, 72, 119-126.

Gunathilaka, N., D.Niroshana, D. Amarasinghe and L. Udayanga. (2018). Prevalence of gastrointestinal parasitic infections and assessment of deworming program among cattle and buffaloes in gampaha district, Sri Lanka. *BioMed Res. Int., available:* https://doi.org/10.1155/2018/3048373.

Gupta S. P. and M. P. Gupta. (2007). Measures of Variations. Business Statistics .New edition, New Delhi,125-171 pp.

Hailu, D., A. Cherenet, Y. Moti and T. Tadele. (2011). Gastrointestinal helminth infections in small-scale dairy cattle farms of jimma town, Ethiopia. *Ethiop. J. Sci. Technol.,* 2(1), 31-37.

Hansen, J. and Perry, B. (1993).The Epidemiology, Diagnosis and Control of Helminth Parasites of Ruminants. 2nd Dd. Nairobi, Kenya ILRAD, 20-22.

Hendawy, S. H. M. (2018). Immunity to gastrointestinal nematodes in ruminants: effector cell mechanisms and cytokines. *J. Parasit. Dis*., 42, 471-482.

Hossain, M. J., M. Amin, M. Mostofa, M. Sharif and S. M. A. Khalid. (2004). Efficacy of levanid against natural gastrointestinal nematodiasis and paramphistomiasis in sheep. *Bangladesh Vet. J.,* 21 (2), 70-73.

Ibrahim, M. M., M. A. A. Ghamdi and M. S. A. Gahmdi. (2008). Helminths Community of Veterinary Importance of Livestock in Relation to Some Ecological and Biological Factors. *Turkiye Parazitol Derg.,* 32, 42-47.

Ilyas, N., M. M. Hossain, M. J. U. Bhuyan and M. M. H. Khan. (2016). Prevalence of Gastrointestinal Nematodes Infection of Cattle in Bangladesh. *American J. Phyto. Clin. Therap.,* 4(3), 091-097.

Islam M.R, Mustafa M.M.H., Rahman M.M. and Alim M.A. (2022). Study on the parasitic infestations in calves at BAPARD surroundings coastal south region in Bangladesh. *International Journal of Scientific Engineering and Applied Science (IJSEAS), 8 (5),264-273.*

Islam, K. B. M. S. and M. J. F. A. Taimur. (2008). Helminthic and protozoan internal parasitic infections in free ranging small ruminants of Bangladesh. *Slov. Vet. Res.,* 45, 67-72.

Islam, M. R., M. G. Yasin, M. A. Al Noman, N. Begum, M. M. H. Mondal. (2014). Prevalence of gastrointestinal parasites in cattle at Vangura upazila in Pabna district of Bangladesh. *Int. J. Nat. Soc. Sci.,* 1, 45-52.

Jabber, M. and Green, D.A.G. (1983). The status and potential of livestock within the context of agricultural development policy in Bangladesh. The University of wales. Aberystwyth, United Kingdom, 113.

Kakar, M.N., Kakarsulemankhel, J.K. (2008). Prevalence of endo (trematodes) and ectoparasites in cows and buffaloes of Quetta, Pakistan. Pakistan Veterinary Journal, 28(1), 34-36.

Karim M. R., Sumon S. M. M. R., Soad S. H.,. Siddiki S. H. M. F, Dey A. R.and Ehsan M. A. (2019). Prevalence and Factors Affecting the Parasitic Infections in Calves at Selected Areas of Bangladesh. *Ann. Bangladesh Agric.,* 23(2), 1-13.

Kothari C. R. (2007). Processing and Analysis of Data. Research Methodology , 2*P*nd edition, 122-152 pp.

Miller, R. S., M. L. Farnsworth and J. L. Malmberg. (2013). Diseases at the livestock-wildlife interface: status, challenges, and opportunities in the United States. *Prev. Vet. Med.,*110, 119-132.

Mustafa M. M. H., M. R. Islam, M. M. Rahman. (2022). Epidemiological Investigation of Gastrointestinal (GI) Parasite at BAPARD Cattle Farm, Gopalganj in Bangladesh. *International Journal of Rural Development, Environment and Health Research (IJREH)*, 6 (2), 8-16.

Paul, A., P. C. Baishnab, H. Kobir, S. Akhter, T. J. Chowdhury, B. Jha and M. M. Rahman. (2016). Status of internal parasitism of cattle at Sylhet Government Dairy Farm, Bangladesh. *Int J Nat Sci.,* 6(2), 54-34.

Pfukenyi DM, Mukaratirwa (2013). A review of the epidemiology and control of gastrointestinal nematode infections in cattle in Zimbabwe. Onderstepoort Journal of Veterinary Research 80, 12.

Pinilla León, J. C., N. U. Delgado and A. A. Florez. (2019). Prevalence of gastrointestinal parasites in cattle and sheep in three municipalities in the Colombian Northeastern Mountain. *Vet. World.,* 12(1), 48-54.

Pinilla, J. C., P. Florez, M. T. Sierra, E. Morales, R. Sierra, M. C. Vasquez and D. Ortiz. (2018). Point prevalence of gastrointestinal parasites in double purpose cattle of Rio de Oro and Aguachica municipalities, Cesar state, Colombia. *Vet Parasitol Reg Stud Reports,* 12, 26-30.

Radostits, O., Blood, D.C., Gay, C.C. (1994). Veterinary Medicine: A text book of disease of cattle, sheep, pigs, goats and horse. 8th ed. Baillere Tindall Publication, London, 1223- 1225, 1237-1238.

Rahman M. M., S. Akther, M. M. Hossain. (1998). Socio Economic Aspects of the farmers for livestock keeping in Mymensingh town adjacent areas. *Progressive Agriculture*, 8, 153-157.

Rahman, M. H. and M. M. H. Mondol. (1983). Helminth parasites of cattle (*Bosindicus*) in Bangladesh. *Indian J. Parasitol.,* 7(2), 173-174.

Raza, A. M., Iqbal, Z., Jabbar, A. and Yaseen, M. (2007). Point prevalence of gastrointestinal helminthiasis in ruminants in southern Punjab, Pakistan. Cambridge University Press, J Helminthol 81, 323-328.

Raza, A. M., S. Murtaza, H. A. Bachaya, A. Qayyum and M. A. Zaman. (2010). Point prevalence of *Toxocara vitulorum* in Large Ruminants Slaughtered at Multan Abattoir. *Pak Vet J.,* 30, 242-244.

Raza, A.M., Murtaza, S., Bachaya, H.A., Qayyum, A., Zaman, M.A. (2010). Point Prevalence of Toxocaravitulorum in Large Ruminants Slaughtered at Multan Abattoir. Pakistan Veterinary Journal, 30(4), 242- 244.

Regassa, F., Sori, T., Dhuguma, R., Kiros, Y., (2006). Epidemiology of Gastrointestinal Parasites of Ruminants in Western Oromia, Ethiopia. International Journal of Applied Research in Veterinary Medicine, 4(1), 51-57.

Rinaldi, M., Dreesen, L., Hoorens, L., Li, P.R., Claerebout, R.W., Goddeeris, E., Vercruvsse,B. J., Van, Den Broek, Geldhof, P. (2011). Infection with gastrointestinal nematode Ostertagia ostertagi in cattle affects mucus biosysthesis in the abomasums. Veterinary Research, 42, 61.

Roy, M. M. Alam, A. K. M. A. Rahman, M. Shahiduzzaman, M. S. Parvez and E. H. Chowdhury. (2010). Prevalence of cryptosporidiosis in crossbred calves in two selected areas of Bangladesh. *Bangladesh J. Vet. Med.,*12, 185-190.

Samad, M. A., K. M. M. Hossain, M. A. Islam and S. Saha. (2004). Concurrent infection of gastro-intestinal parasites and bacteria associated with diarrhea in calves. *Bang. J. Vet. Med.,* 2(1), 49-54.

Sardar, S.A., Ehsan, M.A., Anower, A.K.M.M., Rahman, M.M., Islam, M.A. (2006). Incidence of liver flukes and gastro-intestinal parasites in cattle. Bangladesh Journal of Veterinary Medicine, 4 (1), 39-42.

Siddiki AZ, Uddin MB, Hasan MB, Hossain MF, Rahman MM, Das BC, Sarker MS, Hossain MA (2009). Coproscopic and haematological approaches to determine the prevalence of helminthiasis andprotozoan diseases of Red Chittagong cattle (RCC) breed in Bangladesh. *Pakistan Veterinary Journal,* 30, 1-6.

Siddiki, A. Z., M.B. Uddin, M. B. Hasan, M. F. Hossain, M. M. Rahman, B. C. Das, M. S. Sarkerand M. A. Hossain. (2010). Coproscopic and haematological approaches to determine the prevalence of helminthiasis and protozoan diseases of Red Chittagong Cattle (RCC) breed in Bangladesh. *Pak. Vet. J.,* 30(1), 1-6.

Silvestre, A., Chartier, C., Sauve, C., Cabaret, J. (2000). Relationship between helminth species diversity, intensity of infection and breeding management in dairy goats. Veterinary Parasitology, 94, 91-105.

Singh A., Gangwar A. K., Shinde N. K., Srivastava S. (2008). Gastrointestinal parasitism in bovines of Faizabad. *J. Vet. Parasitol.,* 22 (1), 31-33.

Taylor, M. A., R. L. Coop, and R. L. Wall. (2016). Veterinary Parasitology: 4th ed. Blackwell publishing, Oxford.

Xiao, L. (2010). Molecular epidemiology of cryptosporidiosis: an update. *Exp Parasitol.,* 124(1), 80-89.

Cite this article:

Md. Rafiul Islam (2023). Epidemiological investigation and Factors affecting the Gastrointestinal parasitism in Cattle at selected areas of kotalipara upazila, Gopalganj. *International Journal of Science and Business, 26*(1), 22-34. doi: https://doi.org/10.58970/IJSB.2153

Retrieved from http://ijsab.com/wp-content/uploads/2153.pdf

Published by

IJSAB International