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Research Article

PREVALENCE OF GASTROINTESTINAL PARASITE INFECTIONS OF CATTLE IN NORTHEAST INDIA BORDERING TO MYANMAR AND BANGLADESH

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Abstract- The aim of the present study is to determine the prevalence of bovine gastrointestinal parasitic infections in three states of northeast India bordering Myanmar and Bangladesh. Cattle faecal samples (n=220) were collected from three states of northeast India, *viz*. Champhai district of Mizoram international bordering to Myanmar, East Khasi Hills district of Meghalaya and Dhalai district of Tripura bordering to Bangladesh. Faecal samples were examined by centrifugal floatation and sedimentation method. Descriptive statistical analysis was carried out to determine the prevalence of gastrointestinal parasites. The prevalence of gastrointestinal helminths and protozoa varies in different states of the present study. Samples collected from Tripura and Meghalaya showed that all the adult animals were infected with amphistomes p.; since, the areas are favourable for propagation of snail intermediate host; considerable number (45.4 % in Meghalaya and 17 % in Tripura) were also infected with *Fasciola* sp. Samples collected from Champhai district, Myanmar bordering area of Mizoram, being hilly with no water logging, the occurrence of trematode infection was not found in the present study but the animals were found to be infected with strongyle sp. parasites (52.9 % and 56.7 % in young and adult animals, respectively).

Keywords- Gastrointestinal Parasite, Cattle, Prevalence, Northeast India

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Introduction

Bovine gastro-intestinal helminth infection causes significant economic losses throughout the world especially in developing countries where the animal owners are very often belongs tomarginal income group. The economic losses are mainly due to reduction in milk production, lowering feed conversion ratio along with condemnation of liver and other affected organs at slaughter house [1-5]. To date, the choice for combating most of livestock parasitic infection is chemotherapy as an attempt for vaccination against livestock parasitic infections is having many pitfalls [6]. Excessive use of anthelmintic drugs leads to development of anthelmintic resistance which is being reported from many parts of the world and also there is a fear over anthelmintic residues in the milk and meat of livestock animal [7-11]. For an effective and timely treatment, with minimising use of anthelmintic drugs, against parasitic infection so as not to cause pressure for development of anthelmintic resistance by the parasites, the epidemiological knowledge of parasites present in a particular area is prerequisite.

The epidemiology of bovine gastro-intestinal parasitic infection is being studied across India [12-18]. There arefew reports about the prevalence of cattle parasitic infection from Mizoram where gastro-intestinal parasites like coccidia, ascarid, strongyle, *Setaria* and amphistomes were documented [13,19]. The prevalence of gastrointestinal parasite like *Nematodirus helvetianus*, *Strongyloides* sp., *Eimeria* sp., *Trichuris* sp. and *Moniezia* sp. were reported from organised cattle farm of Shillong, Meghalaya [15]. Therefore, there is a need to study the prevalence of parasites in northeast region of India, to exactly know the parasites present currently in these high rainfall areas with moderately warm climatic regions. The present communication describe the occurrence of parasitic infection of cattle from an area of Mizoram bordering to Myanmar, Bangladesh bordering areas of Tripura and Meghalaya so as to document the present situation of parasitic infection in cattle.

Materials and Methods

Study area:

The cattle faecal samples were collected from East Khasi Hills district, Dhalai district and Champhai district of Meghalaya, Tripura and Mizoram respectively. The East Khasi Hills (25.3682°N & 91.7539°E) has the different climatic conditions ranges from temperate climate in the plate auto warm tropical and sub-tropical climate on the southern and northern parts of the district where the southern portion of Shella region bordering Bangladesh is low-lying area. Dhalai district of Tripura (23.8467°N & 91.9099°E) has tropical climate with hot and humid summers, prolonged rainy season with temperature in summer ranges from 28°C to 36°C and in winter 5.3 °C to 17 °C. Located in the north-eastern part of Tripura, the terrain of the region is intervening hilly area with small water streams, rivers and valleys with an average rainfall of 285.5 cm. Another study area in the present communication is Champhai district of Mizoram, located on the eastern side of Mizoram (23.4454°N & 93.1780°E) has a moderate climate with the temperature in varies from 10°C to 30°C throughout the year with an average rainfall 254 centimetres per annum. The topography of the district is mostly hills with minor plain areas in between the hills [Fig-1].

Faecal sample collection and examination:

Freshly voided cattle faecal samples were collected in plastic zip lock bag in the month of May to July 2016, irrespective of sex and in each of the bag 10 % formalin was added to prevent embryonation of the parasitic eggs. The samples were then transported to Department of Parasitology, College of Veterinary Sciences & A.H., Aizawl, Mizoram. The faecal samples were processed for salt flotation and sedimentation following standard protocol. The processed faecal

samples were examined under microscope for the presence parasitic eggs and protozoan cyst/oocysts based on their morphological features [20].

Statistical Analysis:

Data obtained in the study was tabulated and percent infections out of the total samples collected were calculated to draw the interferences. Chi square ($\chi 2$) test was used to see differences in parasitic infections based on the age of cattle. The difference was considered as statistically significant if $P < 0.05$.

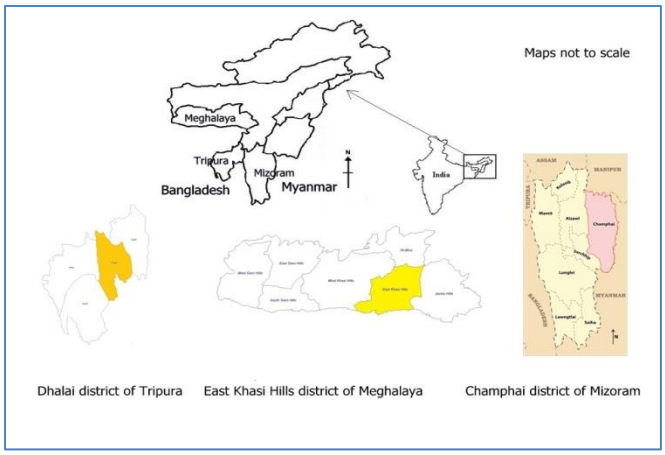

Fig-1 Study area in northeast India

Results and Discussions

Cattle faecal samples (n=220) were collected from northeast India having an international boundaries such as Meghalaya and Tripura bordering areas of Bangladesh and Mizoram bordering area of Myanmar. The samples (n=60) collected from the Shella area of East Khasi Hills, Meghalaya have high parasitic load with all the adult cattle samples examined from this area showed infections with amphistomes p. The other helminths recorded were *Fasciola, Euretrema pancreaticum*, *Trichuris*, strongyle sp. and protozoan parasites like coccidia and *Giardia* sp. [Table-1]. There were significant differences in the prevalence of amphistome sp., *Fasciola* sp. (45 %) and *Toxocara vitulorum* (33 %) infection between the two age groups ($p<0.05$). The prevalence of strongyle sp. in the previous study in organised cattle farm of Mehgalaya was recorded to be 65.96 %, but no report of trematode infection by which the authors concluded that samples were collected from stall fed cattle farms in their study could be the reason [15]. In another study when parasites were sampled at slaughter from goat of Shillong, Meghalaya, the maximum incidence of infection was found to be *Haemonchus contortus* with a percentage of 76.80 % and amphistome sp. of 16.8% [21]. Roy and Tandon (1992) [22] showed seasonal variations in the prevalence of trematode parasites, *F. gigantica* and *E. pancreaticum* in cattle of subtropical north-east hilly region in India where *F. gigantica* and *E. pancreaticum* occurred throughout the year with peaks during cold winter months. In the present study faecal samples of cattle (n=59) collected from Bangladesh bordering area of Tripura showed similar results with samples from Meghalaya and revealed amphistome sp. along with other GI parasites like *Toxocara*, *Eurytrema pancreaticum*, *Trichuris, Fasciola,* strongyle sp. and *Balantidium coli*, coccidia sp. [Table-2]. There were also significant differences in the prevalence of amphistome sp., *Fasciola* sp. and *Toxocara* sp. infections between the two age groups ($p<0.05$). The prevalence of *Fasciola* sp. (Tripura, 17% and Meghalaya, 45.4 %) in the present study is in conformity with the study conducted in Bangladesh where the incidence of *Fasciola* sp. in native cattle (25 %) and crossbred cattle (30.56 %) was recorded [23]. In a study from Bangladesh faecal samples of cattle were examined for the presence of gastrointestinal parasites where the examination revealed presence of *Toxocara* sp., *Strongyloides* sp., gastrointestinal strongyles, *Moniezia* sp., amphistomes, *Dictyocaulus* sp., *Trichuris* sp., *Schistosoma* sp., *Fasciola* sp. and protozoal infections namely, *Balantidium coli* and *Eimeria* sp. where age of cattle has significant effect on the prevalence of parasite ($p<0.05$), whereas the sex of the cattle had no significant effect [24-25].

Table-1 *Age wise prevalence of GI parasitic infection in Meghalaya (n=60)*

Age Group	Strongyle	*Balanti-dium coli*	Coccidia	*Trichu-ris*	*Eury-trema*	*Toxo-cara*	Amphis-tomes	*Fasciola*	*Giardia*
<1 year (n=27)	15 (55.5%)	27 (100%)	12 (44.4%)	-	-	9 (33.3%)	-	-	6 (22.2%)
Adult (n=33)	19 (57.6 %)	33 (100)	15 (45.4%)	3 (9.09 %)	9 (27 %)	-	33 (100)	15 (45.4 %)	13 (39.3%)
$\chi 2$	0.024	0	0.01	2.58	8.66*	12.94*	60*	16.36*	2.02

*significant at 5% level of significance

Table-2 *Age wise prevalence of GI parasitic infection in Tripura (n=59)*

Age Group	Strongyle	*Balanti-dium coli*	Coccidia	*Trichu-ris*	*Eury-trema*	*Toxocara*	Amphis-tomes	*Fasciola*
<1 year (n=24)	18 (78%)	22 (91.6 %)	15 (62.5 %)	-	-	6 (25 %)	-	-
Adult (n=35)	21 (60 %)	35 (100 %)	24 (68.6 %)	5 (14.3 %)	3 (8.6)	-	35 (100 %)	6 (17 %)
$\chi 2$	1.43	3.02	0.23	3.75	2.17	9.74*	59*	4.58*

*significant at 5% level of significance

Out of 111 samples examined from Myanmar bordering area of Mizoram, the incidence of strongyle sp. was found to be 52.9 % and 60 % in young and adult cattle, respectively. Other helimths like *Taenia* and *Trichuris* sp. along with GI protozoa like coccidian sp., *Balantidium coli* were also recorded in the present study. There was no significant difference in the prevalence of strongyle sp. infection between young and adult animals ($p<0.05$). The incidence of trematodes, which requires snail intermediate host like Lymnaea, Indoplanorbis and Gyraulus species, was not recorded in the present study. But, the prevalence of strongyle sp. is accounting to be 56.7 % along with coccidian parasites with 51.3 % irrespective of age [Table-3]. Mizoram is having subtropical forest with heavy rainfall and moderately warm to cool climate in summer which are favourable for propagation of strongyle and coccidian parasites. In the earlier study, the prevalence of strongyle sp. infection from Mizoram was recorded up to 4.68 %. The faecal samples in that study were collected from cattle reared under intensive system with stall feeding in and around Aizawl city, Mizoram which may be one of the reasons of lower prevalence of strongyle sp. infection [13]. The prevalence of nematode parasite of livestock from Mizoramin a study revealed that cattle were infected with *Mecistocirrus digitatus, Bunostomum* sp. And *Setariacervi* whereas cattle sample from Tripura were also infected with *Oesophagostomum radiatum*, *Mecistocirrus digitatus, Bunostomum* sp. And *Setariacervi*[19]. In the present study, samples were collected from Champhai district of Mizoram where the animals were reared under semi-intensive system whereby the prevalence of strongyle sp. and other monoxenous parasites are recorded at higher rate. The prevalence of parasites in Mithun (*Bosfrontalis*) was also recorded to be 66.7 % where Mithun are also reared under semi-intensive system [26]. The prevalence of parasites in Myanmar is scanty, in one study where the prevalence of

Cryptosporidium sp.(57.3%), *Giardia* sp. (34.1%) and *Eimeria* sp. (52.3%) in calf was reported from Myanmar [27].

The present study highlights the prevalence of bovine GI parasites from three states of northeast India *viz*. Mizoram, Meghalaya and Tripura having international boundaries with Bangladesh and Myanmar. It was observed that prevalence of amphistomes and *Fasciola* sp. were restricted on certain parts East Khasi Hills district of Meghalaya and Dhalai district of Tripura. The prevalence of strongyle parasite infection in the hills of Mizoram is more than 50% of the animal examined without record of any trematode infection. Extensive epidemiological survey is necessary to draw a conclusion for the absence of *Fasciola* and amphistome sp. from this part of country. There are several factors needed to be considered for viable control of bovine gastrointestinal parasitic infections. Among these, proper managemental practice like sanitation and hygiene, regular deworming and control of snail intermediate host especially for trematode infection are necessary. Further study is required to determine the economic losses due to parasitic infection of cattle in these areas.

Table-3 *Age wise prevalence of GI parasitic infection in Mizoram (n=111)*

Age Group	Strongyle	*Balantidium coli*	Coccidia	*Trichuris*	*Eurytrema*	*Toxocara*	*Taenia*
<1 year (n=51)	27 (52.9%)	30 (58.8%)	24 (47%)	-	-	6 (11.7%)	-
Adult (n=60)	36 (60%)	45 (75%)	33 (55%)	3 (5%)	15 (25%)	-	3 (5%)
χ2	0.56	3.29	0.70	2.62	14.74*	7.46*	2.62

*significant at 5% level of significance

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Conflict of interest

The authors declare that there is no conflict of interest.

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