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☐ **Brief Communication** ☐

Examination of gastrointestinal helminth in livestock grazing in grassland of Bangladesh

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Abstract: To determine association of grassland with parasitic diseases of livestock in Bangladesh, the 'Tracer' animals (two cow calves and two goats) were released for a month in a grassland used for communal grazing of livestock near school premise in Kanthal, Trishal, Mymensingh, Bangladesh. After slaughtering of the tracer animals, their gastrointestinal tract examination revealed six species of nematode and one cestode. The nematode species were *Haemonchus contortus*, *Trichostrongylus axei*, *Mecistocirrus digitatus*, *Oesophagostomum* spp., *Trichuris* spp. and *Bunostomum* sp. The cestode was one of the genus *Moniezia*. With this preliminary study, grasslands are thought to be one of the main sources of gastrointestinal parasitic diseases of livestock in Bangladesh.
Key words: Grassland, trace, gastrointestinal parasite, Bangladesh, cow, goat

Definite grasslands for livestock grazing are scarce in Bangladesh. However, some fallow lands on the road sides, strips of sandy land rising out of the bed of a river or sea above the water level (called 'Char'), courtyards, uncultivated lands around public houses, institutions, mostly constitute the grasslands. A wide variety of indigenous species of grasses are grown spontaneously in these lands. Since parasitism has been considered as one of the major constraints of livestock production in Bangladesh (Jabbar and Green, 1983), it is most likely that communal grazing of cattle and goats with high stock density make the grasslands more conducive for the development and transmission of various gastrointestinal parasites. In the present paper, an attempt has been taken to describe the grassland associated gastrointestinal parasitic diseases of livestock in Bangladesh with a view to give an insight into the problem of gastrointestinal diseases in two different agro-ecological and agro-operational systems in Bangladesh and Korea

Grassland of about half an acre at a school premise in Kanthal, Trishal, Mymensingh, Bangladesh was selected for this study. The fallow grasslands (courtyards, uncultivated lands around public houses and institutions etc.) have never been utilized for crops and have used approximately one year for livestock grazing. The number of animals grazed per day was about 20. While grazing, the feces excreted by the animals were not removed. The grasses which were identified as durba (*Cynodon dactylon*), shama (*Echinochloa colonum*) and san (*Imperata cylindrica*). was average 5.3 inch length. Since the grassland had high altitude, it was not inundated and

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free from freshwater snails. Insecticides and herbicides have never been used in this type of fallow land.

Two calves of 8-month-old and two goats of 12-month-old were used as the 'tracers' which were released in the grassland in the rainy month of June, 1995 and allowed to graze for a month. They were examined for gastrointestinal nematode parasites following the methods of Hansen and Perry (1990). The tracer animals were treated twice at 14-day intervals with Thiophanate (Nemafax(R), Rhone Poulenc, Bangladesh Limited). The dosage was estimated according to the body weight of the animals as recommended by the manufacturer. The animals, which were housed for one month under stall feeding condition, were free of parasite eggs in fecal examination by means of centrifugal flotation method (Soulsby 1982). They were then allowed to graze for a month. At the end of this period, the tracer animals were again held in a house with no access to the grassland for a period of 21 days to allow the tissue invading third stage infective larvae to reach maturity, and then the animals were slaughtered.

Slaughtered tracer animals were processed for a total parasite count for the abomasum and the small and large intestines following standard techniques (Hansen and Perry, 1990). Briefly, the abomasum and the small and large intestines were ligated and removed from the carcasses. The organs were opened and the contents were emptied into a total content jar separately. Then washed thoroughly in the tray and the washings were also added to the total contents jar. The total volume of contents and washings in the jar were made up to four litres in case of calves and two litres in case of goats by adding water. This was mixed thoroughly using a large ladle. A total of 200 ml of the contents was taken in a wash jar, filled with water and lidded securely. The wash jar was shaken after inverting it with a view to shaking out most of the fluid in it. The process was repeated until all fecal coloring material was removed. For convenience, water was added to the jar up to 50 ml. Small volumes of the fluid were placed in the petri dishes and the nematodes found were counted. The total count made for the calves and goats were multiplied by 20 and 10 to reach the total worm burden, respectively. The differential counts and identification of each nematode species were performed according to the descriptions of Soulsby (1982) and Hansen and Perry (1990).

Gastrointestinal tract examination of the 'tracer' animal revealed six species of nematodes and one cestode in cow calves, The number of parasites in each cow calf were from 42 to 154 for *Haemonchus contortus*, from 18 to 33 for *Trichostrongylus axei*, from 15 to 34 for *Mecistocirrus digitatus*, from 22 to 47 for *Oesophagostomum* spp., from 23 to 32 for *Trichuris* spp, from 13-32 in *Bunostomum* sp. and from 3 to 16 for *Moniezia* spp (Table 1). The number of parasites in each goat were from 22 to 45 for *H. contortus*, from 10 to 27 for *T. axei*, from 24 to 160 for *Oesophagostomum* spp., from 16 to 35 for *Trichuris* spp, from 2 to 8 for *Bunostomum* sp. and from 12

Table 1. Grassland associated parasites encountered in the gastrointestinal tract of tracer animals (cow calves and goats)

Parasite species	Worm burdens[a]	
	Cow calves (n = 2)	Goats (n = 2)
Haemonchus contortus	42-154	22-45
Trichostrongylus axei	18-33	10-27
Mecistrocirrus digitatus	15-34	NF[b]
Oesophagostomum spp.	22-47	24-160
Bunostomum spp.	13-21	2-8
Trichuris spp.	23-32	16-35
Moniezia sp.	3-16	12-21

[a]Minimum-maximum worm burdens [b]None found

to 21 for *Moniezia* spp (Table 1).

Animal husbandry practices are still primitive in Bangladesh as compared to that of the developed countries. farms are not modernized and primitive. Animals are generally kept in captivity provided with dry hay and occasionally with cut grasses most part of the year. For an additional source of grasses, animals are allowed to graze in the grasslands, the most traditional practice seen thorough out the country. In noncropping seasons of the year, grazing animals in the dry/wet paddy fields and sides of irrigation canals are common. In rainy months, submerged cultivated and/or uncultivated lands have also been used for animal feeding. However, this was beyond the scope of this study. The main purpose of this study is to focus the spectrum of gastrointestinal parasitism particularly associated with grazing of ruminants in the uninundated and uncultivated grasslands which have been used around the year.

The agro-ecological conditions that favor development and transmission of the free-living infective stages of gastrointestinal helminthic parasites are inadequately studied although helminthiases have been well documented in each and every farm animal species in Bangladesh. The use of tracing animals in the present investigation has clearly demonstrated that the grasslands that have been used for communal grazing serve as one of the major source of pathogenic nematode and cestode parasites for livestock in the country. The present findings also reflect the fact that the prevalence of the parasites recorded in this study has not been affected over a couple of decades as the agricultural operations (e.g. introduction of high yielding cereals with intensive cropping pattern, the use of chemical fertilizers and insecticides/pesticides, etc) have been increasingly developed to achieve self sufficiency in the production of food. Further, an increased utilization of fallow lands for crop production and rapid urbanization have contributed to the ecology and development of these free-living infective stages of the gastrointestinal nematodes. This is thought to be due to the repeated grazing of the animals in a small but heavily contaminated land with dung and also high rainfall. In the rainy months (June to August), the grasses grew well reaching the highest length, while in the dry months (November to April) the grasses grew poorly in development and remained short in length. Whether the length of the grasses plays any role in the development and transmission of the free-living infective stages is yet to be determined. However, Durrie (1961) and Michel (1976) have given proper reasons that should be taken into account to tackle grassland associated parasitic diseases of livestock in Bangladesh. Agneessens et al (1997) also reported that the major pasture contamination are dependents on animal and grazing season. The major pathogenic helminth such as paramphistomes (*Paramphistomum cervi*, *Gigantocotyle explanatum*, *Ceylonocotyle scolicoelium*, *Cotylophoron cotylophorum*, *Gastrothylax crumenifer*, *Carmyerius spatiosus*, *Homalogaster paloniae* and *Gastrodiscoides hominis*), schistosomes (*Schistosoma nasale*, *S. spindale* and *S. indicum*), *Moniezia* spp., *Neoascaris vitulorum*, *Strongyloides papillosus*, *Haemonchus* spp., *Mecistocirrus digitatus*, *Trichostrongylus* spp., *Cooperia* spp., *Bunostomum* spp., *Gaigeria* sp., *Oesophagostomum* spp. and *Trichuris* spp. were previously recorded from the gastrointestinal tracts of cattle and goats in Bangladesh (Haq and Shaikh, 1968; Rahman and Mondal, 1983). the absence of trematode parasites in the gastrointestinal tracts of the animals indicate that the high grasslands might be incapable of transmitting trematode infections in livestock even grazing in the rainy months of the year. The relatively high mean fecal egg counts of cows and heifer at the time turnout might be different according to the maturation of hypobiotic worms. for example, the stronyles egg counts of calves began to rise soon after turnout onto pasture and reached peak levels at the end of grazing season (Ranjan et al 1992). The number of infective larvae on pasture was highest during September/October. *Ostertagia*, *Cooperia* and *Nematodirus* were the most prevalent genera found from pasture. The reason for absence of *M. digitatus* in goats in this study is not clear. This finding is also supported by Mollah et al.

(1996) who examined 250 abomasi of goats and recorded only *Haemonchus* and *Trichostrongylus* species. It may be explained that the native Black Bengal goats may not serve as the natural host for the nematode species. and also parasites have the unique predominated months for maturity (Couvillion et al 1996). Based on the present findings it appears that the problems associated with gastrointestinal helminthiases in livestock are quite dissimilar to that in the developed countries with different agro-ecological conditions and agricultural operations. For example in Korea, the prevalence of many parasitic diseases has been decreased due to the wide applications of pesticides and herbicides in the modern agricultural systems to promote cereals, fruits and animal production. This is supported by the fact that there had been a wide spectrum of helminth viz. *Fasciola gigantica*, *Oesophagostomum columbianum*, *Ostertagia ostertagi*, *Haemonchus* spp., *M. digitatus*, *Trichostrongylus* spp., *Nematodirrus* sp., *Cooperia* spp., *Bunostomum phlebotomum* and *Trichuris avis* about a decade ago (Kang et al., 1988). However, presently, these parasites have rarely been observed in Korean livestock due to the advancement in agriculture. To evaluate association of the grassland with parasitic diseases in specific districts, experimental tracers, definite host animals, should be considered coincidently with grazing seasons and parasitism.

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