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Prevalence of Gastrointestinal Helminth Infection in Garole Sheep of Sundarban Delta in West Bengal

Anupam Brahma, Ruma Jas*, Supradip Das and Joydeb Ghosh

Department of Veterinary Parasitology, West Bengal University of Animal and Fishery Sciences-37, K.B. Sarani, Kolkata, INDIA

**Corresponding author: R Jas; Email: rumajas@gmail.com*

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ABSTRACT

Gastroenteritis caused by helminth is a major hindrance for optimum productivity in small ruminants. The present study was conducted to determine the prevalence of naturally occurring gastrointestinal helminths (GIH) and intensity of gastrointestinal nematode (GIN) infection in Garole sheep of Sundarban Delta of South 24 Parganas district in West Bengal. Sixty Garole in the age group of three months to one year were selected in two villages of South 24 Parganas district and coprologically screened by Standard technique at monthly interval for a period of one year (from Oct 2012 – September 2013). The prevalence of GIH infection was 82.22%. Highest prevalence (90.83%) as well as intensity of GIN infection (EPG = 521) was observed in monsoon and lowest prevalence (75.83%) and intensity (EPG = 388.75) was recorded in summer. *Haemonchus contortus* was recorded as the predominant GI nematode species with an overall prevalence of 63.91% and Paramphistome (15.28%) was reported to be the predominant trematode species infecting Garole sheep. The present study indicates that the naturally occurring GI parasites were prevalent in Garole sheep all round the year with the highest prevalence in monsoon. The results of the present study might be exploited for developing lucid and specific control measures against naturally occurring GIH in Garole sheep.

Keywords: Gastrointestinal parasites, prevalence, intensity, Garole sheep, West Bengal

The saline belt of Sundarban Delta in South 24-Parganas district of West Bengal is the home tract of a popular sheep breed, the Garole sheep (Sharma *et al*., 1999). In spite of sheep being a popular livestock in this district, inadequate attention has been paid to improve its productivity. Profitable sheep rearing is posed with many constraints of which parasitic diseases particularly gastrointestinal parasitism is the major one. Gastrointestinal parasitic infection dominated by a variety of helminths is responsible for causing significant economic losses attributed to reduced weight gain, retarded growth and impaired reproductive efficiency (Lloyd and Soulsby, 1978; Sykes, 1994; Jas and Ghosh, 2009) in addition to the losses incurred on account of increased management cost and mortality (Bargar and Cox, 1984; Larsen *et al*., 1995). In sheep GIP comprises the nematode parasites as the commonest and major component and it also occurs with high prevalence rate in livestock of South 24 Parganas, the native tract of Garole sheep (AINP on GIP Annual Progress Reports-2010-2011, WBUAFS, Kolkata). Nevertheless, systematic study on GIP in Garole sheep is lacking and it continues to be a major limiting factor for their optimal productivity.

Formulation of control strategy for GI parasitism depends upon comprehensive knowledge of the epidemiological factors, which merit particular attention. Epidemiological studies in this regard plays a very important role to analyse the disease data for diagnostic purposes, that helps in creating disease control strategies and also assess the likely impact between environment and health. Therefore the present study was conducted to determine the prevalence and intensity of infection of naturally occurring GI parasites in Garole sheep of Sundarban Delta of West Bengal.

MATERIALS AND METHODS

Study location

The home tract of Garole sheep is located between 24˚32´ to 22˚40´ North latitude and 88˚05´to 89˚00´ East longitude comprising parts of North and South 24-Parganas district of West Bengal. Two villages (Rangabelia and Jotirampur) under the block Gosaba located in the Sundarban Delta in South 24 Parganas district, where Garole sheep is the major livestock species, was selected for the study of 12 months' total duration. In this village routine deworming was not practised by farmers and the animals were maintained by semi-intensive system of rearing.

Selection of animals and collection of faecal samples

A total of 60 Garole sheep of either sex, 3 to 12 month-old, were selected, properly identified by neck tags and maintained as per the owners' practices. Per-rectal faecal samples from individual sheep were collected at monthly interval during the study period. Pooled sample comprising the mixture of faecal samples of all the sheep were also collected without preservative for determination of species composition of different nematode larvae prevalent in those animals.

Examination of faecal sample

A part of each sample was subjected to qualitative faecal examination by standard sedimentation technique for the presence of trematode eggs and salt flotation technique for cestode and nematode eggs (Soulsby, 1982). Quantitative faecal examination of the remaining part of the samples was performed by Modified McMaster's Technique (Soulsby, 1982). Coprocultural examination of the faeces pooled from all the sheep under study was also performed by honey-jar coproculture technique (Soulsby, 1982) concomitantly with the qualitative and quantitative faecal examinations.

Determination of species composition of third stage larvae (L_3)

The species composition of nematodes (comprising strongyles and *Strongyloides*) in the larval samples obtained by coproculture was determined following the standard guidelines of Anon. (1971). A small drop of larval suspension was placed on a microscopic slide, a drop of Gram's iodine solution was added to it, carefully mixed and a cover slip was gently placed over the fluid. The L_3 were examined under a compound microscope and the characters given in the keys (Anon. 1971) were used to identify a minimum of 200 larvae. The percent composition of different nematode species in the L_3 suspension was calculated accordingly.

RESULTS AND DISCUSSION

The overall prevalence of naturally occurring gastrointestinal parasites in Garole sheep of study area was recorded as 82.22%. Strongyle group of nematodes was found to be the highest among all the naturally occurring gastrointestinal parasites. *Fasciola* sp. and Paramphistome were the trematode parasites and *Moniezia* sp. was the only cestode parasite recorded in Garole sheep of Sundarban Delta in West Bengal (Fig. 1).

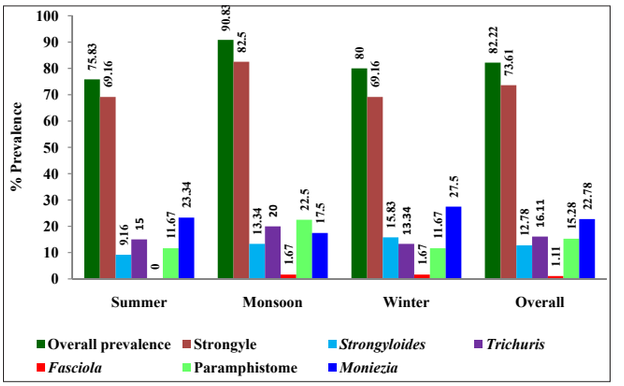

Fig. 1: Prevalence of gastrointestinal helminths in Garole sheep of Sundarban Delta of West Bengal

Epidemiological studies play a very important role to analyse the disease data for diagnostic purposes, that helps in creating disease control strategies and also assess the likely impact between environment and health. Gastrointestinal parasitism is a common occurrence in small ruminants of the world (Abdelnabi *et al*., 2011) including India (Ghosh *et al*., 2012; Rahman *et al*., 2012). Since the prevailing agro – climatic conditions of South 24 Parganas district of West Bengal favour the occurrence of gastrointestinal parasites in livestock in which a high prevalence has been recorded. The possible source of infection might be due to

presence of small ponds, river and thick vegetation which is favourable for free living infective stages on pasture and also meteorological condition of that locality. The monthly average temperature, rainfall and relative humidity of West Bengal are optimum for all round the year for survival and translation of free living stages of GI parasites (AINP on GIP, Annual Report, 2009 – 2010). Rahman *et al*. (2012) recorded 20.68% prevalence of GI parasite in Gharpala sheep in Alpine dry zone of Sikkim. This discrepancy might be due to the different agro – climatic condition of Sikkim than that of West Bengal.

The prevalence of Strongyle group of nematodes was highest among all GI parasites and this was in accordance with the finding of Ghosh *et al*. (2012) who recorded 72.91% prevalence of Strongyle in Garole sheep. The prevalence of *Moniezia* (22.78%) as recorded in the present study was slightly higher than the earlier finding by Pandit *et al*. (2012) who reported prevalence of *Moniezia* was 13.75% in Garole sheep.

Based on abattoir studies *Fasciola* and Paramphistome infection in Garole sheep was reported to be 9.04% and 24.66%, respectively in West Bengal (Patra, 2002; Purohit, 2002). In contrast, the present study recorded a lower prevalence of *Fasciola* (1.11%) and Paramphistome (15.28%) in Garole sheep. The discrepancies in the present findings and that of Patra (2002) and Purohit (2002) might be attributable to the fact that their observations were based on selective abattoir studies in respect of presence or absence of flukes (mature and immature both) on limited number of animals. But the present study was based on the detection of faecal eggs indicating the presence of only mature flukes.

The overall intensity of GIN infections, in terms of faecal egg count (EPG) was 442.08 (Fig. 2) in Garole sheep of Sundarban Delta. The finding of the present study was corroborated with the earlier report by Ghosh et al. (2012) who recorded an overall EPG of 422.37 in Garole sheep of other places of South 24 Parganas in West Bengal.

Highest prevalence of GIH as well as intensity of GIN infection was recorded during monsoon followed by winter and lowest in summer (Fig. 1 and Fig. 2) which corroborated the earlier findings of Jas and Ghosh (2007) and Ghosh *et al*. (2012). Prevalence of predominant nematode parasite (Strongyle group) and trematode parasite (Paramphistome group) was highest during monsoon season (Fig. 1). In Garole sheep the prevalence of gastrointestinal parasites was quite high all round the year but it was interesting to observe that the intensity of nematode infection was low to moderate (EPG = 267 - 570) throughout the study period with an overall EPG of 442.08.

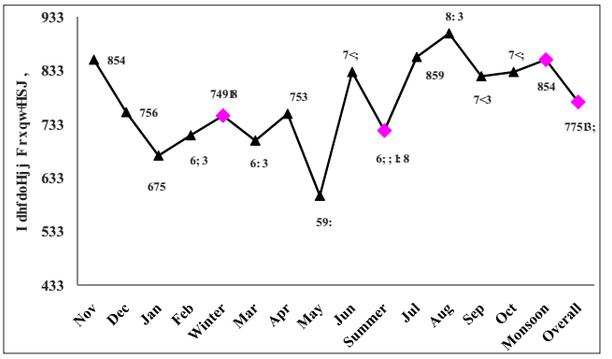

Fig. 2: Intensity of gastrointestinal nematode infection in Garole sheep of Sundarban Delta of West Bengal

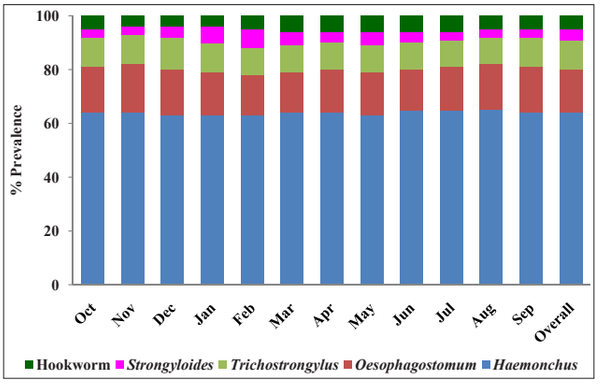

Fig. 3: Composition of Strongyle group of nematodes in Garole sheep of Sundarban Delta of West Bengal

In West Bengal, the environmental temperature and relative humidity during monsoon are suitable for survival and development for the parasitic stages of different GI nematodes. The lower prevalence during summer season compared to monsoon and winter season might be attributed to the high environmental temperature and low relative humidity which were detrimental to the transmission and translation of the infective stages.

In Garole sheep *Haemonchus contortus* (63.91%) was the predominant GIN (Fig. 3) followed by *Oesophagostomum*

sp. (16.25%), *Trichostrongylus* sp. (10.50%), hook worm (5.16%) and *Strongyloides* sp (4.16%). This finding was commensurate with the previous reports in small ruminants of West Bengal (Jas and Ghosh, 2007; Ghosh *et al*., 2012).

CONCLUSION

The present study indicates that the prevalence as well as intensity of GI nematode infection was highest during the monsoon. Therefore the epidemiological data obtained in the present study might be exploited for strategic worm control programme involving at least three anthelmintic treatments one before onset of rainy season and one in the middle of monsoon and one just after end of monsoon to be given in Garole sheep to prevent economic losses to the farmers.

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