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Epidemiology of gastrointestinal parasitism in cattle in Sikkim

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ABSTRACT

An epidemiological study was conducted on gastrointestinal parasitic infection in cattle of different agroclimatic zones of Sikkim during April 2001 to March 2010. Out of 13,248 faecal sample examined, 3,641 (27.48%) were found to be positive for different parasitic infection with a mean number of eggs per gram of faeces (epg), i.e. 86.037. Highest prevalence of infestation was found in the month of July (42.79%). The rate of infestation was found to be more in subtropical and high humid zone (32.52%) followed by temperate humid (22.19%) and sub-alpine low humid zone (9.59%). Overall prevalence of different parasites were strongyles (21.65%), *Strongyloides* (10.58%), Coccidian oocyst (5.91%), *Toxocara* (5.07%), *Moniezia* (4.47%) and *Trichuris* spp (1.10%). Seasonal occurrence of intestinal nematodiasis was found to be highest during summer (38.22%) and autumn (29.28%) and comparatively lower during spring (26.35%) and winter (18.99%). On coproculture of positive samples, *Haemonchus,, Oesophagostomum and Bunostomum* spp. larvae were identified.

Key words: Cattle, Epidemiology, Gastrointestinal parasite, Prevalence, Sikkim

Gastrointestinal parasitic infection is one of the major constraint for limiting the productivity of dairy animals. In Sikkim, like other hilly regions of India, this infection is mainly responsible for retarded growth and increased susceptibility of animals to other diseases. This losses can be minimized by early detection and strategic use of anthelmintic drug (Yadav *et al*. 2004). As incidence of gastrointestinal parasitic diseases in cattle has been reported from different states of India (Agarwal *et al*. 2002, Yadav *et al*. 2004, Mamatha and De-Souza 2006), a systematic epidemiological study in different agroclimatic zones of the country would be helpful for development of a strategic and tactical control programme against these diseases (Jithendran and Bhat 1999).

Sikkim is a small mountaineous state of North-east India having subtropical to dry cold climatic condition prevailing in this state. Detail epidemiological study of gastrointestinal parasitic disease in cattle was not conducted in this state except a preliminary report on prevalence of gastrointestinal nematodiasis in goats and cattle in Sikkim (Katiyar and Sinha 1981, Pal and Bandyopadhyay 2004, 2008). Therefore, it is very important to conduct a systematic epidemiological study of gastrointestinal parasite affecting cattle to adopt a strategy for effective control measures vis-a vis increase productivity in animals. The present study therefore highlighted the current status of GI parasitism in various agroclimatic zones of Sikkim on the basis of epidemiological investigation.

MATERIALS AND METHODS

The investigation was carried out between April 2001 to March 2010 on randomly selected cattle of different ages and both sexes in 4 districts of Sikkim, which comes under 5 agroclimatic zone, viz. sub-tropical high humid, temperate humid, subalpine low humid, alpine dry and dry high cold desert zone depending on various altitudes.

Faecal samples from 13,248 animals were collected randomly from 16 villages of four districts and subjected to qualitative and quantitative examination for presence of gastrointestinal parasites. Faecal egg count (eggs per gram of faeces, epg) of nematode eggs was determined by Modified Mc Master technique (MAFF 1984), while trematode egg count was done as per Souls by (1982). Representative numbers of pooled faecal samples were used for coproculture at 27°C. The infective larvae were harvested and used for larval identification (Souls by 1966). Meteorological data

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were collected from the Department of Meteorology at Tadong, Gangtok.

RESULTS AND DISCUSSION

Out of a total of 13,248 faecal samples examined, 3,641 (27.48%) were found to be positive for various gastrointestinal parasites, either in singly or in mixed infections, during study period (2001–10) with an overall mean epg of 86.037 and epg range of 100–7200 (Table 1). The most commonly occurring parasite egg recovered from faeces were *Strongyle* (21.65%), *Strongyloides* (10.58%), *Toxocara* (5.0%), *Coccidian oocysts* (5.91%), *Moniezia* (4.47%), *Trichuris* (1.10%), Amphistome (2.35%) and *Dicrocoelium* spp (0.65%, Table 2). Among Strongyle group of parasite, *Haemonchus* spp. incidence was found to be highest. No relationship was found between the prevalence of a specific parasite in relation to time or sex of the host. Higher incidence of G.I. nematodiasis (32.52%, epg range: 100–7200) was recorded in subtropical and high humid area followed by temperate humid zone (22.19%, epg range: 100–3700) and Subalpine low humid zone (9.59%, epg range: 100–500). The incidence was found to be lowest in an alpine dry region (5.26%, epg range: 100–400, Table 3). Highest incidence of G.I. nematodes in cattle was recorded in the month of July (42.79%) and August (37.19%) with mean epg level of 229.26. Whereas it was lowest in January (16.01%) and February (20.38%) with mean epg level 40.52 (Table 4).

Table 1. Year-wise prevalence of gastrointestinal parasitic infection in cattle in

	Sikkim	
Year	Percent infected	Mean EPG
2001–2002	52.38	148.90
2002–2003	34.34	68.652
2003–2004	23.34	82.751
2004–2005	30.29	101.723
2005–2006	28.62	420.22
2006–2007	25.34	83.264
2007–2008	29.10	175.65
2008–2009	25.91	80.75
2009–2010	22.37	130.07
Average	27.48	86.037

Table 2. Overall prevalence of gastro intestinal parasites recorded in cattle (n= 13,248)

Parasite	Percent infected
Nematode	
Strongyle spp.	21.65
Strongyloides spp.	10.58
Toxocara spp.	5.07
Trichuris spp.	1.1
Cestode	
Moniezia spp	4.47
Trematode	2.35
Amphistome spp.	2.35
Dicrocoelium spp.	0.65
Protozoa	
Coccidian oocyst	5.91
epg Range	100–7200
Mean epg	86.037

Table 3. Prevalence of gastrointestinal parasite in cattle in different agroclimatic zone of Sikkim

Agro-climatic zone	Number examined	Number positive (%)	epg range
Subtropical and high humid zone	7780	2530 (32.52)	100–7200
TemperateAnd humid zone	4669	1036 (22.19)	100–3700
Sub alpine low humid zone	761	73 (9.59)	100–500
Alpine and dry zone	38	02 (5.26)	100–400
Total	13,248	3641 (27.48)	100–7200

Table 4. Monthly prevalence and mean epg of gastrointestinal parasites in cattle

Month	Percent positive	Mean EPG
April	27.33	124.31
May	25.75	95.384
June	35.00	113.47
July	42.79	229.26
August	37.19	180.112
September	27.07	154.56
October	29.58	110.53
November	30.61	92.61
December	20.75	73.54
January	16.01	40.52
February	20.38	68.59
March	25.35	98.22
Total	27.48	86.037

Mean epg level was served an index of the intensity of worm burden in animals and helps in devising management strategies besides assessing the efficacy of control programmes and keeping track of development of anthelminthic resistance (Yadav *et al.* 2008). The mean epg counts in the present study were recorded to be highest in pre-monsoon for cattle in Sikkim and such observations are in agreement with Borthakur and Das (1998) and Yadav *et al*. (2008). Seasonal pattern of gastrointestinal nematode infections in cattle showed highest prevalence during summer (38.22%) and lowest during winter (18.99%). With the beginning of the winter season from December onwards, the mean total epg count was steadily decreasing to a minimum level of 40.52 epg in January then again it increased gradually with the increase in rainfall (Tables 4, 5). This result was in accordance with Jithendran and Bhat (1999) in Dairy animals in the North west humid Himalayan region of India, Pal and

Table 5. Seasonal occurrence of gastrointestinal parasites of cattle in Sikkim

Season	Animals examined	Animals infected (%)
Spring (March-May)	3818	1006 (26.35)
Summer (June-August)	2687	1027 (38.22)
Autumn (September-November)	3183	932 (29.28)
Winter (December-February)	3560	676 (18.99)
Total	13,248	3641 (27.48)

Bandyopadhyay (2008), Rahman *et al.* (2010) from Sikkim, Yadav *et al*. (2008) from high altitudes of Uttarakhand. The variation in the prevalence might be due to changes in agroclimatic conditions, the timing of the onset of rainy season and differences in the managemental practices followed in the two states. High incidence of strongyle worms as compared to *Strongyloides* and Toxocara recorded in the present study is in comparable with the earlier epidemiological studies of Sanyal *et al*. (1992) and Yadav *et al*. (2008).

Coproculture study of pooled faecal samples identifies the larvae of *Haemonchus contortus*, *Oesophagostomum, Bunostomum*, and *Nematodirus spp.* in decreasing order of prevalence. Among various gastrointestinal nematodes recovered in the present study *Haemonchus* spp. was found to be most predominant parasite of cattle. This might be because of high fecundity of the parasite and ability of the infective larvae to survive for prolonged duration on pasture (Souls by 1982).

Present investigation indicated that the animals harboured a worm burden in normal condition without any clinical infestation. The high humidity and high rainfall prevailing in this region is providing suitable molarities of salt present in soil which is an important factor for ecolysis (Soul by 1966) and prolonged survivability of nematode eggs in the soil vis-à-vis increase the possibility of host infections. The study was confirmed that during August to September cattle were most vulnerable to gastrointestinal parasite infection and pasture contamination. The results also suggested that cattle of Sikkim state were highly susceptible to various gastrointestinal parasitic infections throughout the year and needs anthelmintics treatment of animal at least twice a year, once in March to April and again in July to August, that might reduce the gastrointestinal parasitism and increases the productivity of animals in Sikkim state.

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