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Gastrointestinal parasitic infections in cattle farms of Sikkim

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ABSTRACT

Of the total 303 faecal samples examined, 61 (20.13%) of them were found positive for different parasitic infections with eggs per gram of faeces (EPG) range of 100–700. The incidence was significantly lower in Government cattle farm (11.42%) than that of privately managed farms (22.75%). The most prevalent gastrointestinal helminth parasite eggs detected were strongyles (18.81%), *Moniezia* (11.22%), *Ascaris* (8.25%), *Strongyloides* (6.6%), coccidian oocyst (3.96%), *Trichuris* spp (2.31%), *Nematodirus* (1.66%) and amphistome (1.65%) in decreasing order. The prevalence of gastrointestinal parasitic infection was high in July (31.25%) and low in January (8.7%). Intensity of strongyle infection in terms of epg showed no variations when different ages, body conditions, breeds and lactation conditions were compared. The seasonal distribution of gastrointestinal parasitism indicated a higher percentage of infection during summer (29.11%) followed by spring (22.22%) and autumn (19.22%). The infection rate was significantly lower in winter (10.0%).

Helminth infection especially subclinical gastrointestinal nematode infections are among the major health problems limiting the productivity in dairy animals (Johannes *et al*. 2009, Degefu *et al*. 2011) and thought to be one of the major constraints in development of dairy cattle worldwide (Ezatpour *et al*. 2014). Incidence of parasitic infections in domesticated cattle has been reported in Sikkim (Rahman *et al*. 2012) and Meghalaya (Laha *et al*. 2013). In present study gastrointestinal parasitic infections in cattle managed in small scale organized farms under Government and private indigenous farming systems of Sikkim, were noted.

MATERIALS AND METHODS

Faecal samples of 303 dairy cattle (82 calves and 221 adults) of both sexes and different ages were collected from nine different farms situated at the elevation of 700 m to 1600 m amsl of Sikkim between November 2012 to October 2013 and subjected to qualitative and quantitative examinations of gastrointestinal parasites (Soulsby 1982) and the parasites were identified by examining the eggs (Soulsby 1982).

Table 1. Prevalence and the mean faecal egg counts of gastrointestinal parasites in different cattle farms of Sikkim

Name of the farms	Number of animal examined	Number of animal positive (%)	EPG range	EPG category (%)		
				Low	Moderate	Severe
Government cattle farm, Tadong, East Sikkim	27	2(7.41)	100–200	2(7.41)	-	-
Private cattle farm, Melli-Mezi gaon, South Sikkim	42	11(26.19)	100–700	6(14.28)	3(7.14)	2(4.76)
Private cattle farm, Rumtek villege, East Sikkim	54	12 (22.22)	100–500	8(14.81)	3(5.56)	1(1.85)
Private cattle farm, Ranka villege, East Sikkim	14	4 (28.57)	100–700	1(7.14)	1(7.14)	2(14.29)
Private cattle farm, Mangshila, North Sikkim	22	6 (27.27)	100–500	2(9.09)	4(18.18)	-
Private cattle farm, Chakung, West Sikkim	46	9 (19.56)	100–400	3(6.52)	4(8.71)	2(4.35)
Private cattle farm, Pakyong, East Sikkim	18	3 (16.67)	100–300	1(5.56)	2(11.11)	-
Private cattle farm, Yang-yang villege, South Sikkim	37	8 (21.62)	100–500	4(10.81)	3(8.11)	1(2.7)
Government cattle farm, Kerfecter, South Sikkim	43	6 (13.96)	100–200	4(9.31)	2(4.65)	-
Total	303	61 (20.13)	100–700	31 (10.23)	23 (7.59)	8 (2.64)

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RESULTS AND DISCUSSION

During the study, out of 303 cattle examined in small-holder farms, 61 (20.13%) were found positive for various

gastrointestinal parasites, either in singly (3.63%) or in mixed infections (16.51%), with an overall EPG range of 100–700 (Table 1). The incidence was lowest in the Government cattle farm, Tadong, East Sikkim. Due to the differences in rearing of animals in both farming situations, the prevalence of infection was less in organized Government farm than it was in animals that were traditionally managed in private farm (Table 2). A similar study done in dairy cattle farms in Jimma town, Ethiopia by Degefu *et al*. (2011) reported higher prevalence of 77.6% as compared to the present study. The most commonly occurring parasite egg recovered from faeces were strongyle, *Strongyloides, Ascaris,* coccidian oocysts, *Moniezia*, *Trichuris*, Amphistome and *Dicrocoelium* spp (Table 2). Among strongyle group of parasite, *Haemonchus* spp. incidence was highest. A high prevalence of infection (66.29%) was reported from Western Vidarbha Region (Shirale *et al*. 2009). The overall prevalence of GI parasitic infections in cow calves from Punjab was reported as 61.40% (Singh *et al*. 2011) whereas the GI parasitic infection in adult dairy animals from the same state reported as 37.97% (Haque *et al*. 2011). There are reports of prevalence of gastrointestinal parasitic infections in cattle from North Eastern region of India where a prevalence of 27.48% was reported from Sikkim (Rahman *et al*. 2012) and 28.25% from Meghalaya (Laha *et al*. 2013). The higher prevalence may be due to favourable agroclimatic conditions, constant exposure of infection and availability of infective stage larvae on the grazing ground by animals.

The prevalence of strongyles, *Strongyloides, Trichuris, Ascaris, Paramphistomum* and *Moniezia* showed no significant variations among the 2 age groups (Fig 1; Table 3). A significant variation was observed in the prevalence of *Ascaris* spp. between young (19.51%) and adult animals (4.07%). The prevalence of *Moniezia* showed lower value in calves as compared to adult dairy cattle which could be due to the opportunity of exposure to the intermediate hosts, the free living soil mites on pasture (Degefu *et al.* 2011). The present study revealed a higher prevalence in gastrointestinal parasitic infection in calves than older age groups (Table 3). This may be due to the fact that with the advancement of age, vigor of the animal

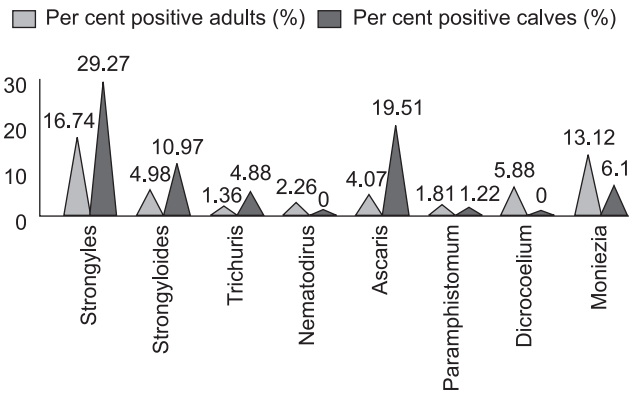

Fig. 1. Prevalence of gastrointestinal helminth parasites among adults (n=221) and calves (n=82) examined.

Table 2. Farm-wise prevalence of gastrointestinal parasites in cattle

Name of the farms	No. of animal examined/ (per cent)	Parasitic		Type of parasite (%)*							
		Single parasitic infection	Multiple parasitic infection	*Eimeria* spp.	Amphistome	*Dicrocoelium* spp.	*Moniezia.* spp.	Strongyle spp.	*Strongyloides* spp.	*Trichuris* spp.	*Nematodirus* spp.	*Ascaris* spp.
Cattle reared in Government farm	70/8 (11.42)	3 (4.29)	5 (7.14)	2 (2.86)	1 (1.43)	1 (1.43)	2 (2.86)	6 (8.57)	3 (4.29)	1 (1.43)	-	4 (5.71)
Cattle reared in privately managed farm	233/53 (22.75)	8 (3.43)	45 (19.31)	10 (4.29)	4 (1.72)	12 (5.15)	32 (13.73)	51 (21.89)	17 (7.3)	6 (2.58)	5 (2.15)	21 (9.01)
Total	303/61 (20.13)	11 (3.63)	50 (16.51)	12 (3.96)	5 (1.65)	13 (4.29)	34 (11.22)	57 (18.81)	20 (6.6)	7 (2.31)	5 (1.65)	25 (8.25)

*Total numbers and total percentage of animals exceed expected values owing to multiple gastrointestinal parasitism.

Table 3. Prevalence of gastrointestinal parasitic infection in animals with different age, sex, body condition, breed groups and lactation conditions

Variables	Category	No. of animals examined	No. of positive animals (%)*	EPG category (%)		
				Low	Moderate	Severe
Age	Calves	82	24 (29.27)	11 (13.41)	8 (9.76)	5 (6.09)
	Adult	221	37 (16.74)	19 (8.6)	14 (6.33)	4 (1.81)
Sex	Male	69	13 (18.84)	5 (7.24)	6 (8.7)	2 (2.9)
	Female	234	48 (20.51)	22 (9.4)	19 (8.12)	7 (0.42)
Body conditions	Poor	112	27 (24.11)	13 (11.61)	11 (9.82)	3 (2.68)
	Good	191	34 (17.8)	18 (9.42)	14 (7.33)	2 (1.05)
Breed	Cross	276	53 (19.2)	24 (8.7)	23 (8.33)	6 (2.17)
	Local	27	8 (29.63)	1 (3.7)	4 (14.81)	3 (11.11)
Lactation condition	Lactating cows (LC)	125	24 (19.2)	13 (10.4)	17 (13.6)	2 (1.6)
	Non- lactating cows (NLC)	72	16 (22.22)	7 (9.72)	8 (11.11)	1 (1.39)

• Values in parenthesis indicate percentage prevalences.

Table 4. Season-wise prevalence and degree of EPG of gastrointestinal parasites in Government and privately managed cattle farms of Sikkim

Name of the farms	Season	No. of animals	No. of positive (%)	EPG category (%)		
				Low	Moderate	Severe
Cattle reared in Government farm	Spring (Mar-May)	14	2 (14.29)	1 (7.14)	1 (7.14)	-
	Summer (June-Aug)	18	3 (16.67)	3 (16.67)	1 (5.56)	-
	Autumn (Sep-Nov)	17	2 (11.76)	1 (5.88)	-	-
	Winter (Dec-Feb)	21	1 (4.76)	1 (4.76)	-	-
Cattle reared in privately managed farm	Spring (Mar-May)	58	14 (24.13)	7 (12.07)	5 (8.62)	2 (3.45)
	Summer (Jun-Aug)	61	20 (32.79)	6 (9.84)	9 (14.75)	5 (8.2)
	Autumn (Sep-Nov)	55	12 (21.82)	5 (9.09)	4 (7.27)	3 (5.45)
	Winter (Dec-Feb)	59	7 (11.86)	5 (8.47)	2 (3.39)	-
Total						
	Spring (Mar-May)	72	16 (22.22)	8 (11.11)	6 (8.33)	2 (3.45)
	Summer (June-Aug)	79	23 (29.11)	9 (11.39)	10 (12.66)	5 (8.2)
	Autumn (Sep-Nov.)	72	14 (19.22)	6 (8.33)	4 (7.27)	3 (5.45)
	Winter (Dec-Feb)	80	8 (10.0)	6 (7.5)	2 (3.39)	-

becomes better and they develop resistance against the parasitic diseases (Dagnachew *et al*. 2011). Relatively higher prevalence of parasitism was observed in female animals compared to male but the difference was not significant (P>0.05) as indicated in Table 4. However, most of the researchers have observed higher rate of infection in female hosts as compared with males despite similar husbandary practices. This finding supported the general understanding of helminth infections that female animals are more susceptible of helminthiasis. It is assumed that sex is a determinant factor influencing prevalence of parasitism and females are more prone to parasitism during pregnancy and pre-parturient period due to stress and decreased immune status (Demissie *et al*. 2013).

Highest incidence of GI nematodes in cattle was recorded in the month of July and August with an EPG range of 200–600 and 300–700, respectively. It was lowest in January (8.7%) with EPG range of 100–200 (Fig. 2). The reason for this could be due to the conduciveness of the environmental condition for the development of larvae. Mean EPG level

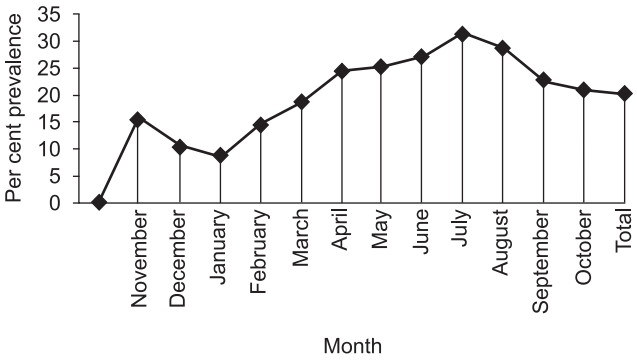

Fig. 2. Monthly prevalence of gastrointestinal parasite infection in cattle farms of Sikkim.

served as 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 EPG counts in the present study were recorded to be highest in monsoon for cattle in Sikkim

Table 5. EPG range of gastrointestinal helminth parasites in cattle farms of Sikkim

Type of parasites	EPG range		
	Cattle reared in government farm	Cattle reared in privately managed farm	Total
Strongyles	100–300	200–700	100–700
Strongyloides	200–400	300–600	200–600
Trichuris	100–200	100–200	100–200
Ascaris	100–500	300–700	100–700
Nematodirus	100–200	100–200	100–200
Paramphistomum	100–200	200–300	100–300
Dicrocoelium	100–200	100–200	100–200
Moniezia	100–300	200–500	100–500

and such observations are in agreement with Yadav *et al*. (2008), Rahman *et al*. (2012) and Laha *et al*. (2013). Season-wise prevalence, EPG ranges of individual helminth parasites and degree of EPG of gastrointestinal parasites in Government and privately managed cattle farms of Sikkim are shown in Tables 4, 5. The highest EPG range (100–700) was found in strongyle parasite. Seasonal pattern of gastrointestinal nematode infections in cattle showed highest prevalence during summer and lowest during winter. With the beginning of the winter from December onwards, the EPG category (per cent) was low in January then again it increased gradually with the increase in rainfall (Table 4). This result was in accordance with Yadav *et al*. (2008) from high altitudes of Uttarakhand, Rahman *et al.* (2012) from Sikkim, Laha *et al*. (2013) from Meghalaya. 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 different states.

The data generated in this study indicated that under prevailing agroclimatic conditions of Sikkim, the prevalence of GI nematodes was slightly high among cattle and further investigation on epizootiology of gastrointestinal parasites in cattle farm in higher altitude region, larval bionomics and pasture burden are required for better understanding of GI parasitism in the area.

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