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Research Article

PREVALENCE OF GASTROINTESTINAL PARASITES IN CATTLE IN AND AROUND CHEYYAR TALUK, THIRUVANNAMALAI DISTRICT

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ABSTRACT

A total of 50 dung samples and 50 gastrointestinal tracts were collected from non-descript cattle slaughtered in and around Cheyyar taluk, Thirvannamalai districts of Tamil Nadu over a period of six months from March 2014 to August 2014. Parasitological examination of dung samples revealed the eggs of Amphistomes, *Moniezia* sp, Strongyle, Strongyloides and *Eimeria sp.* The overall prevalence of parasitic eggs and oocysts was 76.00 per cent. Of this overall prevalence of 76.0%, 40.0% was infected by nematodes, 36.09% by trematodes, 16% by protozoan parasite (*Eimeria sp.*) and 10.00% by cestodes (Table 2). The most common gastrointestinal nematodes observed in this study was the strongyle (21.05%) compared to Strongyloides (2.63%). Among the age groups (Young and Adult), younger animals had higher infection of nematodes (24.0%) and trematode (20.00%) than the adult cattle. Among sex, male cattle had higher infection of nematodes (24.0%), tremaotode (20.00%) and *Eimeria sp*. (8.0%) while female goats had higher infection of cestodes (8.0%). Among the season (summer and monsoon), cattle had heavier infection of trematodes only during summer months (32.00%) whereas cattle had heavy infection of nematodes (30.00%), *Eimeria sp* (10.0%) and cestodes (10.0%) during monsoon months. The worms collected from the rumen and duodenum was identfied as Paramphistomes viz., *Cotylophoron cotylophorum, Fishoederius elongatus, Gastrothylax crumenifer* and *Paramphistomum cevrvi*. The worms collected from abomasum were *Haemonchus contortus*, *Mecistocirrus digitatus, Trichostrongylus axei* and *Oesophagostomum radiatum* (Nematodes). The worms collected from intestines was identified as *Moniezia benedeni* (Tapeworm) and the caecum was *Oeophagostomum columbiunum* and *Trichuris ovis.* The overall prevalence of intestinal parasitic infection (worm count) was 86.0%. Among the age groups (Young and Adult), younger animals had higher infection of trematode (36.0%), nematodes (32.0%) and cestode (20.0%) than the adult sheep. All the slaughtered cattle were males. Among the season (summer and monsoon), cattle had heavier infection of trematodes worms during summer months (38.0%) whereas cattle had heavy infection of cestode worms (10.0%) and nematodes worms (32.0%) during monsoon months.

INTRODUCTION

India, with variable agro-climatological conditions has over 275 million heads of cattle (FAO, 1987) forming the backbone of our dairy Industry. Nevertheless the low productivity of 75 million non-descript cows and buffaloes due to parasitic infections and malnutrition reduces the returns of our dairy programmes. Since the morbidity and mortality due to major bacterial and viral diseases are on the decline and the parasites are known to affect the productivity of the animals, it is high time that more emphasis is placed on a programme for systematic control of parasitic diseases of livestock at National level.

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In a recent survey conducted in Kheda district in Gujarat, (Anon, 1990) it was observed that the helminthic infections accounted for nearly one-third of the total losses due to all animal diseases. Effective prevention and control measures adopted increased the milk production by 20 per cent (Chatterjee and Acharya, 1987). A major distinctive feature of this gastrointestinal parasitism is the loss of protein into the gut and increased rates of gastrointestinal tissue protein metabolism and a net movement of amino acid nitrogen from muscles and skin to liver and gastrointestinal tract which decreases their availability for growth, milk and wool production (Holmes, 1985). Gastrointestinal nematodosis is one of the diseases with the greatest economic impact on beef cattle production in Argentina, with associated losses ranging from calf mortality to cost of antihelmintics and, fundamentally, to significant reductions in animal weight gains (Entrocasso and Steffan, 1981).

In India the epidemiological studies on gastro-intestinal helminths were carried out by research workers like Thapar (1956) in northern India, Gupta *et al.*(1985) in Haryana, Jagannath *et al.* (1987, 1988, 1989) in Karnataka, D'souza *et al.*(1988) in Mysore and Anon (1990) in Gujarat. As no such studies were undertaken in Tamil Nadu the present study was taken up to understand the prevailing situation. Assessments of pasture larval burden with climatologically data were found to be of immense value in determining the minimal threshold of parasitic larval contamination and to adopt necessary strategic control measures. Hence an assessment of pasture larval burden in places around Cheyyar has been taken up. Several studies on the experimental infection of calves with *Haemonchus* sp. have confirmed the haematological changes and use of elevated levels of plasma pepsinogen and gastrin as an aid in the early diagnosis in sub-clinical parasitism. The enzyme tests adopted by the early workers in this field elsewhere were attempted in this study, on the experimental calves, to see how best this technique could be adopted under Indian conditions for the early diagnosis of haemonchosis. Broadspectrum anthelmintics like levamisole, morantel, fenbendazole, albendazole, ivermectin, etc. Have been reported to be effective against various gastro-intestinal nematodes of cattle. The effect of albendazole and ivermectin has been observed in calves experimentally infected with *Haemonchus contortus* for studying the response of plasma pepsinogen and gastrin. Many reports of parasitological and patho-physiological changes in haemonchosis have emphasized the importance of gastro-intestinal parasitism in ruminants. In the present study, experimental *Haemonchus contortus* infection was set up to study in detail the histopathological changes.

In Asia, *Paramphistomum cervi, Paramphistomum explanatum, Gastrothylax crumenifer, Cotylophoron cotylophorum, Fischoederius elongatus* and *F. cobboldi* have been reported from India, Ceylon and China. (Boray, 1959; Malek, 1980; Hanna *et al.,* 1988; Wang *et al.,* 2006). Among the gastrointestinal nematodes, Haemonchus sp., the prime haematophaus trichostrongylids, considered to be the most important one, parasitizing the abomasum of 80 per cent of ruminants (Misra, 1977) and the most pathogenic nematode of sheep and goats (Sood, 1981). Haemonchosis is usually associated with impaired weight gain and loss of production (Fabiyi, 1972). In India, cow dung is accepted as a purifier and has an important role in preserving environment. Besides being used as a fuel, it also finds use as a disinfectant in homes. Burning of cow dung is thought to repel mosquitoes. It also has a significant role in crop growth as manure because of humic compounds and fertilizing bioelements present in it (Srivastava *et al.,* 2010). The low C: N ratio in cow dung manure is an indication that it could be a good source of protein for the microbes involved in the decomposition of organic matter (Adegunloye *et., al* 2007). It is also a component of *panchagavya;* it is a term used in Ayurveda to describe five important substances obtained from cow, namely, urine, dung, milk, ghee and curd. A number of formulation mentioned in Ayurveda describe the use of *Panchagavya* components either alone or in combination with drugs of herbal, animal or mineral origin (Sathasivam *et, al.,* 2010). Cow dung showed positive response in suppression of mycelia growth of plant pathogenic fungi like *Fusarium solani, F.oxysporum* and *Sclerotinia sclerotiorum* (Basak and Lee 2002). Cow dung extract spray was also reported to be effective for the control of bacterial blight disease of rice and was as effective as penicillin, paushamycin and streptomycin (Mary *et. al.,* 1986). The primary reason for the lack of knowledge regarding the composition of the cow dung microbiome relates to the difficulty and expense of methods used to evaluate those populations (Dowd *et. al.,* 2008). Faecal bacteria in cattle have been analyzed using culture methods (Ozutsumi *et. al.,* 2005). Culture based methods are extremely time consuming and to date we have only been able to culture approximately 1% of the bacteria present in animal gut (Nocker *et. al.,* 2007). Metagenomics is the culture-independent analysis of a mixture of microbial genomes (metagenome) using an approach based either on expression (functional analysis) or on sequencing (sequence-based analysis). Metagenomic analysis involves isolating DNA from an environmental sample, cloning the DNA into a suitable vector, transforming the clones into a host bacterium and screening the resulting transformants (Zeyaullah *et. al.,* (2009).

Helminthic parasites in cattle

Monieziosis, though as such, was not a serious problem but in several cases the intestine were found almost packed with parasites leading to nearly complete blockage in young kids up to 6 months of age (Soulsby, 1982). Gupta *et al.* (1985) had encountered helminthic infections in 55.80 per cent of cow claves and 62.90 per cent of buffalo calves in Haryana; the strongyle species were more prevalent (44.20 per cent). He also observed a positive correlation between the incidence of strongyle infection and the age of the host. Jagannath *et al.* (1987, 1988 and 1989) conducted epidemiological studies in various districts of Karnataka State and noted that 36.25 per cent of cattle and 42.12 per cent of buffaloes were found to be positive for gastro-intestinal parasitic infections. Cattle in the age group of 4-8 years were most commonly infected while those below one year were least infected.

Soundararajan (2000) studied the epidemiology gastrointestinal nematodes in Toda buffaloes, crossbred cattle, Nilagiri sheep and non-descript goats in Nilagiri sheep and Crossbred goat in Tamil Nadu. All the four species of animals passed highest number of strongyle eggs during October months. Highest egg per gram was recorded during the northeast monsoon, moderate during southwest monsoon and lowest during the winter and summer months. Hassan *et al.* (2005) reported that 3.99 per cent of prevalence rate of paramphistomosis in ruminants in Punjab. The incidence rate was highest in buffaloes (5.42%) followed by cattle (3.71%), sheep (1.79%) and goats (0.85%). Highest incidence was recorded during monsoon and post monsoon (July to October) with the prevalence rate of 8.06% followed by 2.92% in summer (March to June) and 0.49% in winter (November to December).

Rahman and Samad (2010) reported that the prevalence of sub-clinical gastro-intestinal parasitosis and their effects on health and milk production with therapeutic management in 87 Red Chittagong Cattle (RCC) reared at the Bangladesh Agricultural University Dairy Farm (BAUDF), Mymensingh during the period from March to July 2008. Parasitological examination of faecal samples of all the selected 87 RCC showed that 51.72% (n = 45) animals affected with different types of gastro-intestinal parasites, of which 37.93% had single, 12.64% had dual and only 1.15% animals had triple types of infection. An overall 34.48% paramphistomiasis, 25.29% balantidiasis, 2.30% toxocariasis, 2.30% strongyloidiasis, 1.15% trichuriasis and 1.15% fascioliasis was recorded in RCC. However, toxocariasis (18.75%), strongyloidiasis (18.75%) and trichuriasis (6.25%) were recorded in calves up to 6 months old, and paramphistomiasis (34.48%) and fascioliasis (1.15%) in cattle more than 6 months of age whereas balantidiasis (25.29%) was recorded in all age groups of cattle.

Paul *et al.,* (2011) observed 59.5% and 45%.of the prevalence of paramphistomosis in female animals and in male animals, respectively. Vijaya Bhaskara Reddy *et al.,* (2012) reported that the prevalence of helminthes infection among cattle and buffaloes in of Piler, Chittoor district of Andhra Pradesh and observed that the overall prevalence of parasitic infection was 336 (42.0%) out of 800 faecal samples. The highest incidence was observed by amphistomes 180 (22.5%) followed by Coccidia 65 (8.1%), Strongyles 61 (7.6%) and *Fasciola* 30 (3.8%). The incidence of parasitic infection was higher in monsoon season as compared to that of summer and winter. Sintayehu Melaku and Mekonnen Addis (2012) reported that the prevalence and intensity (worm burden) of *Paramphistomum* in ruminants slaughtered from October, 2010 to April, 2011 at Hashim Nur's Ethiopian Livestock and Meat Export industrialized abattoir in Debre Zeit, Ethiopia. The overall prevalence of *Paramphistomum* infection in the study was proved to be 28.6 % (329/1152) of which 154 (40.1 %) were in cattle, 111 (28.9 %) were in sheep and 64 (16.7 %) were in goats. The mean worm burdens of *Paramphistomum* were proved to be 270.46 ± 471.947, 222.96 ± 521.850 and 73.31± 281.612, in cattle, sheep and goats, respectively. Highest prevalence of paramphistomosis was registered in highland shoats, 30.2% (116/384) compared with those originated from lowland, 15.4 % (59/384). They observed that the prevalence was proved to be higher in adult shoats than young shoats with prevalence of 30.5 % (117/384) in adult and 15.1% (58/384) in young shoats. Infection was known to be highest in poor body conditioned animals (76.3 %), followed by medium (23.9 %) and good (6.9 %) body conditioned animals.

Laha *el al.* (2013) reported 191 (28.25%) faecal samples were found positive for gastrointestinal parasitic infections. The eggs of Strongyle spp. were found predominant (65.96 %) followed by Strongyloides spp. (25.13%), *Eimeria* spp. (17.80%), *Trichuris* spp. (13.08%), *Moniezia* spp. (10.47%) and *Nematodirus* spp.(2.61%). The *Nematodirrus* spp. was identified as *Nematodirus helvetianus*, a first report of its kind from cattle of North-Eastern Region of India, particularly from the state Meghalaya. The eggs per gram of faeces in case of nematode parasites were ranged between 50 to 4000 and in case of coccidian infections the range of oocysts per gram of faeces (OPG) was between 50 to 1400. Tanveer Hussain *et al* (2014) reported the sympatric species distribution, genetic diver-sity, population structure and frequency of β-tubulin isotype 1 alleles associated with benzimidazole resistance. Internal transcribed spacer 2 (ITS2) sequences revealed three sympatric species of *Haemonchus, H. contortus, H. placei and H. longistipes* with 12 dis-tinct genotypes circulating among ruminant hosts in Pakistan. Karen Malraita *et al*., (2015) studied the rumen fluke (*Calicophoron daubneyi*) biology in cattle. They evaluated the diagnostic performance of mini-FLOTAC to detect adult rumen fluke infections based on faecal egg count in an abattoir survey and found high sensitivity (0.94) and specificity (0.98). Moreover, there was an association between ruminal fluke burden (assessed by visual scoring) and faecal egg count and a cut-off of 200 eggs per gram is proposed to detect highly infected animals (>200 flukes present in the rumen and/or reticulum). There was also a significant association between ruminal fluke burden and faecal consistency.

MATERIALS AND METHODS

Study area

Cattle slaughtered at Cheyyar taluk, Thirvannamalai district were chosen for the study.

Selection of animals

A total of 50 dung samples were collected from non-descript cattle. Similarly 50 gastrointestinal tracts of non-descript cattle was collected in and around Cheyyar taluk, Thirvannamalai district of Tamil Nadu (Plate-I, Figure 1 and 2). All the animals were maintained under extensive system. The cattle was penned at night and allowed to graze in the day from 9.30 am to 5.00 pm (Plate-II, Figure 3 and 4). Dung samples and gastrointestinal tracts were collected from two age groups (young, <12months and adult, >12 months) and in two seasons viz, summer (March to May) and Monsoon (June to August). Dung sample were collected from male and female cattle where as gastrointestinal tracts were collected only from male cattle, since males only slaughtered for beef.

Sampling procedure

Collection of dung

A total of 50 fresh faecal samples were obtained from the rectum of non-descript cattle and individually labelled in polythene bags. The dung samples were collected over a period of six months from March 2015 to August 2015. Dung samples collected were brought to PG & Research Department of Zoology, Arignar Anna Govt. Arts College, Cheyyar for identification of different types of eggs / oocystes. For further confirmation the samples were sent to the Department of Veterinary Parasitology, Madras Veterinary College, Chennai, Tamil Nadu and for identification of different types eggs / oocysts.

Collection of worms

A total of 50 gastrointestinal tracts were collected from the slaughter houses in and around Cheyyar taluk, Thirvannamalai district of Tamil Nadu from March 2015 to August 2015. Rumen, reticulum, abomasums and intestines were examined for the presence of Trematode, cestodes and nematodes. Worms were collected and kept separately and labeled. Every anatomical portion of the intestine was emptied of its contents separately and the worms separated for parasitological diagnosis. After collecting the macroscopic worms from intestines, the intestinal contents were scrutinized for very small worms.

The contents were well mixed with water, allowed to settle and the supernatant fluid was decanted. This process was repeated several times to remove all the coarser particles. Then the sediments in petridish placed under a dissection microscope and the minute worms were recovered and immediately washed in normal saline and subsequently preserved in 10% formalin. Worms collected were brought to the PG & Research Department of Zoology, Arignar Anna Govt. Arts College, Cheyyar for identification of different types of Endoparasites. Then the samples were sent to Department of Veterinary Parasitology, Madras Veterinary College, Chennai, Tamil Nadu for further confirmation.

Parasitological techniques for dung

Qualitative parasitological examination was performed by faecal sedimentation technique with following standard procedures for the presence of parasite eggs / oocysts (Sloss *et. al.,* 1994; Rathore *et. al.,* 2005).

Parasitological technique for worm

Trematodes and Cestodes were placed in a darsoventral position on a slide. Another slide was placed over the worm and pressed gently until desired flattening was reached.

Figure1. Amphistomes eggs

Figure 2. Moniezia eggs

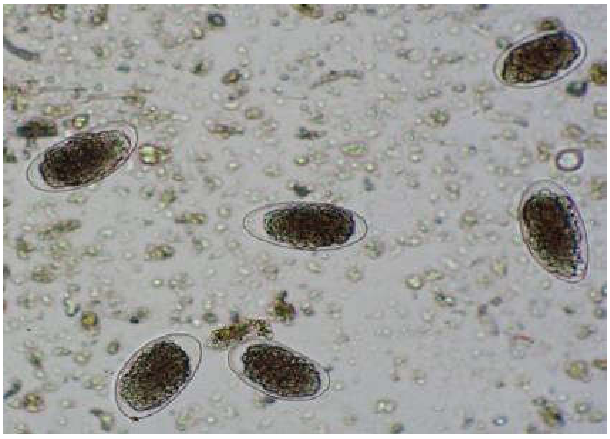


Figure 3. Strongyle eggs

Figure 4. Strongyloides eggs

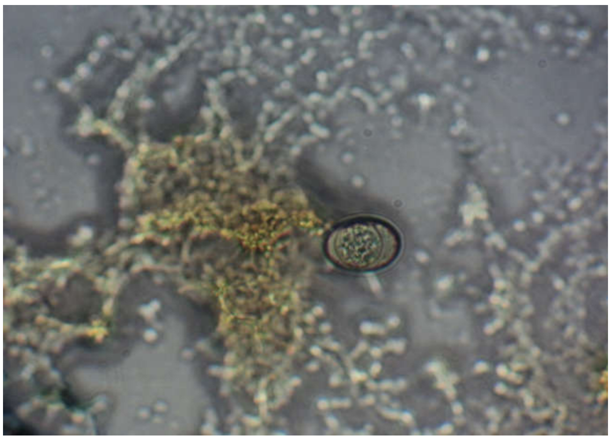


Figure 5. Eimeria unsporulated oocysts

Figure5. Ruman with Paramphistomes

At this stage, the two ends of the slides were tied together with a thread and then the whole material was put in 5 % formalin for fixation for 48 hours. Then it was removed from the formalin, thoroughly washed in water and the it was put in the Acetic Alum Carmine stain (1:7) for 3 days. Then the worms were removed from the stain and destined with 1%acid alcohol to remove excess stain. The worms were immediately washed in running tap water to remove acid alcohol (Bluing). The stained parasites were then dehydrated in ascending grades of alcohol (70%, 90% and absolute alcohol). Then the worms were cleared in carbolic acid and then the worms were mounted in Canada balsam and examined under low or high power.

The nematode worms were washed well in water to remove the preservative. Then the worms were dehydrated in ascending grades of alcohol (70%, 90% and absolute alcohol). The nematodes were cleared in lacto phenol and then the worms were mounted in Canada balsam and examined under low or high power. Worms were identified with keys provided by (Souls by 1982; Urquhart *et al.,* 1987; Taylor *et al.,* 2007).

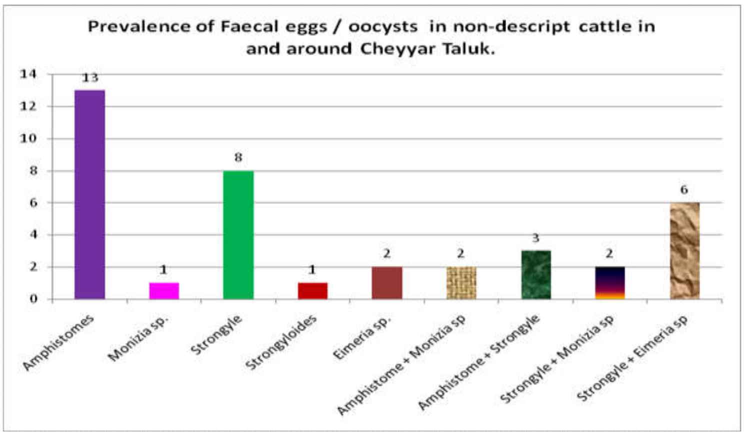
RESULTS

Study on gastrointestinal parasites of non-descript cattle in and around Cheyyar taluk, Thirvannamalai district of Tamil Nadu were carried out for six months from March 2015 to August 2015.

6 hooks (hexacanth embryo). Strongyle egg was identified by oval shape, the egg shell with segmented yolk while strongyloides was identified based on oval shape both poles blunt and well developed embryo (larva) inside. The prevalence of intestinal parasitic eggs / oocysts identified in cattle shown in Table 1. The overall prevalence of parasitic eggs and oocysts was 76.00 per cent. Amphistome egg was the only Trematode parasites identified in this study. Similarly in Cestodes, *Monizia benedeni* egg was identified in this study. Where as in Nematodes three types of eggs were identified viz., Strongyle, and Strongyloides eggs. In Protozoan parasites, *Eimeria sp.* was the only coocidian parasites identified in this study. Single infection of Amphistome egg and Strongyle egg had the highest prevalece of 13 (34.21 %) and 7 (21.05%) respectively, followed by *Eimeria sp.* oocysts 2 (5.26%) while *Monizia sp.* egg and Strongyloides eggs had the lowest with 1 (2.63%). Mixed infection by Strongyle egg + Eimeria oocyst had highest prevalence of 6 (15.79%) followed by Amphistome + Strongyle (7.89%) and with lowest level of Strongyle + Monizia (5.26%) and Amphistme + Moniezia (5.26%) (Table -1 and Graph -1). Of this overall prevalence of 76.0%, 40.0% was infected by nematodes, 36.09% by trematodes, 16% by protozoan para site (*Eimeria sp.*) and 10.00% by cestodes (Table 2 and Graph-2). The most common gastrointestinal nematodes observed in this study was the strongyle (21.05%) compared to Strongyloides (2.63%). Single and mixed parasitic infection were also examined in this study in which single infection by trematode (34.21%) and nematode (23.400%) were higher than the mixed infections. The results are given in Table 3 and Graph -3. Table 4 and Graph 4 show the prevalence of faecal eggs / oocysts in non-descript catlle in relation to age, sex and season. Among the age groups (Young and Adult), younger animals had higher infection of nematodes (24.0%) and trematode (20.00%) than the adult cattle.

Table 1. Prevalence of Faecal eggs / oocysts in non-descript cattle in and around Cheyyar Taluk

Parasite	Parasitic eggs / oocysts	No. (%) of animals infected (N=50)
	Overall	38 (76.00)
Trematode	Amphistomes	13 (34.21)
Cestode	*Monizia sp.*	1 (2.63)
Nematode	Strongyle	8 (21.05)
	Strongyloides	1 (2.63)
Protozoan parasite	*Eimeria sp.*	2 (5.26)
Trematode + Cestode	Amphistome + *Monizia sp*	2 (5.26)
Trematode + Nematode	Amphistome + Strongyle	3 (7.89)
Nematode + Cestode	Strongyle + *Monizia sp*	2 (5.26)
Nematode + Protozoan parasite	Strongyle + *Eimeria sp*	6 (15.79)

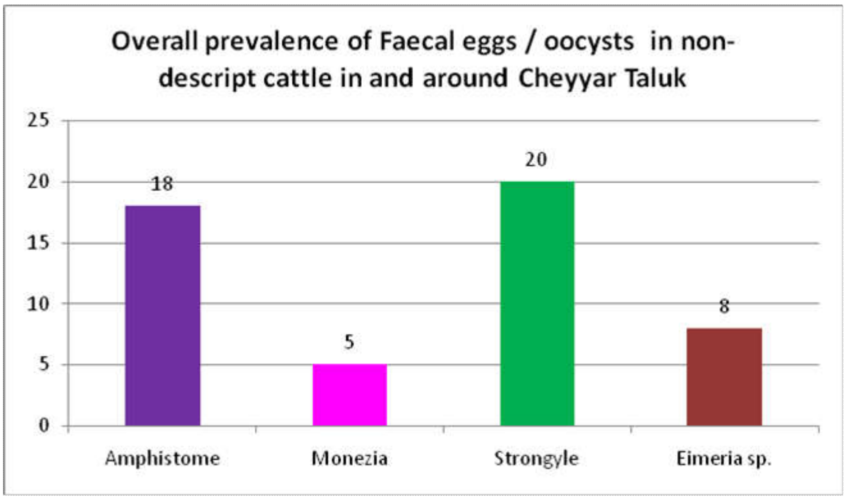


Graph 1.

Parasitological examination of dung samples revealed the presence of eggs of *Amphistomes, Moniezia sp, Strongyle, Strongyloides and Eimeria sp* (Figure 1 to 6). Amphistomes eggs were identified by oval shape, colourless, distinct operculum at one end and contain yolk and germ cells with. *Monizia sp* egg was identified based on square shape and contain an embryo with

Table 2. Overall prevalence of Faecal eggs / oocysts in non-descript cattle in and around Cheyyar Taluk

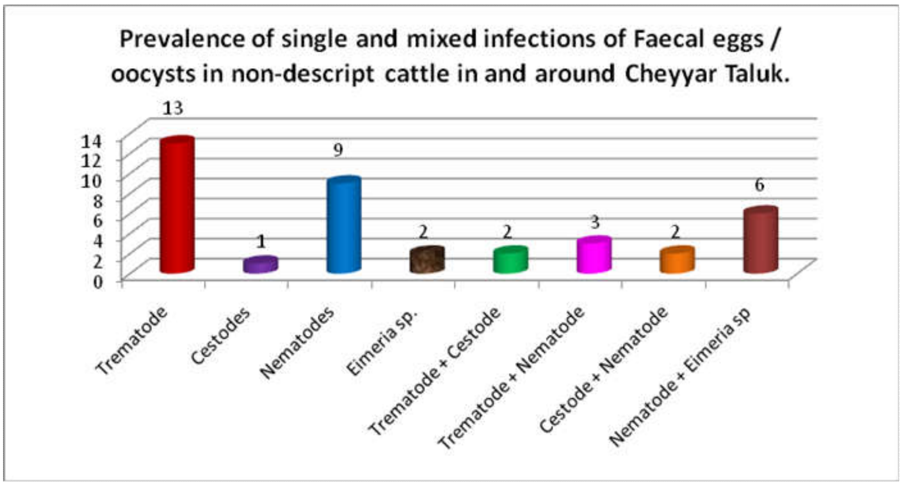
Parasite	Species	No. (%) of positive
Trematode	Amphistome	18 (36.00)
Cestode	Monezia	5 (10.00)
Nematode	Strongyle	20 (40.00)
Protozoan parasite	Eimeria sp.	8 (16.00)
Total		38 (76.00)



Graph 2.

Table 3. Prevalence of single and mixed infections of Faecal eggs / oocysts in non-descript cattle in and around Cheyyar Taluk

Infection	Parasite	No. (%) of positive
Single	Trematode	13 (34.21)
	Cestodes	1 (2.64)
	Nematodes	9 (23.68)
	Eimeria sp.	2 (5.26)
Double	Trematode + Cestode	2 (5.26)
	Trematode + Nematode	3 (7.89)
	Cestode + Nematode	2 (5.26)
	Nematode + *Eimeria sp*	6 (15.78)

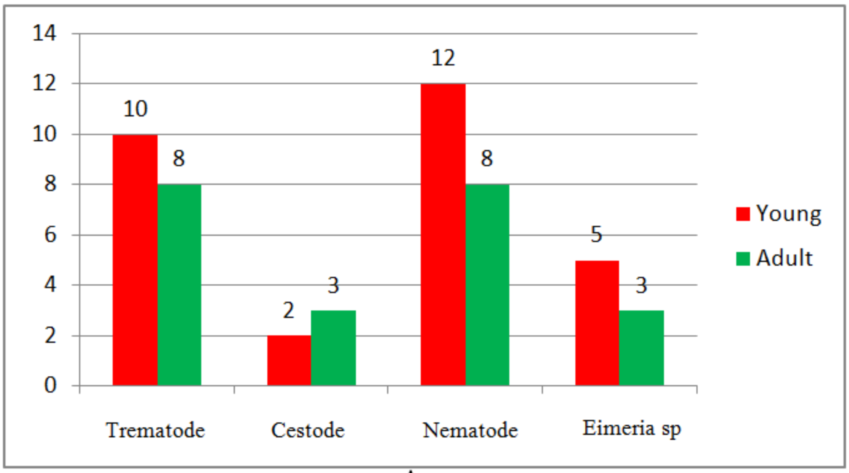


Graph 3.

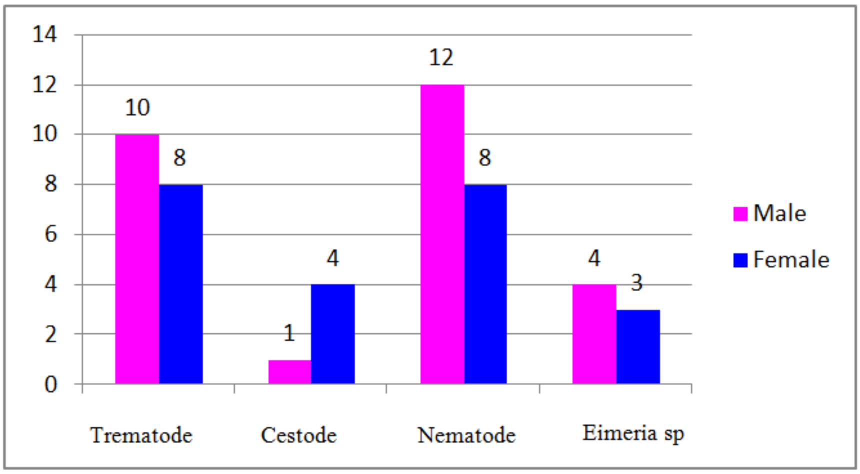
Among sex, male cattle had higher infection of nematodes (24.0%), tremaotode (20.00%) and *Eimeria sp*. (8.0%) while female cattle had higher infection of Cestodes (8.0%). Among the season (summer and monsoon), cattle had heavier infection of Treaties only during summer months (32.00%) whereas cattle had heavy infection of nematodes (30.00%), *Eimeria sp* (10.0%) and cestodes (10.0%) during monsoon months. The worms collected from the rumen and duodenum was identified as Paramphistomes viz., *Cotylophoron cotylophorum, Fishoederius*

Table 4. Prevalence of Faecal eggs / oocysts in non-descript cattle in relation to age, sex and season in and around Cheyyar Taluk

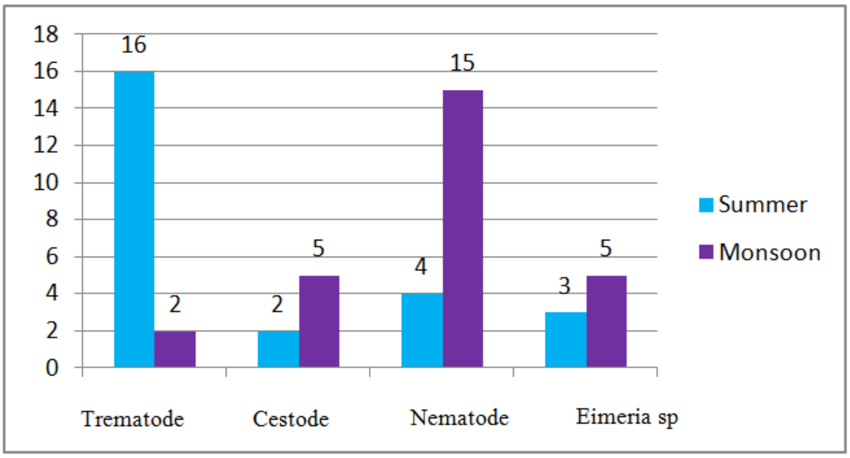
Variable		Trematode	Cestode	Nematode	*Eimeria sp*
Age	Young	20.00% (10)	4.00% (2)	24.00% (12)	10.00% (5)
	Adult	16.00% (8)	6.00% (3)	16.00% (8)	6.00% (3)
Sex	Male	20.00% (10)	2.00% (1)	24.00% (12)	8.00% (4)
	Female	16.00% (8)	8.00% (4)	16.00% (8)	6.00% (3)
Season	Summer	32.00% (16)	4.00% (2)	6.00% (4)	6.00% (3)
	Monsoon	4.00% (2)	10.00% (5)	30.00% (15)	10.00% (5)



Age



Sex

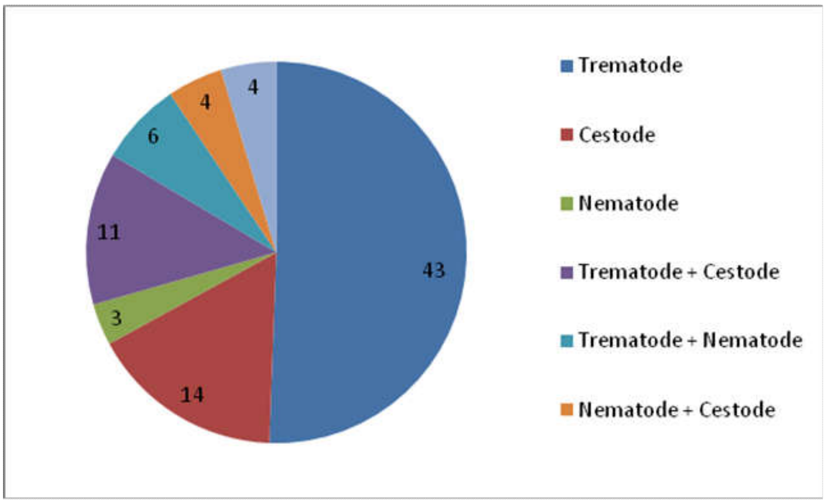


Season

Graph 4. Prevalence of Faecal eggs / oocysts in non-descript cattle in relation to age, sex and season in and around Cheyyar Taluk

Table 5. Overall prevalence of intestinal worm in non-descript cattle in and around Cheyyar Taluk

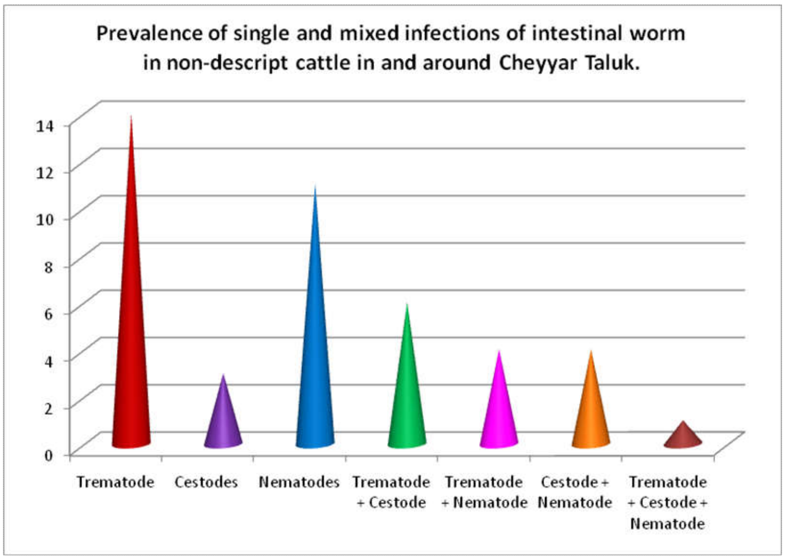
Parasite	Species of the parasite	No. (%) of animals infected (N=50)
	Overall	43 (86.00)
Trematode	*Cotylophoron cotylophorum, Fishoederius elonatus, Gastrothylax crumenifer* and *Paramphistomum cervi*	14 (28.00)
Cestode	*Monizia expansa*	3 (6.00)
Nematode	Strongyle *Haemonchus contortus*, Mecistocirrus digitatus, *Trichostrongylus axei* and *Oeophagostomum columbiunum*	11 (22.00)
Trematode + Cestode		6 (12.00)
Trematode + Nematode		4 (8.00)
Nematode + Cestode		4 (8.00)
Trematode + Cestode + Nematode		1 (2.00)



Graph 5. Overall prevalence of intestinal worm in non-descript cattle in and around Cheyyar Taluk

Table 6. Prevalence of single and mixed infections of intestinal worm in non-descript cattle in and around Cheyyar Taluk

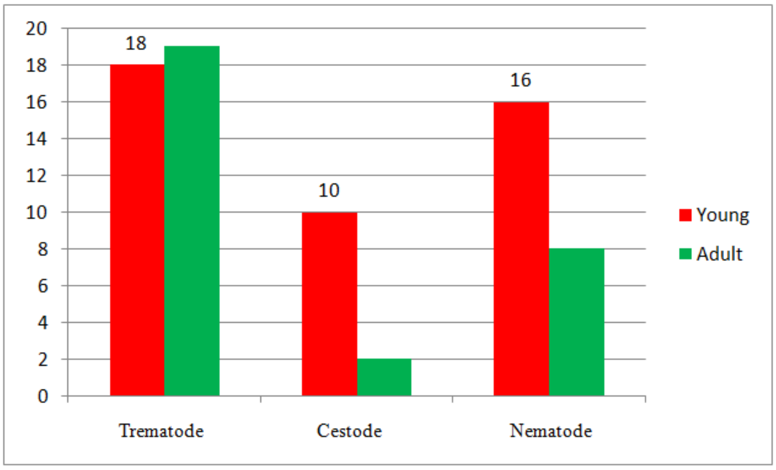
Infection	Parasite	No. (%) of positive
Single	Trematode	14 (28.00)
	Cestodes	3 (6.00)
	Nematodes	11 (22.00)
Double	Trematode + Cestode	6 (12.00)
	Trematode + Nematode	4 (8.00)
	Cestode + Nematode	4 (8.00)
Triple	Trematode + Cestode + Nematode	1 (2.00)



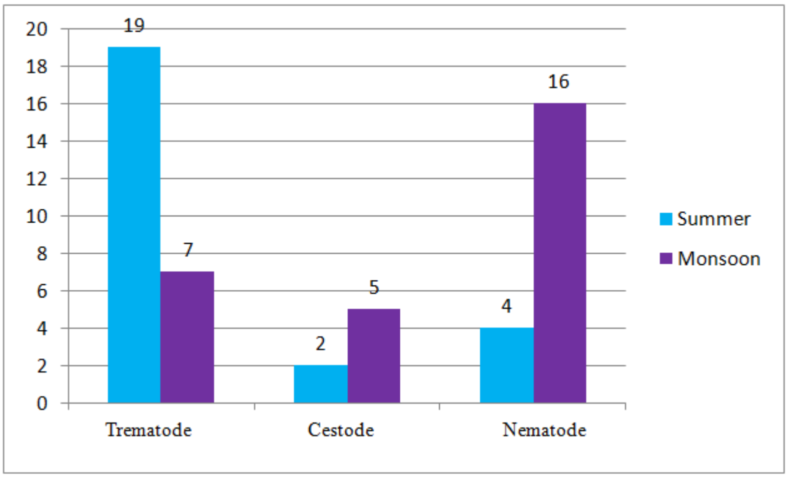
Graph 6.

Table 7. Prevalence of intestinal parasites worm in non-descript cattle in relation to age and season in and around Cheyyar Taluk

Variable		Trematode	Cestode	Nematode
Age	Young	36.00% (18)	20.00% (10)	32.00% (16)
	Adult	38.00% (19)	4.00% (2)	16.00% (8)
Season	Summer	38.00% (19)	4.00% (2)	8.00% (4)
	Monsoon	14.00% (7)	10.00% (5)	32.00% (16)



Age



Season

Graph 7. Prevalence of intestinal parasites worm in non-descript cattle in relation to age and season in and around Cheyyar Taluk

elongatus, Gastrothylax crumenifer and *Paramphistomum cevrvi*. The worms collected from abomasum were *Haemonchus contortus*, *Mecistocirrus digitatus, Trichostrongylus axei* and *Oesophagostomum radiatum* (Nematodes). The worms collected from intestines was identified as *Moniezia benedeni* (Tapeworm) and the caecum was *Oeophagostomum columbiunum* and *Trichuris ovis.* The overall prevalence of intestinal parasitic infection (worm count) was 86.0% (Table 5 and Graph 5). Single infection of tematode (paramphistomes) and nematode had highest prevalence of 14 (28.00) and 11 (22.00%) respectively while tapeworm had the lowest with 3 (6.0%). Mixed infection by Trematode + Cestode worms had highest prevalence of 6 (12.0%) followed by Trematode + Nematode of 4 (8.0%) and Nematode + Cestode of 4 (8.0%) while the lowest by Trematode + Cestode + Nematode worms with 1 (2.0) (Table 6 and Graph 6). Among the age groups (Young and Adult), younger animals had higher infection of trematode (36.0%), nematodes (32.0%) and cestode (20.0%) than the adult cattle.

All the slaughtered cattle were males. Among the season (summer and monsoon), cattle had heavier infection of trematodes worms during summer months (38.0%) whereas cattle had heavy infection of cestode worms (10.0%) and nematodes worms (32.0%) during monsoon months (Table 7 and Graph 7).

DISCUSSION

Coccidia cause an intestinal disease of young cattle, usually 3 weeks to 6 months old, but can affect cattle up to 2 years old.

They are transmitted when:

- Infected cattle pass cysts in manure on to the ground;
- Rain washes the cysts from the manure;

- The cysts develop under moist and moderate temperature conditions; and
- Cattle swallow cysts on moist ground.

As with hairworms and lung worms, transmission is common during rainy times in spring and fall. The diarrhea caused by coccidian may be confused with the diarrhea caused by hairworms, bacteria and viruses. Internal parasites can cause significant production losses in cattle, resulting in substantial economic losses for owners. Often, parasite losses are subclinical and unnoticed but severe infestation can cause disease and even death. Subclinical production losses caused by internal parasites include reduced milk production, reduced weaning weights, delayed puberty and decreased fertility in replacement heifers, reduced pregnancy rates in mature cows, and reduced feed intake, reduced feed efficiency and immune suppression in all classes of cattle. A parasitic relationship exists when one organism (the parasite) benefits at the expense of another organism (the host). The parasite may cause harm to the host – enough to kill it if not properly controlled. Parasites can damage and irritate stomach and intestinal linings or mucosa, resulting in reduced digestion and absorption of nutrients from the intestine as well as bleeding and protein loss from the gut.

Parasites are normally host-specific, and cattle serve as hosts for a variety of parasites. The major threat to cattle health and performance comes from internal parasitic nematodes (worms), especially those found in the stomach and intestines (gastrointestinal parasites). Pasture management is a critical component of effective parasite control. Cattle production relies on the efficient use of grazing for cost effective weight gains; however, grazing exposes young cattle to large numbers of parasite larvae if pasture parasite contamination isn't controlled. Most of the internal parasites of cattle are found in the abomasums (true stomach) or small intestine. *Ostertagia* species are common internal parasites of cattle and can cause significant production losses, severe disease and even death in all classes of cattle. They typical *Ostertagia* spp. Life cycles are direct. Infected cattle pass eggs in the manure, and with favorable weather conditions, the eggs hatch and develop into third-stage, infective larvae in about 14 days.

These larvae move from the manure up moist grass bides and are eaten as the cattle graze. Under normal conditions they do not migrate more than a few feet from the manure pile where they hatched. They penetrate the lining of the abomasums, and mature into egg-laying adults two to four weeks after they're eaten. The fourth stage of the *Ostertagia* life may vary. Sometimes, the immature larvae are able to stay in the stomach glands for up to six months. These are called inhibited or arrested larvae. The ability to inhibit and then stomach glands seems to be triggered by weather, hormones or nutritional factors. This complex life cycle of *Ostertagia* has been divided into three types: Type 1 is when large numbers of infective larvae are eaten over short time and quickly complete their life cycle to become adults. The results of this study showed that non-descript cattle of Cheyyar taluk, Thiruvannamalai District of Tamil Nadu are commonly infected with a various types of gastrointestinal parasite spices with a high prevalence of 76 per cent and generally very high egg / oocyst count. This is similar to that of Vijaya Bhaskara Reddy *et al.* (2012) who has recorded 42.00% of prevalence in cattle and buffaloes in Andhra Pradesh. This finding agrees with the reports by Adejinmi and Harrison (1997) and Biu *et al.*, (2009) that the incidence of parasitic gastro-enteritis of ruminants is usually high especially those kept under traditional methods of husbandry, with insidious effects that undermine host health particularly when compounded by additional stress such as malnutrition (Pal and Qayyum, 1993). The prevalence and seasonal variation in the intensity of parasites of cattle and buffaloes has been observed in different parts of the country (D'Souza *et al.* 1988; Sanyal *et al.*, 1992; Manna *et al.*, 1994; Hirani *et al.*, 1999 and Roy *et al.*, 2004). In these studies also revealed Paramphistomes, Strongyle and Eimeria species as the most common parasites of the non-descript cattle, and are reported as the most incriminated gastro-intestinal parasites of domestic ruminants (Eysker and Ounsun, 1998). Vijaya Bhaskara Reddy *et al.* (2012) also reported the highest incidence amphistomes 180 (22.5%) followed by Coccidia 65 (8.1%), Strongyles 61 (7.6%) and *Fasciola* 30 (3.8%) among cattle and buffaloes in Piler, Chittoor district of Andhra Pradesh. The most prevalent infection was that of Amphistomes (34.21%) which is in agreement with the report of Hirani *et al.* (1999). In this study, younger animals (<12 months) had higher infection of nematodes,

Amphistomes and *Eimeria* oocysts than the adult cattle. Choudhury *et al.,* (1994) concluded that this could be due to heavy grazing in submerged areas. In naturally infected beef suckling calves, the first OPG peak can be observed at about 3 months of age, involving *E. ellipsoidalis*, *E. bovis* and *E. zuernii* (Parker and Jones, 1987). As compared to females, male cattle had higher infection of nematodes, Trematode and *Eimeria sp.* while female cattle had higher infection of Cestodes (6.00%). Among the season (summer and monsoon), cattle had heavier infection of Trematodes only during summer months (32.00%) whereas cattle had heavy infection of nematodes (30.00%), *Eimeria sp* (10.00%) and cestodes (10.00%) during monsoon months. Similarly Dhar *et al.,* (1982), Gupta *et al.,* (1987), Singh *et al.*, (1997) and Khan *et al.,* (1999) reported nematode (Strongyle infection) was more during monsoon months. Soundararajan (2000) also recorded highest egg per gram (e.p.g) during northeast monsoon (June to August) in non-descript cattle and Toda buffaloes in Nilgiris hills of Tamil Nadu. At present, 12 Eimeria species have been identified in Argentina (Sánchez *et al.,* 2005), out of which *Eimeria bovis* and *Eimeria zuernii* are mostly related to clinical episodes. In the present study, the overall prevalence of intestinal parasitic infection (worm count) was 86.00%. Trematodes (*Cotylophoron cotylophorum, Fishoederius elongatus, Gastrothylax* and *Gigantcotyle explanatum),* cestodes (*Moniezia expansa)* and Nematodes (*Haemonchus contortus*, *Mecistocirrus digitatus, Trichostrongylus axei* and *Oeophagostomum radiatum)* were identified in this study. Sey and Eslami (1981) reported *Paramphistomum cervi*, *P. gotoi*, *P. gracile*, *P. microbothrium*,*Cotylophoron* c*otylophorum*, *Gastrothylax crumenifer*, *G. compressus*, *Carmyerius spatiosus*, *Calicophoron papillosus*, *Orthocoelium scoliocoeium* were identified in ruminants of Iran Cattle. The prevalence of *Paramphistomum* in cattle was proved to be 32.0% in the current study. Similar prevalence were recorded by Mogdy *et al.* (2009) who recorded 38.92 % in Egypt and Bouvry and Rau (1984) who confirmed the prevalence of *Paramphistomum* in cattle to be 34 % in Canada. Lower prevalence of *Paramphistomum* in cattle was recorded by Ozdal *et al.* (2010) who recorded 8.95 % prevalence in Turkey.

Similarly, Titi *et al*. (2010) recorded 12% prevalence of *Paramphistomum* in cattle in Algeria and Haridy *et al*. (2006) indicated the prevalence of *Paramphistomum* in cattle to be 7.3 % in Egypt. Higher prevalence of *Paramphistomum* in cattle (40.1%) was recorded by Manna *et al*. (1994) and Sintayehu Melaku and Mekonnen Addis (2012) in Ethiopia. Among the age groups (Young and Adult), younger animals (<12 months) had higher infection of Trematode, Cestode and nematodes than the adult cattle. Sintayehu Melaku and Mekonnen Addis (2012) reported that the adult cattle were highly infected with Paramphistomes than the young animals. The occurrence of parasitic infection was influenced by season. Seasonal influence showed that cattle had heavier infection of trematodes worms during summer months whereas cattle had heavy infection of Cestode worms and nematodes worms during monsoon months. These findings are in accordance with those reported by Hirani *et al*. (1999) and Vijaya Bhaskara Reddy *et al*. (2012). The variation in the incidence of parasitic infections might be due to the differences in the climatic conditions prevailing in the study area. The high prevalence of Coccidia in the month of monsoon might be due to contamination of water bodies which are filled with water resulting from monsoon rains. The onset of southwest monsoon is early during that year in the study area. Roy *et al*. (2004), Hirani *et al*. (1999) and Raman *et al*. (1999) reported the occurrence of different parasitic infections with variable prevalence rates from different parts of country. These variations in the prevalence rates might be due to agroclimatic variations.

The resultant infection pressure by gastrointestinal helminths is more serious in cattle that suffer from acute disease, particularly haemonchosis (*Haemonchus contortus*). Chronic helminthosis is more widespread and probably of more significance in all grazing ruminants (Allonby and Urquahrt, 1975) because of its insidious effects which reduce weight gain, milk yield, wool production and carcass quality, especially in situation where nutrition is poor (Gatani *et al.,* 1997). Haemonchus species are major gastro-intestinal parasites affecting ruminants across the world (Tanveer Hussain *et al.* 2014). In conclusion, the egg output by gastrointestinal parasites; which is an important index to determine the degree of pasture contamination with parasitic eggs / oocysts suggests periodic deworming treatment to the Cattle.

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