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RESEARCH ARTICLE

SURVEY STUDY ON GASTRO-INTESTINAL PARASITES OF BUFFALO IN CHEYYAR TALUK THIRUVANNAMALAI DISTRICT

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ABSTRACT

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 Vembakkam Taluk, Thiruvannamalai District. The work was carried out for six months from March 2016 to August 2016. 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. 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 coccidian parasites identified in this study. 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. 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%), Trematode (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 Trematodes only during summer months (32.00%), 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 elongatus, Gastrothylax crumenifer* and *Paramphistomum cevrvi*. The worms collected from abomasum was *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 cattle.

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INTRODUCTION

The infection with various types of gastrointestinal parasites in buffalo is a worldwide problem (Bennema *et al.,* 2010; Khan *et al.,* 2010; Dorny *et al.,* 2011; Rinaldi *et al.,* 2011). Gastrointestinal (GI) parasitic infections may be considered as one of the major constraints in buffalo production. The infection causes productivity losses through reduced feed intake and decreased efficiency in feed utilization due to subclinical or chronic infections that are responsible for economic losses (Belem *et al.,* 2001; Jittapalapong *et al.,* 2011; Stromberg *et al.,* 2012). GI parasitic infections in buffalo in general cause economic losses to the livestock owner due to decreased milk production (Charlier *et al.,* 2009; Bandyopadhyay *et al.,* 2010). The decreased milk production due to the infection of parasites may be mediated by growth hormone, type I insulin-like growth factor and prolactin, because a decrease of these hormones in serum during lactation in buffalo with positive EPG has been observed in a recent study (Perri *et al.,* 2011). The water buffalo (*Bubalusbubalus*) is important to the economy of several countries, especially in Asia and South America. It is the main dairy animal species in India. Little is known regarding the impact of *coccidiosis* in buffaloes. Buffalo and buffaloes are considered to have common species of *Eimeria* (Levine, 1973), but critical cross-transmissions have not been made because it is difficult to raise these hosts coccidian free. Additionally, *E. bareillyi* has been described in water buffalo (Gill *et al.,* 1963). In a study from India, *E. bareillyi* was non transmissible to buffalo, whereas *E. zuernii*and *E. ellipsoidalis* were cross transmissible (Sanyal *et al.,* 1985). In addition to several

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reports of *E. bareillyi* infection in buffaloes in India, coccidian oocysts have been found in buffaloes from Italy, Turkey, and Brazil. Restani and Tassi (1969) reported *E. bareillyi* oocysts in feces of 23 of 162 buffalo calves from 20 farms in Italian provinces of Caserta and Latina; no mention was made of clinical signs associated with oocysts. Riebeiro *et al.,* (2000)reported eimerian oocysts in all 106 young Murrah buffalo calves from Ribeira Valley, Sa o Paulo state, Brazil; 48 of the these calves had diarrhea. Sayin (1968) described oocysts of 11 speciesin 93.5% of 130 apparently healthy buffaloes from 5 provinces of Turkey. Three, 1-wk-old buffalo calves fed a mixture of *E. bovis*, *E. zuernii*, *E. ellipsodalis*, *E. auburnensis*, and a newspecies, *E. ankarensis* from buffalos, shed oocysts of *E. bovis*, *E. zuernii*, *E. ellipsodalis*, and *E. Auburnensis* but not *E. ankarensis*. *Eimeriabovis*, *E.suspherica*, and *E. clyinderica* oocysts were reported in faeces of 20 Murrah buffalo calves from Malaysia (Sani and Chandrawathani, 1987).

Coccidiosis is an intestinal disease that affects several different animal species including buffalo, sheep, goats, cats, water buffalo, dogs, rabbits, and poultry. Since the disease may result in death especially in young animals, it is the cause of a considerable economic loss in farm animal world-wide (Levine 1985; Mimioglu *et al*., 1969; Pellèrdy 1974; Soulsby 1982). Coccidian species generally have host specificity, and in this respect the species of *E. ankarensis*, *E. azerbaidjanica*, *E. bareillyi*, *E. gokaki*, *E. ovoidalis* and *E.thianethi* have been reported in water buffaloes. Moreover, species found in buffalo, suchas *Eimeriaalabamensis*, *E. auburnensis*, *E. bovis*, *E. brasiliensis*, *E. bukidnonensis*, *E.canadensis*, *E. cylindrica*, *E. ellipsoidalis*, *E. subspherica*, *E. wyomingensis,* and *E. zuernii*have also been reported in the water buffalo (Levine 1985; Pellèrdy 1974; Sayin 1968; Soulsby 1982). The prevalence of helminths in tropical and sub tropical areas has reduced production potential of livestock development programmes by causing countless deaths and economic losses (Al-Quaisy *et al.,* 1987). In Pakistan, parasitism is one of the major menaces for livestock, causing obstacles to the development of a profitable livestock industry, as in sheep (Khan *et al.,* 1999; Iqbal *et al.,* 1993), goats (Iqbal *et al.,* 1993), Buffalo and buffaloes (Hayat *et al.,* 1990). Geoclimatic conditions and a poor awareness of livestock farmers contribute towards a conductive environment for the development and growth of parasites. In spite of significant production losses the problem is neglected due to its chronic and insidious nature (Sanyal, *et al.,* 1992). The potential importance of cross-regulated immune defenses for disease control and public health has been recognized (Bentwich *et al.,* 1999, Elias *et al.,* 2006), but their relevance to the dynamics of infectious diseases in wildlife populations has yet to be demonstrated. Parasites and pathogens represent an increasing threat to natural populations (Harvell *et al.,* 1999; Daszak, Cunningham and Hyatt, 2000), and recently, attention has been focused on examining methods by which disease threats can be managed in free-ranging wildlife (Woodroffe, 1999). Buffalo diseases have been identified as one of the major factor which have disrupted the development of the industry in Asia and have caused substantial economic loss to the poor subsistent farmers in the developing countries. The parasitic diseases are not less important in buffaloes than other infectious diseases. The buffalo milk and meat production of Pakistan are 16.46 and 0.6 million metric tons that are 27.27 and 19.56% of the total world milk and meat production, respectively (FAO, 2000).

The pathogen is exotic to sub-Saharan Africa, and bovine tuberculosis (bTB) is emerging as a wildlife disease in southern Africa. In excess of helminths, buffaloes are suffered from various intestinal protozoan infections also *(*Azam *et al.,* 2002; Nalbantoglu *et al.,* 2008). Coccidiosis can occur at any age of animals, but clinical coccidiosis occurs mainly in young calves (Penzhorn, 2002). They continue to pass oocysts in their feaces (Andrews, 2002). There are 13 known species of *Eimeria,* but not all are pathogenic. Although, coccidiosis is host specific, every host may be infected with several species of coccidia at the same time (Andrews, 2002). The global population of buffaloes (*Bubalusbubalis*) is estimated to be approximately 177.247 million of which 97% (171 million) are found in Asia (FAO. Food and Agriculture Organization. Rome 2008). India has 98.7 million buffalo heads which constitute approximately 55.7% of the total world buffalo population. Buffaloes are raised as economically important animals because they are multipurpose; providing milk, meat and good quality hides. The global population of buffaloes (*Bubalusbubalis*) spread in some 42 countries is estimated to be approximately 177.2 million of which 97% (171 million) and 55.7% (98.7 million) are found in Asia and India, respectively (FAO, 2008). But the coccidiosis in Buffalo are almost a neglected area in our country because of the scarcity of research on this specific topic, especially in buffalos little is known concerning the impact of coccidiosis in buffaloes (Dubey *et al.,* 2008). They are also used as draft animals ("tractors" in Southeast Asia) in agriculture farms, means of transportation, and their dung act as a good fertilizer. Buffaloes are raised as economically important animals because they are multipurpose animals providing milk, meat and good quality hides (Liu *et al*., 2009).

MATERIALS AND METHODS

Four places in Thiruvannamalai District viz., Cheyyar, Vembakkam, Vanthavasi, and Arani were chosen for the study. A total of 50 dung samples were collected from Buffalos. Similarly 50 gastrointestinal tracts of Buffalo were collected in and around Cheyyar Taluk Thiruvannamalai district. All the animals were maintained under extensive system. The Buffalos were penned at night and allowed to graze in the day from 8.30 am to 5.00 pm. Dung sample and gastrointestinal tracts were collected from two age groups (young, <12 months and adult,>12 months) and in two seasons viz, summer (March and May) and Monsoon (June to August). Dung samples were collected from male and female Buffalos whereas gastrointestinal tracts were collected only from male Buffalo, since males only slaughtered for beef. A total of 50 fresh faecal samples were obtained from the rectum of buffalo and individually labeled in polythene bags. The dung samples were collected over a period of six months from January 2016 to June 2016. Dung samples collected were brought to the PG and Research Department of Zoology (Division of Parasitology) Arignar Anna Govt Arts College, Cheyyar for identification of different types eggs/oocysts. For confirmation the samples were sent to Department of Veterinary Parasitiology, Veterinary College, Chennai, Tamil Nadu. Qualitative parasitological examination was performed by faecal sedimentation technique with following standard procedures for the presence of parasitic eggs/oocysts (Sloss *et al.,* 1994; Rathore *et al.,* 2005). Trematodes and Cestodes were placed in a dorso ventral position on a slide. Another slide was placed over the worm and pressed gently until desired flattening was reached. At the stage is, to the end of the slides

was tied together with the 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 it was put in the Acetic Alum Carmine stain (1:7) for 3 days. Then the worms were removed from the stain and de stained 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 (Soulsby 1982; Urquhart *et al.,* 1987; Taylor *et al.,* 2007).

RESULTS

Studies on gastrointestinal parasites of Buffalo in and around Cheyyar Taluk, Thirvannamalai district of Tamil Nadu were carried out for six months from January 2016 to June 2016. Parasitological examination of dung samples revealed the presence of eggs of *Amphistomes, Moniezia sp, Strongyle, Strongyloides and Eimeria sp* (Figure 1 to 5). 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 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 Buffalo shown in Table 1. The overall prevalence of parasitic eggs and oocysts was 92.00 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

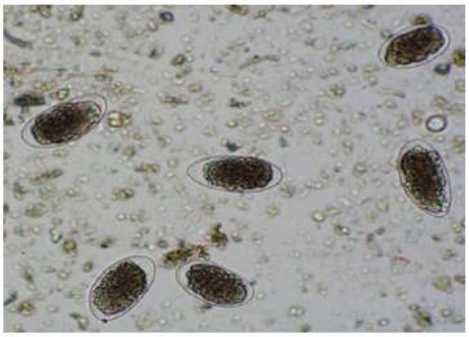
Figure-1

Amphistome eggs

Fiture-2

Moneizia eggs

Figure-3

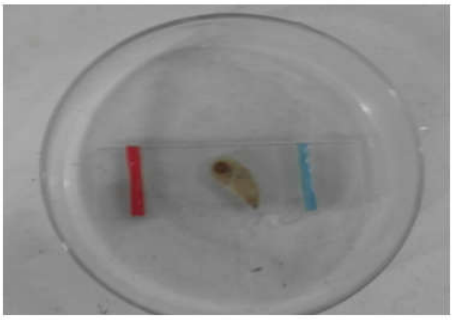


Strongyle eggs

Figure-4

***Strongyloides* eggs**

Figure-5



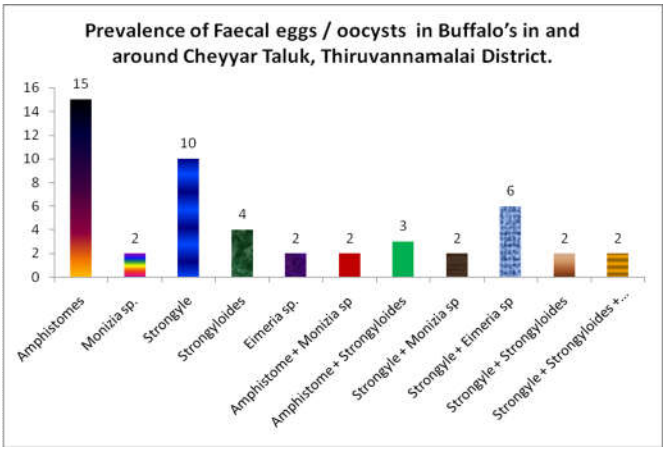
Eimeria Sp

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 prevalence of 15 (36.60 %) and 10 (21.73%) respectively, followed by *Eimeria sp.* oocysts 2 (4.34%) while *Monizia sp*. Egg 2(4.34%) and Strongyloides eggs had third highest with 4 (8.69%). Mixed infection by Strongyle egg + Eimeria oocyst had highest prevalence of 6 (13.04%) followed by Amphistome + Strongyle 3 (6.52%) and with lowest level of Strongyle + Monizia 3 (4.34%) and Amphistme + Moniezia 2 (4.34%) (Table -1 and Graph -1). Of this overall prevalence of 92.00%, 39.13% was infected by nematodes, 34.78% by trematodes, 15.21% by protozoan para site (*Eimeria sp.*) and 10.86% by cestodes (Table 2 and Graph-2). The most common gastrointestinal nematodes observed in this study was the strongyle (21.73%) compared to Strongyloides (8.69%). Single and mixed parasitic infection were also examined in this study in which single infection by trematode (36.60%) and nematode (30.42%) were higher than the mixed infections. The results are given in Table 3 and Graph -3. Table-4 and Graph-4 shows the prevalence of faecal eggs / oocysts in Buffalo in relation to age, sex and season. Among the age groups (Young and Adult), younger animals had higher infection of nematodes (9.36%) and trematode 8 (32.07%) than the adult Buffalo. Among sex, male Buffalo had higher infection of nematodes (43.47%), tremaotode (39.13%) and *Eimeria sp*. (13.04%) while female Buffalo had higher infection of Cestodes (17.39%). Among the season (summer and monsoon), Buffalo had heavier infection of Trematodes only during summer months (40.00%) where as Buffalo had heavy infection of nematodes (50.00%), *Eimeria sp* (11.53%) and cestodes (23.07%) during monsoon months. Table-5 and Graph-5 shows the relative incidence of paracitic infection in pure and mixed form. In the present study, *Cotylophoron cotylophorum, Fishoederius elongatus, Gastrothylax cumenifer* and *Paramphistomum cevrvi*. (Trematode parasites), *Monizia expansa,* (Cestoda parasites), *Strongyle Haemonchus, Controtus, Mecsitistocirrus digitatus, Trichostrongylus axei* and *Oesophagostomum Columbiunum* (Nematode) Mixed parasites Trematode + Cestode, Trematode + Nemato de, Nematode+ Cestode, and Trematode + Cestode +Nematode. *Monizia expansa* and *Eimeria spp were the gastrointestinal parasites found in buffalo.* The Strongyloides was found to be the commonestparasites (25%). Such fining have also been reported by Sharma and Pannde (1963) and Patnaika and Pande (1963). Highest incidence of this Parasite is above studies might be due to parental infection and milk-borne larval transmission as reported by Soulsby (1982). *Monizia* was the second common parasite. The *Moniziaexpansa* was found in only 2% cases. The worms collected from the rumen and duodenum was identified as Paramphistomes viz., *Cotylophoron cotylophorum, Fishoederius elongates, Gastrothylax crumenifer* and *Paramphistomum cevrvi*. The worm collected from abomasum was *Haemonchus contortus*, *Mecistocirrus digitatus, Trichostrongylus axei* and *Oesophagos tomum radiatum* (Nematodes). The worm 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 96.0%. Single infection of termatode (paramphistomes) Termatode had highest prevalence of 16 (33.33%) and Nematode 12 (25.00%) respectively while tapeworm had the lowest with 4 (8.33%).

Table 1. Prevalence of Faecal eggs / oocysts in Buffalo's in and around Cheyyar Taluk, Thiruvannamalai District

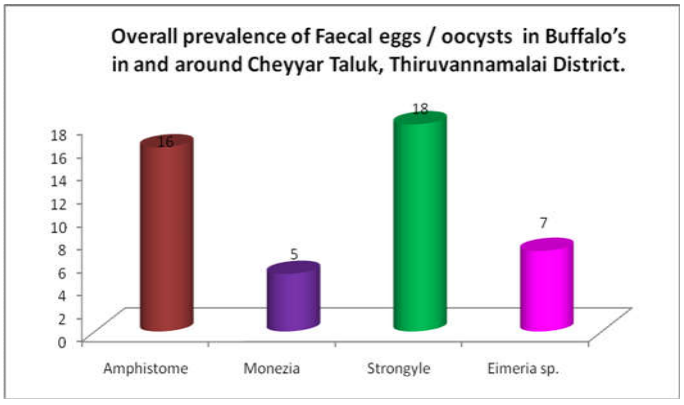
Parasite	Parasitic eggs / oocysts	No. (%) of animals infected (N=50)
	Overall	46 (92.00)
Trematode	Amphistomes	15 (36.60)
Cestode	*Monizia sp.*	2 (4.34)
Nematode	Strongyle	10 (21.73)
	Strongyloides	4 (8.69)
Protozoan parasite	*Eimeria sp.*	2 (4.34)
Trematode + Cestode	Amphistome + *Monizia sp*	2 (4.34)
Trematode + Nematode	Amphistome + Strongyle	3 (6.52)
Nematode + Cestode	Strongyle + *Monizia sp*	2 (4.34)
Nematode + Protozoan parasite	Strongyle + *Eimeria sp*	6 (13.04)



Graph 1.

Table 2. Overall prevalence of Faecal eggs / oocysts in Buffalo's in and around Cheyyar Taluk, Thiruvannamalai District

Parasite	Species	No. (%) of positive
Trematode	Amphistome	16 (34.78)
Cestode	Monezia	5 (10.86)
Nematode	Strongyle	18 (39.13)
Protozoan parasite	Eimeria sp.	7 (15.21)
Total		46 (92.00)



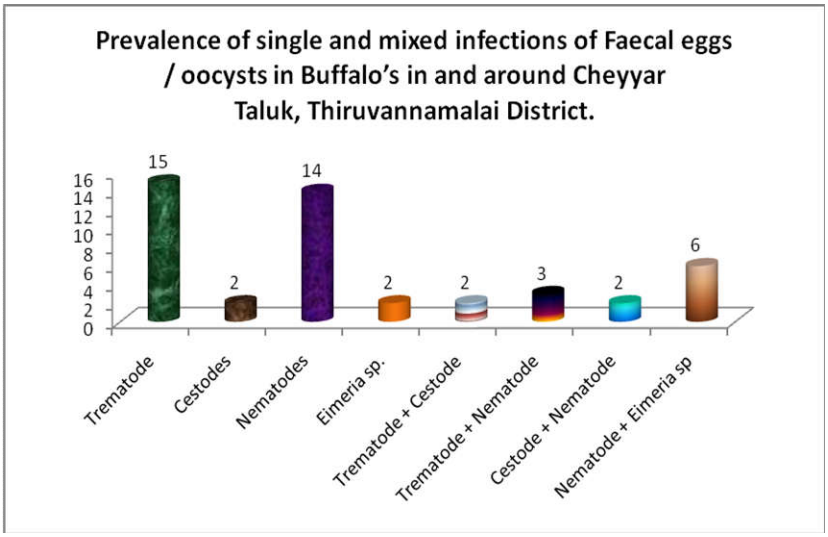
Graph 2.

Table 3. Prevalence of single and mixed infections of Faecal eggs / oocysts in Buffalo's in and around Cheyyar Taluk, Thiruvannamalai District

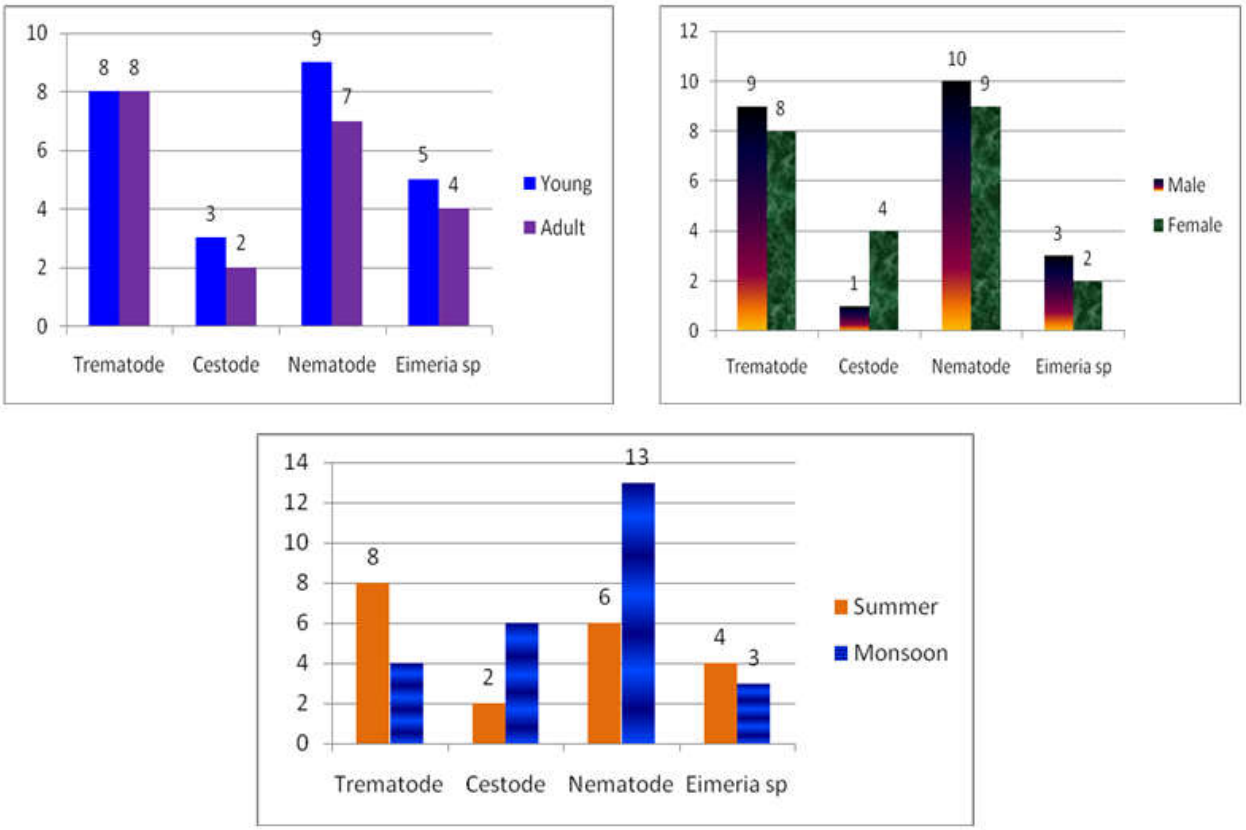
Infection	Parasite	No. (%) of positive
Single	Trematode	15 (36.60)
	Cestodes	2 (4.34)
	Nematodes	14 (30.42)
	Eimeria sp.	2 (4.34)
Double	Trematode + Cestode	2 (4.34)
	Trematode + Nematode	3 (6.52)
	Cestode + Nematode	2 (4.34)
	Nematode + *Eimeria sp*	6 (13.04)

Table 4. Prevalence of Faecal eggs / oocysts in Buffalo's in relation to age, sex and season in and around Cheyyar Taluk, Thiruvannamalai District

Variable	Species	Trematode	Cestode	Nematode	*Eimeria sp*	*Total*
Age	Young	32.07% (8)	11.53% (3)	36.00% (9)	20.00% (5)	25
	Adult	38.09% (8)	9.52% (2)	33.33% (7)	19.04% (4)	21
Sex	Male	39.13% (9)	4.34% (1)	43.47% (10)	13.04% (3)	23
	Female	34.78% (8)	17.39% (4)	39.13% (9)	8.69% (2)	23
Season	Summer	40.00% (8)	10.00% (2)	30.00% (6)	20.00% (4)	20
	Monsoon	15.38% (4)	23.07% (6)	50.00% (13)	11.53% (3)	26



Graph 3.

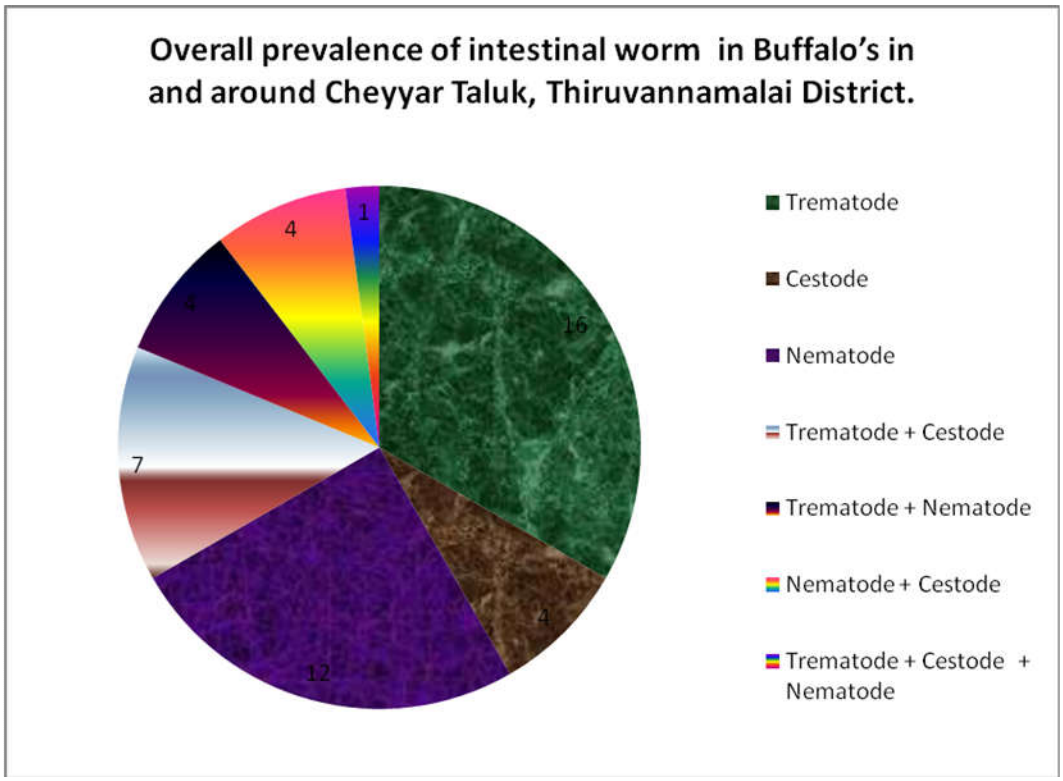


Graph 4. Prevalence of Faecal eggs / oocysts in Buffalo in relation to age, sex and season in and around Cheyyar Taluk

Season

Table 5. Overall prevalence of intestinal worm in Buffalo's in and around Cheyyar Taluk, Thiruvannamalai District

Parasite	Species of the parasite	No. (%) of animals infected (N=50)
	Overall	48 (96.00)
Trematode	*Cotylophorun cotylophorum, Fishoederius elonatus, Gastrothylax crumenifer* and *Paramphistomum cervi*	16 (33.33)
Cestode	*Monizia expansa*	4 (8.33)
Nematode	Strongyle *Haemonchus Contortus*, Mecistocirrus digitatus, *Trichostrongylus axei* and *Oeophagostomum columbiunum*	12 (25.00)
Trematode + Cestode		7 (14.58)
Trematode + Nematode		4 (8.33)
Nematode + Cestode		4 (8.33)
Trematode + Cestode + Nematode		1 (2.08)



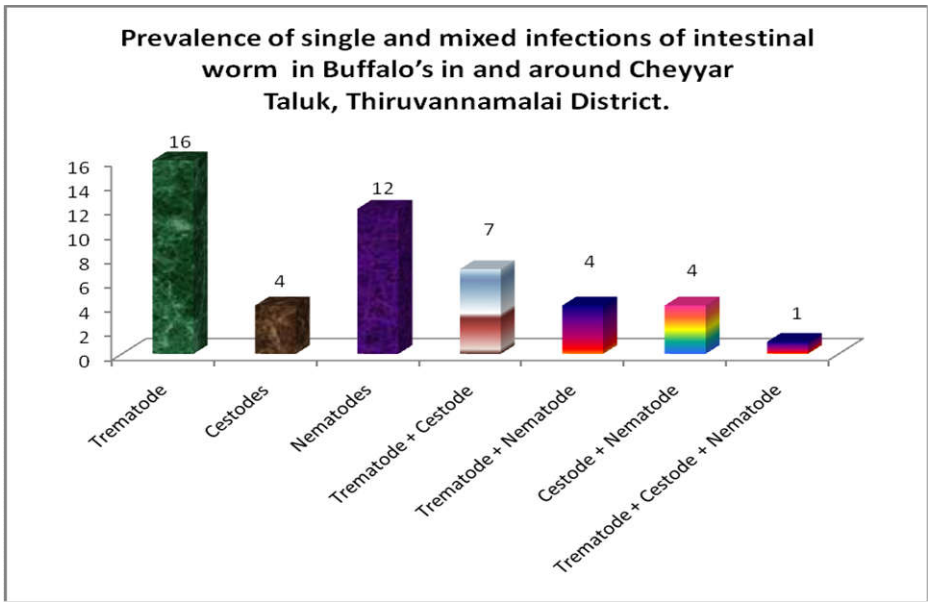
Graph-5

Table 6. Prevalence of single and mixed infections of intestinal worm in Buffalo's in and around Cheyyar Taluk, Thiruvannamalai District

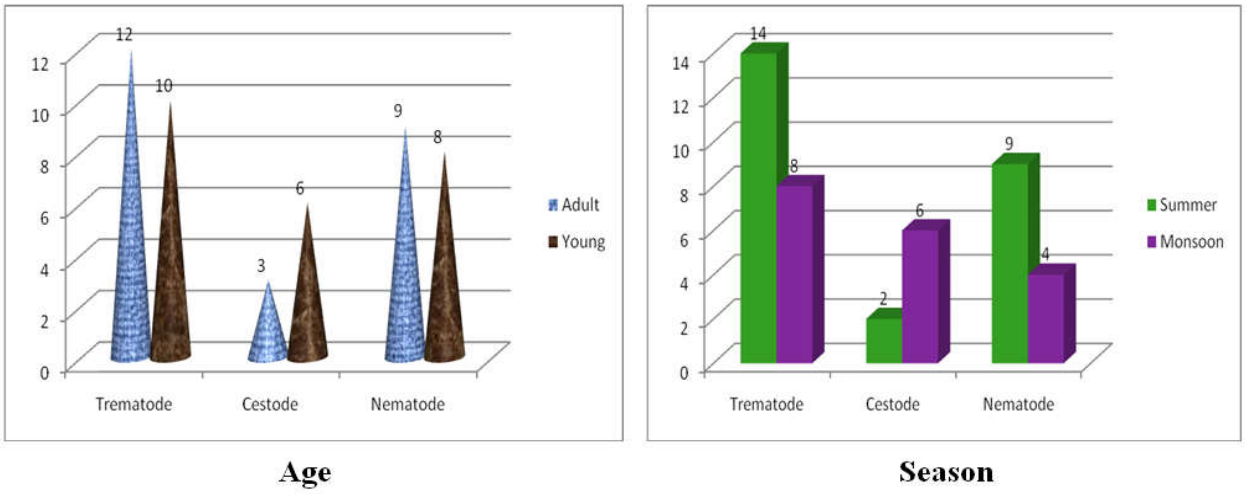
Infection	Parasite	No. (%) of positive
Single	Trematode	16 (33.33)
	Cestodes	4 (8.33)
	Nematodes	12 (25.00)
Double	Trematode + Cestode	7 (14.58)
	Trematode + Nematode	4 (8.33)
	Cestode + Nematode	4 (8.33)
Triple	Trematode + Cestode + Nematode	1 (2.08)

Table 7. Prevalence of intestinal parasites worm in Buffalo's in relation to age and season in and around Cheyyar Taluk, Thiruvannamalai District

Variable		Trematode	Cestode	Nematode	Total
Age	Adult	50.00% (12)	12.50% (3)	37.50% (9)	24
	Young	41.66% (10)	25.00% (6)	33.33% (8)	24
Season	Summer	56.00% (14)	8.00% (2)	36.00% (9)	25
	Monsoon	28.57% (8)	21.42% (6)	50.00% (14)	28



Graph-6



Graph 7. Prevalence of intestinal parasites worm in Buffalos in relation to age, and season in and around Cheyyar Taluk

Mixed infection by Trematode + Cestode worms had highest prevalence of 7 (14.58%) followed by Trematode + Nematode of 4 (8.33%) and Nematode + Cestode of 4 (8.33%) while the lowest by Trematode + Cestode + Nematode worms with 1 (2.08) (Table-6 and Graph-6). Among the age groups (Young and Adult), younger animals had higher infection of trematode (50.00%), nematodes (37.50%) and cestode (12.50%) than the adult Buffalo. All the slaughtered Buffalo were males. Among the season (summer and monsoon), Buffalo had heavier infection of trematodes worms during summer months (38.0%) whereas Buffalo had heavy infection of cestode worms (21.42%) and nematodes worms (50.00%) during monsoon months (Table-7 and Graph-7).

DISCUSSION

Coccidia cause an intestinal disease of young Buffalo, usually 3 weeks to 6 months old, but can affect Buffalo up to 2 years old. They are transmitted when:

1. Infected Buffalo pass cysts in manure on to the ground;
2. Rain washes the cysts from the manure;
3. The cysts develop under moist and moderate temperature conditions; and
4. Buffalo swallow cysts on moist ground.

As with hair worms and lung worms, transmission is common during rainy times in spring and fall. The diarrhea caused by coccidia may be confused with the diarrhea caused by hairworms, bacteria and viruses. Several types of nematodes or roundworms can infect Buffalo. Although there are many species of worm parasites harbored in the gastrointestinal tract of Buffalo, only a few target species are clinically and economically important. Haemonchus place and Haemonchuscontortus are also known as: the barber pole, large stomach, and twisted stomach or wire worms of Buffalo. These worms are found in the abomasums of Buffalo and are notorious blood suckers. Haemonchus are capable of undergoing a period of arrested development which allows them to persist for long periods of time. They have also shown some seasonal inhibition. Generally these nematodes are restricted to the south and southeastern portions of the United States as major Buffalo parasites. *Ostertagiaostertagi* is the brown or medium stomach worm and is recognized as the most

important nematode parasite of Buffalo raised in North America. This parasite is a resident of the abomasum. In Buffalo this worm is able to arrest its development depending upon the season or number of infecting adults. By arresting its development this allows for a longer duration of infection by adults and evading immune regulation by the host. *Trichostrongylusaxei* is the small or minute stomach worm. It is found as resident of the abomasums and is immunologically protected somewhat by co-infecting Ostertagia. This worm is usually found in low numbers and in approximately 10% of animals examined for intestinal parasites. Internal parasites can cause significant production losses in Buffalo, 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 Buffalo. 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 Buffalo serve as hosts for a variety of parasites. The major threat to Buffalo 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. Buffalo production relies on the efficient use of grazing for cost effective weight gains; however, grazing exposes young Buffalo to large numbers of parasite larvae if pasture parasite contamination isn't controlled.

Most of the internal parasites of Buffalo are found in the abomasums (true stomach) or small intestine. *Ostertagia*species are common internal parasites of Buffalo and can cause significant production losses, severed disease and even death in all classes of Buffalo. They typical *Ostertagia* spp. Life cycles are direct. Infected Buffalo 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 Buffalo 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. In this study also revealed Paramphistomes, Strongyle and *Eimeria*species as the most common parasites of the Buffalo, and are reported as the most incriminated gastro-intestinal parasites of domestic ruminants (Eysker and Ounsun, 1998). VijayaBhaskara 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 Buffalo and buffaloes inPiler, 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 Buffalo. 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 Buffalo had higher infection of nematodes, Trematode and *Eimeria sp.* while female Buffalo had higher infection of Cestodes (6.00%). Among the season (summer and monsoon), Buffalo had heavier infection of Trematodes only during summer months (32.00%) whereas Buffalo had heavy infection of nematodes (30.00%), *Eimeriasp* (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 Buffalo and Toda buffaloes in Nilgiris hills of Tamil Nadu.

In the present study, the overall prevalence of intestinal parasitic infection (worm count) was 92.00%. Trematodes (*Cotylophoroncotylophorum, Fishoederiuselongatus, Gastrothylax* and *Gigantcotyleexplanatum),* cestodes (*Monieziaexpansa)* and Nematodes (*Haemonchuscontortus*, *Mecistocirrusdigitatus, Trichostrongylusaxei* and *Oeophagostomumradiatum)* were identified in this study. Sey and Eslami (1981) reported *Paramphistomumcervi*, *P. gotoi*, *P. gracile*, *P. microbothrium*, *Cotylophoroncotylophorum*, *Gastrothylaxcrumenifer*, *G. compressus*, *Carmyeriusspatiosus*, *Calicophoronpapillosus*, *Orthocoeliumscoliocoeium* were identified in ruminants of Iran Buffalo. The prevalence of *Paramphistomum*in Buffalo 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 Buffalo to be 34 % in Canada. Lower prevalence of *Paramphistomum* in Buffalo 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 Buffalo in Algeria and Haridy *et al*. (2006) indicated the prevalence of *Paramphistomum*in Buffalo to be 7.3 % in Egypt. Higher prevalence of *Paramphistomum*in Buffalo (40.1%) was recorded by Manna *et al*. (1994) and SintayehuMelaku and Mekonnen Addis (2012) in Ethiopia. Among the age groups (Young and Adult), younger animals (<12 months) had higher infection of Trematode, Cestodeand nematodes than the adult Buffalo. SintayehuMelaku and Mekonnen Addis (2012) reported that the adult Buffalo were highly infected with Paramphistomes than the young animals. The occurrence of parasitic infection was influenced by season. Seasonal influence showed that Buffalo had heavier infection of trematodes worms during summer months whereas Buffalo 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. 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 agro climatic variations. Paramphistomosis constitutes a major health hazard

to ruminants particularly in low-lying areas where snails are found abundantly during monsoon and post monsoon season. The death rate due to immature paramphistomosis is very high and may go up to 80% in ruminants (Hassan and Juyal, 2006). Adult flukes that live in rumen and reticulum of ruminants do not cause serious problem, but massive number of immature paramphistomes can migrate through intestinal tract causing acute gastroenteritis with high morbidity and mortality rate especially in young animals (Borgia and collis 1989). The resultant infection pressure by gastrointestinal helminths is more serious in Buffalo that suffer from acute disease, particularly haemonchosis (*Haemonchuscontortus*). 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 Buffalo.

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