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COPROSCOPIC PREVALENCE OF MAJOR TREMATODE INFECTIONS OF CATTLE IN AND AROUND BAHIR DAR

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ABSTRACT

A cross sectional study was conducted from November 2013 to March 2014 in Bahir Dar veterinary clinic to determine the coproscopic prevalence of major trematode infections in cattle. A total of 384 cattle were included in this coproscopic study using the sedimentation technique for the recovery of fluke eggs from freshly collected fecal sample directly from their rectum. The results indicated that 337 cattle were found to be positive for fluke eggs with overall prevalence of 87.8%. Flukes recorded were *Paramphistoms* (38.8%) followed by *Schistosomes* (26.6%), and *Fasciola* spp (22.4%). Coproscopic examination further showed that from the total of 384 faecal samples of cattle examined, 106 (27.6 %) were positive for mixed trematode infections. Of the prevalence of mixed infections of cattle, *Fasciola* with *Paramphistomum* was found to be very common. In most cases, there was no a statistically significant variation between fluke infections and associated risk factors. The result of the present study revealed that the prevalence of cattle fluke infection in the study area was relatively high. It could be concluded that cattle trematodes are major obstacles for livestock production and productivity in the study area by inflicting direct and indirect production losses. Therefore, strategic

applications of effective flukicides and keep cattle away from potentially dangerous water habitats were recommended as control measures.

KEYWORDS: *Bahir Dar, Cattle, Trematodes, Sedimentation, Coproscopy, Prevalence.*

1. INTRODUCTION

Ethiopia is believed to have the largest livestock population in Africa, yet produces insufficient animal protein and other livestock products to meet the demand of fast growing human population. The contribution of livestock industry to the national economy is considerably less than its tremendous potential (Malone *et al*., 1989). This is due to several constraints like malnutrition, traditional management practice, poor genetic makeup, and prevailing diseases (Bekele *et al*., 1992). Among the prevailing diseases in the country, trematode parasites are one of the main parasitic problems of cattle and other ruminants lowering productivity and may cause death around the world (Vercruysse and Claerebout, 2001).

These parasitic diseases are found in vast water lodged and marshy grazing field, a condition anticipated being ideal for the propagation and maintenance of the intermediate host snails and hence high prevalence of trematode infection (Solomon and Abebe, 2007).

The class trematoda falls into two main sub classes, the Monogenea, which have a direct life cycle, and the Digenea, which require an intermediate host. The former are found mainly as external parasites of fish, while the latter are found exclusively in vertebrates and are of considerable veterinary importance. The adult digenetic trematodes, commonly called 'flukes', occur primarily in the bile ducts (*Fasciola,* liver fluke), alimentary tract (*Paramphistomum,* rumen fluke) and vascular system (*Schistosoma,* blood fluke). Most flukes are flattened dorsoventrallv, have a blind alimentary tract, suckers, for attachment and are hermaphrodite. However, the sexes are separate in *Schistosomes*. The eggs of fluke parasites pass out of the final host, usually in faeces, and the larval stage develop in a molluscan intermediate host (Urquhart *et al.,* 1996).

The life cycles of flukes are always indirect, involving one or two intermediate hosts before invasion of definitive hosts. The snails such as *Lymnaea truncatula* for *Fasciola*, *Planorbis* or *Bulinus* for *Paramphistomum* and *Bulinus contortus*, *Physopsis africana*, *Physopsis globsa* and *Physopsis nausta* for *Schistosoma* act as intermediate hosts for these flukes (Kahn, 2005).

They are narrowly dependent of their close environment (nature of the soil), and of the climatic conditions for survival and multiplication of the intermediate hosts and also for the survival and evolution of larval stages (miracidium, sporocyst, redia, cercaria, and metacercaria) (Dorchies *et al.*, 2006).

Pathogenesis of fasciolosis varies according to the phase of parasitic development in the liver and species of host involved, essentially the pathogenesis is twofold; the first phase occurs during migration in the liver parenchyma and is associated with liver damage and hemorrhage causing anemia and hypoalbuminemia. The hypoalbuminemia is associated with plasma volume expansion caused by liver damage and reduced albumin synthesis. The second phase occurs when the parasite is in the bile ducts, and results from the hematophagic activity of the adult flukes and from the damage to the mucosa, by their cuticular spines (Urquhart *et al.*, 1996).

The adult *Paramphistomum* in rumen and reticulum is essentially non-pathogenic even though large numbers may present. At most, there may be a localized loss of rumen papillae. However, the immature helminthes attach to the duodenal mucosa by means of a large posterior suckers and causes severe enteritis, possibly necrosis and hemorrhage. In heavy infection a frank hemorrhage, duodenitis, hypoproteinemia, and edema may be produced with immature flukes deeply embedded in the mucosa. Severely affected animals exhibit anorexia, polydipsia, unthriftiness and severe diarrhea. Extensive mortality may occur, especially in young cattle. Older animals can develop resistance to reinfection but may continue to harbor numerous adult flukes (Kahn, 2010).

Schistosomes are found in the portal and mesenteric blood vessels; lay so many eggs that the tiny blood vessels of the host's intestine break open. The broken blood vessels leak both blood and eggs into the intestine. The eggs are not digested by the host and thus become part of the faeces. The principal clinical signs are associated with passage of the spined eggs through the tissue of the gut lumen. The young parasites cause some damage during migration, but most of the lesions are due to the irritation produced by the eggs of parasites in the intestine and other organs, and blood sucking habit of the helminthes worm (Soulsby, 1982).

Cattle trematode infections can be controlled by the application of many methods. The best way to prevent paramphistomosis, fasciolosis and schistosomosis is to keep cattle away from

potentially dangerous water habitats. Drainage or fencing-off of wet areas prevents infection of those parasites but is rarely cost effective on grazing land in developed countries and neither is it feasible in developing countries (Roberts and Suhardono, 1996).

Among the flukicide drugs, praziquantel remains the drug of choice for all trematode infections except fasciolosis. Praziquantel increases cell membrane permeability in susceptible worms, resulting in loss of intracellular calcium, massive contractions, and paralysis of musculature. In addition, it produces disintegration of the *Schistosomes* tegument (Utzinger *et al*., 2001). However, the drug of choice in the treatment of fasciolosis is triclabendazole, a member of the benzimidazole family of anthelmintics. The drug works by preventing the polymerization of the molecule tubulin into the cytoskeletal structures and microtubules (Waruiru *et al*., 1994). Resorantel and oxyclozanide are considered the anthelmintics of choice against both immature and adult rumen flukes in cattle and sheep (Urquhart *et al*., 1996).

Molluscicides have been used successfully as a short-term control method of snail intermediate hosts and can be cost effective but have gained little acceptance (Roberts and Suhardono,1996). The main problems being environmental pollution and killing of non targeted aquatic organisms (Roberts and Suhardono, 1996) and also due to rapid recovery of the snail populations (Woolhouse and Chandiwana, 1990). Therefore, the objective of this study was to identify and explore the status of major cattle trematode parasitic diseases prevalent in Bahir Dar veterinary clinic by classical coprological examination.

2. MATERIALS AND METHODS

2.1. Description of study area

The study was conducted from November 2013 to March 2014 in Bahir Dar town, Northwest Ethiopia. Bahir Dar is located at 11°36' latitude N and 37°23' longitude E in Northwestern part of the country and it is 563 kms away from Addis Ababa. It is the capital city of Amhara National Regional State situated in the Southwest direction of Lake Tana. This town is bordered with Lake Tana and having an altitude ranging from 1600-1800 meters above sea level and has a warm humid climate with an average annual rainfall of 700 mm. The annual temperature of the area ranges from 12.40 -27^{0}C. The landscape is marked by the presence of Lake Tana, which drains a watershed of about 3,000km^2 and areas adjacent to Lake Tana and Abay river have poor drainage and annual over flooding during the rainy seasons leave pockets of water bodies, which persist during the dry months (CSA,2008).

2.2. Study design and sample size

A cross-sectional study on major cattle trematode parasitic infections was carried out from November 2013 to March 2014 in local and cross breeds of cattle in Bahir Dar veterinary clinic. The study cattle were sampled by using simple random sampling technique and a total of 384 cattle were sampled. The sample size for this study purpose was determined according to Thrusfield (2005) as follows:

$$n = \frac{1.96^2 P (1-P)}{d^2}$$

Where, p = Expected prevalence

d = Absolute precision

n = Sample size. By taking P = 50% and d = 5%, $n = 1.96^2\ 0.5(1-0.5) / (0.005)^2 = 384$

The other determinant considered in sample size determination is 95% confidence interval.

2.3. Sampling animals

The sampling units for the study were phenotypically grouped local and cross breeds of cattle, which are frequently managed under the traditional husbandry system. All most all study animals were often kept out-doors and grazed all day near the vicinity of the Lake Tana and the Blue Nile river and its tributaries (Andassa and Tikurit). These areas are used as communal grazing lands and water points for the study animals.

Attempts were made to include all age groups, sex, breed, body condition and address of cattle in the study. Cattle were classified as young (< 2 years), adult (2-5 years) and old (> 5 years) according to the classification used by Almaz and Solomon (2011).

2.4. Detection of trematode parasites

2.4.1. Sedimentation technique

The sedimentation technique is a qualitative method for detecting trematode eggs in the faeces (Antonia *et al*., 2002). Most trematode eggs are relatively large and heavy as compared to nematode eggs. This technique concentrates them in sediment (Hansen and Perry, 1994).

2.5. Coprological examination

While the initial recording of the cattle detail was taken, fecal samples were collected directly from the rectum of the cattle using sterile gloves. The collected faecal samples were placed in clean 10% formalin filled universal sampling bottle and closed with screw top in air tight

condition. The universal bottles were labeled with the unique identification number which matched with the detailed data recorded using the standard format. After labeling with specific identification number, the collected faecal samples were taken to Bahir Dar regional veterinary laboratory, parasitology department for microscopic examination.

2.6. Statistical analysis

Collected data was entered into Microsoft office excel spread sheet and analyzed using SPSS statistics (Version 20.0) software. The prevalence of each parasite infection was calculated as the number of animals' diagnosed positive for a given parasite divided by the total number of animals examined at the particular time (Thrusfield, 2005). Chi-square statistics ($\chi 2$) was carried out to determine the association of the explanatory variables (sex, age, breed, body condition and location) with the prevalence of flukes. The P-value less than 0.05 were taken as statistically significant and greater than 0.05 was taken as insignificant at 95% confidence interval.

3. RESULTS

3.1. Overall prevalence

The results indicated that 337 cattle were found to be positive for fluke eggs with overall prevalence of 87.8%. Of those, 149 (38.8%), 102 (26.6%), and 86 (22.4%) were found to be infected with *Paramphistomum, Schistosoma and Fasciola* respectively. In this prevalence study of flukes, higher percentage was recorded for *Paramphistomum* followed by *Schistosoma* and *Fasciola* (Table 1). Coproscopic examination further showed that from the total of 384 faecal samples of cattle examined, 106 (27.6 %%) were positive for mixed trematode infections. Of these, 46 (12.0%), 37 (9.6%) and 16 (4.2%) were found positive for *Fasciola* with *Paramphistomum*, *Schistosoma* with *Paramphistomum* and *Fasciola* with *Schistosoma* respectively (Table 1). Moreover, this study revealed that there was a concomitant infection with these three parasites with the prevalence of 7 (1.8%) (Table 1). Of the overall prevalence of mixed infections of cattle, *Fasciola* with *Paramphistomum was* found highest.

Table 1: The frequency and prevalence of single and mixed infection of cattle with trematodes.

Trematode egg encountered	No. positive	% (positive)
Fasciola	86	22.4
Schistosoma	102	26.6
Paramphistomum	149	38.8
Total	337	87.8
Fasciola with *Schistosoma*	16	4.2
Fasciola with *Paramphistomum*	46	12.0
Schistosoma with *Paramphistomum*	37	9.6
Fasciola, *Schistosoma* and *Paramphistomum*	7	1.8
Total	106	27.6

3.2. Site specific prevalence

There was a predominant occurrence of fasciolosis in Kebele 11 (45.0%) whereas lower in other Kebeles. The prevalence of cattle schistosomosis (54.8%) and paramphistomosis (64.3%) were found highest in Sebatamit Kebele. However, the occurrences of those parasitic infections were null in Kebele 9 and Gordema respectively (Table 2). Unlike cattle fasciolosis, there was a statistical significance variation between address and the prevalence of paramphistomosis and schistosomosis (P-value=0.000). The highest prevalence of a combined infection with *Fasciola* and *Schistosoma* was found at Andassa (20.0%), but there was no mixed infection with those parasites at Woramit Kebele and Kebele 9. In Kebele 11, the proportion of a combined infection with *Fasciola* and *Paramphistomum (*40.0%) was found highest but there was no a mixed infection with those parasites at Kebele 9, Gordema and Woramit. The occurrence of a concomitant infection with *Schistosoma* and *Paramphistomum* (40.5%) was found highest in Sebatamit. However, there was no a concurrent infection with those parasites in Kebele 9, Gordema and Woramit. The occurrence of concomitant infection with all *Fasciola*, *Schistosoma* and *Paramphistomum* was found highest in Sebatamit but there was no mixed infection with these three trematode parasites in Kebele 9, Kebele 11, Addisalem, Andassa, Gordema and Woramit (Table 2). Of the mixed infections, there was no a statistical significant variation between address and the prevalence of a combined infection with *Fasciola* and *Schistosoma* (P-value >0.05).

Table 2: The prevalence of single and mixed fluke infections of cattle in different localities.

Address	Single infection						Mixed infection							
	Fasc		*Schis*		*Para*		*Fasc* with *Schis*		*Fasc* with *Para*		*Schis* with *Para*		*Fasc, Schis* And *Para*	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Kebele 7	9	28.1	9	28.1	12	37.5	1	3.1	2	6.2	1	3.1	1	3.1
Kebele 9	1	16.7	0	0.0	3	50.0	0	0.0	0	0.0	0	0.0	0	0.0
Kebele11	9	45.0	8	40.0	11	55.0	1	5.0	8	40.0	2	10.0	0	0.0
Kebele 14	16	14.4	16	14.4	22	19.8	2	1.8	4	3.6	3	2.7	1	0.9
Kebele 17	8	25.0	8	25.0	13	40.6	1	3.1	6	18.8	1	3.1	1	3.1
Addisalem	25	22.1	33	29.2	56	49.6	5	4.4	16	14.2	11	9.7	0	0.0
Andassa	2	40.0	2	40.0	3	60.0	1	20.0	1	20.0	2	40.0	0	0.0
Gordema	1	16.7	1	16.7	0	0.0	1	16.7	0	0.0	0	0.0	0	0.0
Sebatamit	11	26.2	23	54.8	27	64.3	4	9.5	9	21.4	17	40.5	4	9.5
Woramit	4	23.5	2	11.8	2	11.8	0	0.0	0	0.0	0	0.0	0	0.0

***Fasc* = *Fasciola, Schis* = *Schistosoma, Para* = *Paramphistomum,* N = number of positive cattle**

3.3. Age specific prevalence

The proportion of cattle fasciolosis, paramphistomosis and schistosomosis were found higher in old (35.1%, 48.6% and 32.4% respectively) than young (16.5%, 37.6% and 28.4%) and adult (23.1%, 37.8% and 24.8%) cattle. There was no a statistical significance variation in the prevalence of single trematode parasitic infections between age groups of cattle (P-value > 0.05). Generally, the proportion of paramphistomosis was found highest in all age groups of cattle in the area. However, the prevalence of cattle fasciolosis was lowest in young cattle although the proportion of paramphistomosis was more or less the same in both young and adult cattle (37.6% and 37.8% respectively). There was no a concomitant infection with all *Fasciola*, *Paramphistomum* and *Schistosoma* in old cattle (Table 3). The current study indicated that there was no a statistical significant difference between mixed infection of trematodes and all associated risk factors apart from address of cattle (P-value > 0.05).

3.4. Sex specific prevalence

The proportion of paramphistomosis and schistosomosis were found higher in male (40.1% and 28.7% respectively) than female (37.9% and 25.1 %) cattle. Similarly, the prevalence of mixed infections of trematodes was found relatively higher in male than female cattle (Table 3). On the other hand, the proportion of fasciolosis was found relatively higher in female (22.9%) than male (21.7%). Analysis of the fecal egg detection result did not show statistically significant difference between sexes as risk factor (P-value > 0.05). This indicates that there is no difference in acquiring trematode parasitic infestation between male and female animals. This might be due to common exposure to a similar trematode parasite

contaminated pasture land by both sex groups and traditionally animals are driven to pasture regardless of sex.

3.5. Prevalence of trematodes based on cattle

The proportion of bovine fasciolosis and schistosomosis were found higher in local breed (27.9% and 24.7% respectively) than cross breed cattle (22.7% and 15.5%). Similarly, the prevalence of mixed infections of flukes was found higher in local than cross breed cattle (Table 3). However, the prevalence of paramphistomosis was higher in cross breed (45.4%) than local breed cattle (36.6%). There was no statistically significant difference in the prevalence of cattle fluke infections and between breeds of cattle (P-value > 0.05).

3.6. Prevalence of trematodes based on body condition

The proportion of paramphistomosis, schistosomosis and fasciolosis were found higher in cattle having poor body condition (49.1%, 33.3% and 31.6% respectively) than thin (41.5%, 33.1% and 24.0%), moderate (31.6%, 16.5% and 16.5%) and good body conditioned cattle (34.8%, 17.4% and 21.7%). Apart from the prevalence of paramphistomosis and fasciolosis, the body condition results indicated that there was a statistically significant variation in the prevalence of cattle schistosomosis among the four groups of body conditions of cattle (P-value = 0.04). There was no mixed infection with *Fasciola* and *Schistosoma* in cattle having good body condition (Table 3).

Table 3: Prevalence of mixed fluke infections of cattle with respect to age, sex, breeds and body condition of cattle.

Factors		*Fasciola* with *Schistosoma*		*Fasciola* with *Paramphistomum*		*Schistosoma* with *Paramphistomum*		*Fasciola, Schistosoma* and *Paramphistomum*	
		N	%	N	%	N	%	N	%
Age	Young (n = 109)	5	4.6	9	8.3	9	8.3	2	1.8
	Adult (n = 238)	9	3.8	30	12.6	24	10.1	5	2.1
	Old (n = 37)	2	5.4	7	18.9	4	10.8	0	0.0
Sex	Male (n = 157)	8	5.1	20	12.7	18	11.5	3	1.9
	Female (n = 227)	8	3.5	26	11.5	19	8.4	4	1.8
Breed	Local (n = 287)	14	4.9	36	12.5	28	9.8	6	2.1
	Cross (n = 97)	2	2.1	10	10.3	9	9.3	1	1.0
Body co.	Poor (n = 57)	4	7.0	7	12.3	5	8.8	2	3.5
	Thin (n = 171)	10	5.8	28	16.4	21	12.3	4	2.3
	Moderate(n=133)	2	1.5	8	6.0	9	6.8	1	0.8
	Good (n = 23)	0	0.0	3	13.0	2	8.7	0	0.0

n = number of animals examined, Body co. = Body condition, N = number of positive cattle, P-Value > 0.05

4. DISCUSSION

The results of the present study indicated that the overall prevalence of cattle fluke infections in Bahir Dar veterinary clinic was higher (87.8%) than the previous studies on cattle trematode infection at Andassa 60.42% (Yeneneh *et al*., 2012), Bahir Dar and its surroundings 34.5% (Derib, 2005) and Jimma 52.53% (Abebe *et al*., 2011). The highest proportion was recorded from paramphistomosis (38.8%) followed by schistosomosis (26.6%) and fasciolosis (22.4%). In previous study the prevalence of paramphistomosis, fasciolosis and schistosomosis at Andassa were 45.83% ,23.96% and 9.89% respectively (Yeneneh, *et al*., 2012) whereas prevalence of those parasites in Jimma were 44.23%, 42.31% and 13.46% (Abebe *et al*., 2011) and 22.6%, 8.7% and 3.2% in Bahir Dar and its surroundings (Derib,2005). In the current study, the proportion of bovine fasciolosis was found lowest. However, in previous studies its prevalence on cattle at Andassa, Bahir Dar and its surroundings and Jimma was higher than bovine schistosomosis.

Generally, the prevalence of paramphistomosis was found highest in this study as well as in the previous studies made by Yeneneh *et al*. (2012), Derib (2005) and Abebe *et al*. (2011) at Andassa, Bahir Dar and its surroundings and Jimma respectively. The highest proportion of *Paramphistomum* infection may account partly by no effective treatment and numerous intermediate hosts. Moreover, adult *Paramphistomum* is very prolific and many eggs are expelled (Dorchies *et al*, 2006). In the current study, the prevalence of paramphistomosis was slightly lower (38.8%) as compared with the previous studies at Andassa 45.83 % (Yeneneh *et al*., 2012) and in Jimma municipal abattoir 44.23 % (Abebe *et al*., 2011). However this finding was found higher as compared with the previous study in Bahir Dar and its surroundings 22.6% (Derib, 2005).

Higher prevalence of bovine fasciolosis has been reported by other researchers such as Bahru and Ephraim (1979) in Kaffa (86%), Yadeta (1994) in Western Showa (82.5%), Dagne (1994) in and around Debre Berhan (80%), Wondwossen (1990) in Arsi administration region (53.72%), Yehenew (1985) in Gondar clinic (52.00%), Fekadu (1988) and Fikirtemariam *et al*. (2009) in and around Bahir Dar (60.2% and 36.72% respectively), Biniam *et al*.(2010) in and around Woreta (41.41%) and Abebe *et al*. (2011) from Jimma municipality abattoir (42.31%). However, the present prevalence in Bahir Dar veterinary clinic was found lower when compared with the above reports. On the other hand, the prevalence of cattle fasciolosis was higher when compared with the prevalence study reported

by Abunna *et al*. (2010) at Sodo municipal abattoir (4.9 %). This discrepancy might be attributed due to the variations in ecological and climatic conditions in the study areas, and management systems (Tesfaheywet and Negash, 2012). However, the prevalence of fasciolosis in the current study was more likely similar to the prevalence conducted by Yeneneh *et al*. (2012) at Andassa livestock research center (23.96%).

In the current study, the prevalence of schistosomosis was slightly higher (26.6%) as compared with the previous studies in Bahir Dar 12.3% (Amero, 1993), 3.2% (Derib, 2005), and 10.93% (Almaz, 2007), in Fogera 13.73% (Mersha et *al*., 2012) and 17.4% (Yalelet, 2004) at Andassa livestock research center 9.89% (Yeneneh *et al*., 2012), and in Jimma municipality abattoir 13.46% (Abebe *et al*., 2011). However, the prevalence of this study was relatively lower than other previous studies conducted in Bahir Dar 33.8 % (Solomon, 1985), 29% (Hailu, 1999), and in Kemissie 28% (Ameni, *et al*., 2001) by faecal examination.

The present study revealed that the proportion of fasciolosis in Kebele 11 and Andassa were 45.0% and 40.0% in that order. These results were relatively higher when compared with the prevalence 36.92 % and 37.09% reported by Fikirtemariam *et al*. (2009) in those Kebeles of Bahir Dar. Apart from cattle fasciolosis, there was a statistical significant variation between address and prevalence of paramphistomosis and schistosomosis.

The results of the current study indicated that the occurrences of major cattle fluke infections were found higher in old cattle than adult and young cattle. This result contradicts the fact that older animals can develop resistance to reinfection (Kahn, 2005), and Fikirtemariam *et al*. (2009) reported that fluke infection was low in animals above 5 years age (old). Analysis of the fecal egg detection results did not show statistically significant difference between age groups of cattle as risk factor.

In the present study, the prevalence of paramphistomosis and schistosomosis were relatively higher in male (40.1% and 28.7% respectively) than female cattle (37.9% and 25.1%). On the other hand, the prevalence of fasciolosis in female (22.9%) was slightly higher than male cattle (21.7%). Similarly, Fikirtemariam *et al.* (2009) revealed that the prevalence of fasciolosis in female (37.33%) was higher than male cattle (35.84%). However, in Yeneneh *et al.* (2012) study the prevalence of schistosomosis and fasciolosis were relatively higher in female (11.22% and 21.45% respectively) than male cattle (4.94% and 19.75%) whereas the prevalence of paramphistomosis was higher in male (48.15%) than female cattle (45.21%).

The prevalence of paramphistomosis was higher in cross breed cattle (45.4%) than local breed cattle (36.6%). Unlike the prevalence of paramphistomosis, the proportion of schistosomosis and fasciolosis were found higher in local breed (27.9% and 24.7% respectively) than cross breed cattle (22.7% and 15.5%). This finding agrees with the result recorded by Yeneneh *et al.* (2012) who noted that the prevalence of schistosomosis and fasciolosis were relatively higher in local Fogera cattle (10.43% and 21.16% respectively) than cross breed cattle (5.13% and 20.51%) although prevalence of paramphistomosis was found higher in cross breed cattle (58.97%) than local breed cattle (44.35%). However, the present finding disagrees with the result recorded by Hailu (1999) who noted that indigenous local Fogera breed is known for its tolerance to parasitic diseases and Fikirtemariam *et al*. (2009) noted that prevalence of fasciolosis in cross breed was higher (60%) than prevalence of fasciolosis in local breed (34.74%) due to lower resistance of cross breed than local breed. The reason may be associated with imbalanced sampling ratio; small sample size of cross breed (n=97) and relatively large sample size of local cattle breed (n=287).There was no significance difference between bovine fluke infections and breed of cattle.

The prevalence of paramphistomosis, schistosomosis and fasciolosis were found higher in cattle having poor body condition (49.1%, 33.3% and 31.6% respectively) than good body conditioned cattle (34.8%, 17.4% and 21.7%). However, in previous study Fikirtemariam *et al*. (2009) reported that the prevalence of fasciolosis in cattle having poor and good body condition was more or less the same (36.87% and 36.58%). Apart from cattle paramphistomosis and fasciolosis, there was a statistically significant difference between prevalence of schistosomosis and body conditions of cattle.

The results of the current study showed that the prevalence of mixed infections with the trematode parasites were 4.2%, 12.0% and 9.6% for *Fasciola* with *Schistosoma, Fasciola* with *Paramphistomum* and *Schistosoma* with *Paramphistomum* respectively. The proportion of the former parasitic mixed infection was lower, but the latter two mixed infections were higher as compared with the prevalence study in Jimma municipal abattoir reported by Abebe *et al*. (2011) as 8.08%, 4.04%, and 0.5% in that sequence. Of the overall prevalence of mixed infections, the proportion of a concomitant infection with all *Fasciola, Schistosoma* and *Paramphistomum* was 1.8%. The results of the current study did not show any statistical significant variation between concomitant fluke infections and risk factors (age, sex, breed and body condition). However, there was a statistical significant difference between the

prevalence of mixed infections and address of cattle apart from mixed infection with *Fasciola* and *Schistosoma*.

5. CONCLUSION AND RECOMMENDATIONS

Cattle trematodosis was found to be highly prevalent in this study area. This study has established that *Paramphistomum* infection was highly prevalent in Bahir Dar. The prevalence of cattle trematode infections was found to be variable in different Kebeles. The prevalence of cattle fasciolosis, paramphistomosis and schistosomosis were highest in old cattle. The result did not show statistically significant difference between cattle fluke infections and sex, age, and breed as risk factors. However, there was a statistically significant difference between the prevalence of cattle schistosomosis and body conditions of cattle. Moreover, the study area is suitable for the survival of the snail, which worsened the situation for the future.

Based on the above conclusive remarks, the following recommendations were forwarded.

- Strategic treatment of cattle by applications of effective flukicides should be accomplished.
- Keep cattle away from potentially dangerous water habitats.
- Measures to reduce snail intermediate host in the environment should be practiced.
- Further study should be conducted to see the seasonal prevalence of trematode infection.

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