

Full Length Research Paper

Study on coprological prevalence of bovine fasciolosis in and around Woreta, Northwestern Ethiopia

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A cross-sectional study was conducted from November, 2009 to March, 2010 to determine the prevalence of bovine fasciolosis in and around Woreta, Northwestern Ethiopia. A total of 384 fecal samples were examined and 159 (41.41%) were found to be positive for fasciolosis. Sex, age, peasant associations and breed were taken into consideration where 40 and 42.25% prevalence were recorded for young and adult animals, respectively. Similarly, 41.43 and 41.38% prevalence were recorded for male and female cattle, respectively. However, no statistical significance ($P > 0.05$) was observed for both variables. The prevalence as determined from coprological examination was highest in Kuher Abo (42.71%), followed by Woreta Zuria (41.58%), Woreta town (41.10%) and Tiwaza kena (40.35%). There was also no statistically significant difference ($P > 0.05$) in infection rate between these kebeles. The result of the study indicated that breed had significant difference ($P < 0.05$) with prevalence of (14.7%) and (44%) in cross and local breeds, respectively. Therefore, further abattoir surveys are recommended to strengthen the result for better understanding on the epidemiology of bovine fasciolosis in the study area.

Key words: Bovine fasciolosis, prevalence, Woreta, coprology.

INTRODUCTION

Fasciolosis is an economically important parasitic disease, which is caused by trematodes of the genus *Fasciola* that migrate in the hepatic parenchyma and establish in the bile ducts (Troncy, 1989). *Fasciola* is commonly recognized as liver flukes and are responsible for wide spread morbidity and mortality in cattle characterized by weight loss, anemia and hypoproteinemia. The two most important species are *Fasciola hepatica* found in temperate area and in cooler areas of high altitude in the tropics and subtropics and *Fasciola gigantica*, which predominates in tropical area (Troncy, 1989).

In Ethiopia, *F. hepatica* and *F. gigantica* infections occur in areas above 1800 m and below 1200 m above sea level, respectively which has been attributed to variations in the climatic and ecological conditions such as rainfall, altitude, and temperature and livestock management

system. In between these altitude limits, both species coexists where ecology is conducive for both snail hosts, and mixed infections prevail (Yilma and Malones, 1998). Fasciolosis caused by *F. hepatica* and *F. gigantica*, is one of the most prevalent helminth infections of ruminants in different parts of the world including Ethiopia (WHO, 1995; Okewole et al., 2000). In cattle, it occurs commonly as a chronic disease and the severity often depends on the nutritional status of the host (Graber, 1978). Fasciolosis causes a substantial economic loss which includes death, loss in carcass weight, reduction in milk yield, condemnation of affected liver, decline production and productive performances, exposure of animals to other diseases due to secondary complications and cost of treatment expenses. Both *F. hepatica* (high land) and *F. gigantica* (low land) type of liver flukes cause severe losses in Ethiopia where suitable ecological conditions for the growth and multiplication of intermediate host snails are available (Anne and Gary, 2006).

The presence of fasciolosis due to *F. hepatica* and *F.*

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gigantica at abattoir surveys in some parts of the country has long been known and its prevalence and economic significance have been reported by several workers (Tadele and Worku, 2007; Gebretsadik et al., 2009; Abunna et al., 2010). But there is still a gap for many potential sites of the country and information is not available to review country wide prevalence and economic significance. Therefore, the objective of the study was to determine coprological prevalence of bovine fasciolosis in and around Woreta.

MATERIALS AND METHODS

Study area

The study was conducted from November, 2009 to March, 2010 in and around Woreta, located 625 km from Addis Ababa and 55 km from the regional capital Bahir Dar in Southern Gondar zone of the Amhara national regional state in North western Ethiopia (Wikipedia, 2007). The area has a latitude and longitude of 11°55' N and 37°42' E with an elevation of 1828 m.a.s.l. The area is characterized agro-ecologically as moist woina dega and the annual rainfall is monomodal ranging from 1103 to 1336 mm and the temperature ranges from 19 to 20°C (ILRI, 2000).

Study animals and type of study

A total of 384 heads of cattle were randomly selected and subjected to qualitative coprological examination. The selected animals were from both local and cross breeds of different age and sex groups. A cross-sectional study was conducted to determine the prevalence of the disease in the study area.

Sampling methods and sample size determination

The animals were selected by using simple random sampling method. To determine the sample size, an expected prevalence of 50% was taken into consideration since there was no research work on fasciolosis in the area. The desired sample size for the study was calculated using the formula given by Thursfield (2005) with 95% confidence interval and 5% absolute precision.

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

Where P_{exp} = expected prevalence; d = absolute precision; n = sample size.

The estimated sample size was 384 animals.

Coprological examination

Coprological examination was conducted on fecal samples collected directly from the rectum of the animals into a universal bottle containing 10% formalin and transported to Bahir Dar Regional Veterinary Laboratory for examination. Sedimentation technique was used to detect the presence or absence of fluke eggs in the fecal sample collected, as described by Antonia et al. (2002). To differentiate between eggs of *Paramphistomum* species and *Fasciola* species, a drop of methylene blue solution was added

to the sediment where eggs of *Fasciola* species show yellowish colour while eggs of *Paramphistomum* species stain by methylene blue (Hansen and Perry, 1994). During sampling information on sex, breed, and approximate age of individual animals were recorded. Age was classified as young (<4 years) and adult (>or = 4 years) (Cringoli et al., 2002). Samples that were not processed within 24 h were stored in a refrigerator at 4°C.

Data management and analysis

The raw data generated from the study were entered into Microsoft Excel database organized and arranged using Microsoft Excel spread sheet computer program and were imported to be analyzed by STATA Version 7.0. Chi-square (χ^2) was used to determine the statistical association between infection rates, age, sex, breed and localities. A statistically significant association between variables was considered to exist if the calculated p-value is less than 0.05 with 95% confidence level.

RESULTS AND DISCUSSION

Fecal examination showed that from a total of 384 fecal samples examined, 159 were found to be positive with an overall prevalence 41.41% (Table 1).

The result of coprological examination was very close to the findings of Haymanot (1990), which reported 42.9% in Eastern Hararghe Administrative region. High prevalence of bovine fasciolosis has been reported by other researchers such as Bahru and Ephraim (1979) in kafa (86%), Yadeta (1994) in Western Showa (82.5%), Dagne (1994) in and around Debre Berhan (80%), Fekadu (1988) around Bahir Dar (60.2%) and Wondwossen (1990) in Arsi Administration region (53.72%). However, the present prevalence was lower when compared with the above reports and this may be due to the expansion of animals' health post at peasant association level and the intervention of nearby private veterinary drug shop and pharmacies. This enables the farmers to have more access for disease control and intervention.

The infection rate of bovine fasciolosis on the basis of breed showed statistically significant difference ($P < 0.05$). Infection rate in local breeds (44%) was higher than cross-breed (14.7%), this could be due to differences in the management practices of the farmers. The local breeds are reared under traditional husbandry system and farmers give more attention to cross-breed than local breeds because of their production differences. Though the number of animals sampled under cross-breed was very small, similar result supporting the present finding was reported by Dejene (2008) and Wondwossen (1990). A prevalence of 41.43 and 41.38% was recorded in male and female animals, respectively. However, there was no statistically significant difference ($P > 0.05$) in infection rates between the sexes. This signifies that sex has no impact on the infection rate and both male and female animals were equally susceptible and exposed to the disease. Similar results that support the present finding were reported by Yehene (1985),

Table 1. Prevalence of bovine fasciolosis by site, age, sex and breed of the animal in the study sites and their statistical significance.

Category	Variable	Animals examined	No. of positive	Prevalence (%)	χ^2	p-value
Site	Tiwaza Kena	114	46	40.35	0.1236	0.989
	Kuher Abo	96	41	42.71		
	Woreta Zuria	101	42	41.58		
	Woreta town	73	30	41.10		
Age	Adult	239	101	42.25	0.190	0.663
	Young	145	58	40		
Sex	Male	210	87	41.43	0.0001	0.992
	Female	174	72	41.38		
Breed	Local	350	154	44	10.961	0.001
	Cross	34	5	14.7		
	Total	384	159	41.14		

Fekadu (1988), Rahmeto (1992), Haymanot (1996) and Abdu (2008). On the contrary, Block and Arthur (1985) revealed a higher prevalence in the male than female. This was probably related to the management system with longer exposure of male outdoor while females are kept in door during pregnancy and lactation. Statistical analysis of infection rates on the basis of age indicated a prevalence of 40.0 and 42.24% in young and adult animals, respectively. Similarly, there was no significant difference in infection rates ($P > 0.05$) among different age groups. This showed that age groups have no effect for the presence or prevalence of fasciolosis; hence, both animals were equally exposed to infection. In this survey, the samples were collected from grazing area or field where both animals shared grazing lands and watering points. In Ethiopia, similar results which support the present finding, that is, an increase prevalence rate as age increases were reported by Wondwossen (1990). On the contrary, results indicating inverse correlation of prevalence rate and age of cattle were reported by Fekadu (1988), Rahmeto (1992) and Dagne (1994). This is the result of acquired immunity which is manifested by humoral response and tissue reaction in bovine liver due to previous challenge (Ogurinide and Ogurinide, 1980)

CONCLUSION AND RECOMMENDATIONS

The present study conducted on bovine fasciolosis for a period of 5 months in and around Woreta indicated that fasciolosis was the most widespread and prevalent parasitic disease affecting the health and productivity of animal with an overall prevalence of 41.41%. Fasciolosis was the disease of primarily concern in the site remarked by its priority list in the disease control program of the study areas. The occurrence is closely associated to the

presence of suitable environmental conditions for the development of snails. Draining or fencing of marshy areas, utilization of swampy areas for crop production, and strategic deworming were recommended at the end of the study. Finally, the author suggested further epidemiological study on biology and ecology of the intermediate host so as to develop a substantiable planning and implementation on the control strategies of the disease.

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