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Study on the Prevalence of Ovine Fasciolosis in Ambasel Woreda, South Wollo Zone, Amhara Regional State, Ethiopia

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ABSTRACT

The present study was carried out in and around Ambasel Woreda namely, Marye, Chafie and Wuchalie from June 2012 to September 2012. Coprological examination was used to determine the prevalence of Ovine fasciolosis. Out of 384 feacal samples examined, 137(35.68%) were found positive for fasciola. Chi-square statistical analysis technique was used to evaluate the variations between the epidemiological area (origin), age, sex and body condition. The prevalence rate of Ovine Fasciolosis with regard to Origin Chafie (31.72%), Wuchalie (34%) and Marye (44.94%), age (young = 17.99%, and adult = 45.7%), Sex (Male = 34.6% and Female = 36.6%) and Body condition (Good = 18.71% and Poor= 47.16%), were found in the study area. According to the result the disease has a statistical significance association with Age (P = 0.031) and body condition (P = 0.0164) but there was no significant difference among sex groups (P = 0.381) and origin (0.246). Feacal examination indicates that fasciolosis is the most important disease of sheep in the study area by the result of coprological examination. Therefore, the present study indicated that Ovine Fasciolosis was widely distributed with high prevalence in the study area.

Keywords: Ambasel, coprology, fasciolosis, ovine, prevalence

Production of sheep for meat, milk, wool, hair, skin, and manure is an attractive agricultural enterprise for Ethiopian farmers because of the relatively low cost of breeding stock, the high productive rate of sheep, and the source of cash income. Sheep require minimal inputs and maintenance costs to live in various conditions, from desert to humid rainforest (Gatenby, 1991). In Ethiopia, sheep are the dominant livestock, providing up to 63% of cash income and 23% of the food subsistence value obtained from production. The sheep population of the country is estimated to be 25.5 million (CSA, 2004). Despite the large size of the sheep population, the productivity per animal and the contribution of this sub-sector to the national economy is relatively low. Endo-parasitic infections, malnutrition, and management problems are known to be the main factors that affect productivity. The various species of gastrointestinal and pulmonary nematodes, trematodes, and cestodes are known to be prevalent in Ethiopia as previously reported (Yilma, 1985) fasciolosis is one of the major parasitic diseases that cause immense economic losses in livestock productivity. Fascioliasis is caused by *Fasciola*, commonly referred to as liver flukes. Fascioliasis is a widespread parasitic disease of sheep, cattle, and occasionally humans. *Fasciola hepatica* and *F. gigantica* were commonly implicated. *F. hepatica* has a worldwide distribution, but predominates in the temperate zones and cool areas of high altitude in the tropics and subtropics while, *F. gigantica* is mostly located in tropical areas (Urquhart *et al.*, 1994). In Ethiopia, the annual losses due to ovine fasciolosis were estimated at 48.4 million Ethiopian per year, of which 46.5%, 48.8%, and 4.7% were due to mortality, productivity (weight loss and reproductive wastage), and liver condemnation at slaughter, respectively (Ngategize *et al.*, 1993).

In Ambasel woreda, especially in marye, chafie and

wuchalie, fasciolosis is the most important disease in sheep production. The main reason is that the area attributes to create a favorable environment for the growth and multiplication of snails as intermediate hosts by providing moisture, from flooding during rainy season and from the irrigation schemes during the dry season. Unfortunately, the data regarding the prevalence and distribution of fasciolosis in sheep and other ruminant species are fragmented or not well documented. Therefore, seasonal coprological studies were designed to investigate the prevalence of *Fasciola* spp. infections in this area and to associate the infection with age, sex, body condition and origin of the animals. Hence present research project was undertaken with the aim to determine the prevalence and assess risk factors of ovine fasciolosis in study area.

MATERIALS AND METHODES

Study Areas

The study was conducted in Ambasel Woreda town Amhara national regional state, south wollo zone. Ambasel Woreda has many peasants associations (PAS) and out of these only three representative PAS namely Wuchalie, Marye and Chafie was selected by considering their similarity in production system, their differences in altitude and livestock populations. Geographically, Ambasel woreda is located at 11º 31' 05''North and 39º 36' 34''East with an elevation of about 3500 meters above sea level. Ambasel woreda receives a mean annual rain fall (RF) of 500-800 Mm3 in bimodal pattern. The long rainy season extends from June to September followed by a dry season ranging from October to February the short rainy season lasts from March to May the average temperature is 19 º c (NMSA, 2005).

Study Population

The study population will be included local breeds of all sheep at different age (young < 1 year and adult ≥ 1 year) and both sex group, which are brought to Marye veterinary clinic for treatment during the study period.

Study Design

The study involved a cross-sectional observation in a multi stag sampling technique. For estimation of disease prevalence (at the standard error of the estimated prevalence (SE, expected prevalence, and precision level), a sample size of 384 sheep were screened for Fasciolosis from July 2012-September 2012. In this study coprological examination were used to assess the disease status in the study area.

Sample size and Sampling Method

The sample were determined by assuming the expected prevalence to Ovine Fasciolosis estimate 50%, the desire sample size for study is calculate using 95% confidence interval and at 5% absolute precession (Thrusifield,1995).

$$n = 2^2 p\left(\frac{1-p}{d^2}\right)$$ where n=sample size required

P = prevalence

d = level of precision

A guess estimate of the probabilities prevalence of 50% where desire confidence level (Cl) is 95% then

$$n = 2^2 p\left(\frac{1-p}{d^2}\right) = \frac{(1.96)^2(0.5)(1-0.5)}{(0.05)^2}$$ =384 animals

Therefore, the samples were collected randomly directly from the rectum of each animal which applied in systematical selected sample in and around Ambasel Woreda clinics.

Study Methodology

Statistical programme SPSS version 15.0was employed for the data analysis. The prevalence was calculated as positive samples dived by the total samples examine and multiply by 100 and used chi square (x^2) test as well as significance p value for comparison of result with dependent variables like age, sex, body condition and sampling agro ecology. The study period range from July 2012 to September 2012. Feacal samples for parasitological examination were collected directly from the rectum of each animal, using disposable plastic gloves and placed in clean screw caped universal bottle and each sample was clearly lablled with animal identification, date, place of sample collection, sex and age of each animal. The samples were preserved with 5% formalin solution or with ice box. The laboratory technique employed by direct

feacal examination and sedimentation using saturated zinc sulphate solution (Hanson and Perry, 1994)

RESULTS

A total of 384 feacal samples were collected from June 2012 to September 2012, 137 (35.68%) were positive for fasciola eggs. There is no statistical variation in the prevalence of ovine fasciolosis with in PAS even if relatively highest in chafie (44.94%) and lowest in Marye (31.72%) (Table 1).

Table 1. The prevalence and association of fasciolosis with regard to different peasant associations (PAS) of Ambasel Woreda

PAS	No. of animals examined	No. of positive animals	Prevalence
Marye	89	40	44.94%
Wuchalie,	150	51	34%
Chafie	145	46	31.72%
Total	384	137	35.68%

X^2 = 3.324 df = 2 P value =0.246

There is significance difference ($p< 0.05$) on the prevalence of ovine fasciolosis between age groups which is 45.7% in adult (significantly higher than young (17.4)) (Table 2).

Table 2. Prevalence of ovine fasciolosis with regard to age in Ambasel Woreda

Age	No. of animals examined	No. of positive cases	Prevalence
Adult	245	112	45.7%
Young	139	25	17.4%
Total	384	137	35.68

X^2 = 4.678 df = 1 P value =0.031

In this study fasciola eggs were detected in (36.6%) of the female and (34.6%) of male sheep but there was no statistically significant difference in prevalence of ovine fasciolosis between sexes (Table 3).

Table 3. Prevalence of ovine fasciolosis with regard to sex in Ambasel Woreda

Sex	No. of animals examined	No. of positive cases	Prevalence
Male	179	62	34.6%
Female	205	75	36.6%
Total	384	137	35.68

X^2 = 0.769 df = 1 P value =0.381

The study was carried out on the prevalence of fasciolosis on the basis of body condition. The results of the study reviled that infection rates in poor body condition animals were significantly higher ($p<0.05$) than that of good body condition (Table 4).

Table 4. Prevalence of ovine fasciolosis with regard to body condition in Ambasel Woreda

Body conditions	Total No. of animals examined	No. of positive cases	Prevalence
Good	155	29	18.71%
Poor	229	108	47.16%
Total	384	137	35.68

X^2 = 10.273 df = 1 P value =0.0164

DISCUSSIONS

The present study was designed to determine prevalence and assess risk factors associated with *Ovine fasciolosis*. It revealed that an overall prevalence of Fasciolosis based on coprological investigation of *Ovine fasciolosis* was 35.68%. The prevalence of the disease in the study area may be attributed to the favorable ecological factors for the snail intermediate host and the parasite. The area is water lodged swampy and marshy area which is suitable for the intermediate host (snail) to continue the lifecycle (Urquhart *et al.*, 1996).

The present finding was not agrees with previous studies observed at different regions by Michael, (2003) who reported the prevalence as 51% in Zeit and Yilma, (1985) 49% in Holeta. This may be due to the difference of the

climatic conditions and geographical regions such as rain fall, temperature and humidity. Prevalence of Fasciolosis has agreed with the previous report by Ahmed *et al.*, (2007) 32.1% in the middle Awash river basin. The reason might be due to the similarity in temperature, moisture, humidity and soil that might favor multiplication of intermediate host, snails. Urquhart *et al.*, (1996) also suggested that the difference in prevalence and severity of the disease syndrome are evident in various geographical regions depending on the local climatic conditions, availability of permanent water and system of management. Marshy area by Marye in the study area combined with the construction of multiple micro dams from this area might be other important factor for the perpetuation of the intermediate host. Moreover, most of plain land of the area contains pockets of water logged marshy areas, which provide suitable habitats year round for the snail intermediate hosts. Such ecological conditions are considerable for breeding and survival of the intermediate host snails and the parasite (Argaw, 1998).

The prevalence of the disease in different PAs of study areas were very closely similar having chafie (31.72%), wuchalie (34%) and marye (44.94%) with non-statistical difference ($P > 0.05$). This non significant difference indicates that there is no difference in the prevalence of the disease. They are ecologically similar having 3500 meters above sea level. (NMSA, 2005). Yilma and Malone, (1998) suggested that distribution of Fasciolosis depends on altitude.

The prevalence of the disease in female and male animals was recorded as 36.6% and 34.6% respectively. There was non-significant difference ($P > 0.05$) between the two sexes indicating that sex seems no effect on the prevalence of the disease. This may be due to the fact that grazing of both sex groups in similar pasture land. Moreover, it might also be that fasciolosis is not a disease directly related to animal reproductive system. Similar results have been reported by Argaw (1998).

The present study indicated that there was highly significant difference between age groups, which agrees with reports of (Ahmed *et al.*, 2007). This study revealed that prevalence of fasciolosis was higher in sheep with increase of age. The younger the age the lower the prevalence and the older the age the higher the prevalence is ($P < 0.05$). This could be due to the fact that young animals are not allowed to go far with adult animals for grazing/feeding reducing the chance of exposure to infective metacercaria as compared to adults.

Study was carried out on prevalence of Fasciolosis on the basis of body condition. The results of this study indicated that infection rates in poor body condition animals were significantly higher ($P < 0.05$) than that of good body conditions animals. This signifies that the importance of Fasciolosis in causing weight loss and is a characteristic sign of the disease. Sheep of poor body condition are vulnerable to parasitic diseases (Devendra and Marca, 1983).

CONCLUSION AND RECOMMENDATIONS

The result of the present study indicated that Fasciolosis is a highly prevalent ovine disease in the study area. However, it is increasingly evident that a proper evaluation of the epidemiology of Fasciolosis is lacking. The relatively high prevalence reported in this study has clearly indicated lack of strategic control measures against the disease as well as poor veterinary services. This high prevalence found in the study area could be also due to the water lodgment which is marshy at grazing areas of animals and the tendency of farmers to graze their animals in these areas because of feed scarcity.

Based on the aforementioned conclusion the following recommendations are forwarded:

- Drainage of swampy areas to reduce the snail population
- Integrated approach, which is a combination of selective chemotherapy and selective vector control, should be considered more practically and economically feasible.
- Training need to be organized to farmers with economical significance and control methods of this disease in the study area.
- Detailed studies should be conducted on the epidemiology of the disease in order to expand and implement disease investigation and control strategy.

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