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Study on Prevalence of Bovine Fasciollosis and its Economic Importance in Damot woyide Woreda Municipal Abattior, Wolaita Zone, South Ethiopia

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ABSTRACT

Fasciolosis is a major parasitic disease, its occurrence being dependent on the presence of biotypes suitable for the parasites as well as the snail intermediate host. A cross sectional study was conducted from August 2024 to April 2025 to determine the prevalence and economic importance of bovine fasciolosis in Damot woyide municipal abattoir. Over all prevalence of 46.87% (180) was observed. Based on body condition of animals, prevalence rates of 73.4%, 61.33%, and 13.57% were recorded for poor, medium and good respectively. The difference between the prevalence of bovine fasciolosis in animal of different body conditions was statistically significant (P<0.05). Of 180 infected livers 55.55%, %, 41.11% and3.33 % were infected with Fasciola hepatica, Fasciola gigantic and mixed, respectively. In view of the current result, fasciolosis could be considered as a major problem in Damot woyide areas as the ecological factors and management conditions are suitable both for the snail intermediate host and the parasite to be maintained. Strategic treatments need to be implemented at appropriate timing with the aim of reducing worm burden from infected animals and preclude pasture contamination. It is concluded that fasciolosis is prevalent in cattle in the study area. Hence, this disease deserves serious attention by the various stakeholders in order to promote the beef industry in the study area in particular and in general in the country.

Keywords: Abattoir, Bovine, Damot woyide, Fasciolosis, Prevalence.

INTRODUCTION

Ethiopia has the largest livestock population in Africa, with 65 million cattle, 40 million sheep, 51 million goats, 8 million camels and 49 million chickens in 2020 [1]. Hence an increase in livestock's production could contribute to the attainment of food self-sufficiency in the country particularly in response to the protein requirement for the growing of human population as well as to enhance the export earnings. Moreover, livestock are important cultural resources, social safety nets and means of saving and are also supply for crop production and transport, as source of meat, milk and source of income [2].

In spite of large livestock population in Ethiopia, the productivity remains marginal and this may be mainly due to drought, infrastructures problem,

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poor husbandry practices, malnutrition, management and the most problem of prevalent diseases. Parasites are a major constriants of production (result in enormous both direct and indirect economic losses) through decreased productivity, reduced immunity, lower fertility, general stress, depression of immune function, costs of treatment and deaths [3].

Fasciolosis is a cosmopolitan's disease, its occurrence being dependent on the presence of biotypes suitable for the para- sites as well as the snail intermediate host [4]. Fasciola species are among the major parasitic diseases that have reduced meat production due to liver condemnation in abattoirs [5]. Fasciola hepatica and Fasciola gigantica remains economically significant parasite of livestock. Both Fasciola hepatica and F. gigantica are the two liver flukes commonly re- ported to cause fasciolosis in cattle. The life cycle of these flukes involves an intermediate host snail L. truncatula and L. natalensi respectively [6].

Among many parasitic problems of farm animals fasciolosis is a major disease, which imposes direct and indirect economic impact on livestock production particularly of sheep and cattle. Available published reports have indicated that bovine fasciolosis causes economic losses of roughly 350 million Birr per annum due to decreased productivity alone. Fasciola hepatica and Fasciola gigantica are the two liver flukes commonly reported to cause fasciolosis in ruminants [7]. Bovine fasciolosis exists in almost all region of Ethiopia. Howev- er, the prevalence, epidemiology and Fasciola species involved vary with locality. This is mainly attributed to the variation in the climate and ecological condition such as altitude, rainfall, temperature and livestock management system [8]. The distribution of F. gigantica was mainly localized in the western zone of the country that encompasses approxi- mately one fourth of the nation.The life cycle of these trematodes involves snail as an inter- mediate host. The disease is responsible for considerable economic losses in the cattle industry, mainly through mortality, liver condemnation, reduced production of meat, milk and wool and expenditures for anthelmintics [9]. The world-wide losses in animal productivity due to fasciolosis were estimated at USD 200 million per annum, to rural agricultural communities and commercial producers with over 600 million animals infected [10]. Damot woyide manucipal abattoir is one of the slaughtering houses where the animal brought for slaughtering from the different altitude and environmental conditions of the area is conducive for the occurrence of Fasciola. However; little information is available about its prevalence and its economic loss due to liver condemnation caused by fasciolosis at Damot woyide municipal abattoir. Therefore, this study was conducted to determine the prevalence of Fasciola species in liver of cattle slaughtered at Bishoftu municipal Abattoir; and to assess the magnitude of the direct economic losses caused by this parasite as consequence of liver condemnation.

Therefore, the objectives of the study were:

- To determine the prevalence of bovine fasciolosis in Damot woyide woreda municipal abattoir.
- To determine direct economic significance of bovine fasciolosis due to liver condemnation.

MATERIALS AND METHODS

Study Area

The study was conducted from August 2024 to April 2025 in Damot woyide woreda municipal abattoir, Wolaita Zone, Ethiopia, which is located at 406 km from Addis AbabaThe annual mean temperature 17.6-25 co and annual mean rainfall ranges 1001-1400 mm. The livestock population was cattle (165,879), sheep (85,841), goat (95,478), equine (7,943) and poultry (105,171). (DWWLFD, 2019).

Study design

A cross-sectional study was conducted to determine the prevalence of liver fluke of cattle which were presented for slaughtered at Damot woyide woreda municipal abattoir and to investigate the direct economic importance of parasite infectious due to liver condemnation of cattle slaughter at Damot woyide municipal abattoir.

Study Population

The study animals were cattle that presented for slaughter purpose at Damot woyide municipal abattoir with different age, breed, and Sex and body condition were used during the study period. The age of animals was determined based on dental eruption pattern and information from the owners, every sampled of cattle was recorded for age and categorized in to adult age and old during sampling. The body condition score was determined and fall in any of the three scores (poor, medium and good) with the criteria for scores.

Sample size and sampling methods

A simple random sampling method was used and animals were selected in the lottery method in which all the ID of the cattle that was transported to Damot woyide woreda municipal abattoir. Possibly, all cattle slaughtered were examined for the presence of fasciolosis. In case of live animal sampling, the animals were selected using simple random sampling method where it was planned to include some 384 cattle. The required numbers of slips were selected at random for the desire sample. The desired sample size was calculated using the standard formula described by with 95% confidence interval, at 5% desired absolute precision and by assuming the expected prevalence of 50% used since there

is no recently reported studies at Damot woyide woreda municipal abattoir. Hence, the sample size was calculated to 384 [2]. The formula given by Thrusfield (1995) is used to determine the number of cattle for sampling as follows: n = 1.962 P (1-P)/d2 where p - Expected prevalence d- Absolute precision n- Sample Size by taking P=50% and d=0.5%, n= 1.962 0.5(1-0.5) / (0.0025) n=384 live animals were sampled

Data Analysis

All the collected data in study period were entered into Microsoft Excel sheet and analyzed by using statistical package for social science (SPSS) software version 20. Descriptive Statistics was used to determine the prevalence through percentage and frequency. The significance of association between and among the considered variables was determining using p-value, chi-square ($\chi 2$) test statistics. Association between variables were said to exist if the calculated level of significance is less than 5% ($p<0.05$) at 95% confidence level.

RESULTS

Postmor tem Examination Inspection

A total of 384 adult indigenous cattle were slaughtered at Damot woyide abattoir and examined for fasciolosis. From the total of cattle slaughtered and examined, 180(46.87%) were found to be positive for lesion of fasciolosis.

Fasciola Species Identification

From a total of 180 livers found positive for fluke infection during post mortem inspection of slaughtered animals, 100 livers (55.55%) harbored F. hepatica, 74 livers (41.11%) F. gigantica, 25 livers (13%) mixed and 6 livers (3.33%) (Table 1).

Table 1. Species composition of Fasciola detected in livers of infected cattle slaughtered at Damot woyide municipality abattoir

Species of Fasciola	No of infected	Percrntage
F. hepatica	100	55.55
F.gigantica	74	41.11
Mixed	6	3.33
Total	180	100

Prevalence of Bovine Fasciolosis Based on Body Condition

Animals brought to Damot woyide Municipal abattoir to be slaughtered were examined and grouped in to three body condition categories. From these categories, the highest fasciolosis prevalence was recorded in poor (73.4%) followed by medium (61.33 %) and good body condition (13.67%) as shown in Table 2. This result revealed the existence of statistically significant ($P<0.05$) difference in the occurrence of Fasciola among the three body condition categories.

Table 2. Host related risk factors for fasciolosis

Body Condition	No of Animals Examined	No of Positive	Prevalence	$\chi 2$	P-value
Poor	94	69	73.4	47.678	0.000
Medium	150	92	61.33		
Good	140	19	13.67		
Total	384	180	100		

Economic loss

The direct annual total financial loss suffered due to fasciolosis infection in Damot woyide municipal abattoir was estimated based on liver condemnation. The economic loss due to liver condemnation was estimated through interview made with local butcher men in Damot woyide, from one-year data recorded from abattoir in this study was 122348 ETB per annum.

DISCUSSIONS

The result of the present study proved the prevalence of fas ciolosis in cattle to be 46.87%. The result of the present study was higher than the findings of [10] that reported 30.1% of prevalence rate at Asella Municipal Abattoir, [11] at Wolaita Sodo (12.7%), 25.6% prevalence of fascioliosis in six districts of Punjab viz., Lahore, Gujranwala, Sheikhupura, Sargodah, Jhang and Faisalabad. On the other hand, present

study shows lesser prevalence as compared with the previous reports in different parts of Ethiopia Mulualem (1998) in South Gondar (83.08%), 81.6% in west shoa by Yadeta (1994), and 83.6% in Debere Berhane. This might be due to difference in climate and ecological conditions such as altitude, rainfall, and temperature and livestock man- agement system and suitability of the environment for survival and distribution of the parasite as well as the intermediate host might have played their own role in such differences [10]. The finding of the present work was found to be in line with that of Mulugeta (1993) and Adem (1994) who revealed 53.5% and 56.6% fasciolosis in cattle in Kombolcha and Zeway abattoir, respectively. The prevalence of fasciolosis was found to be 73.4%, 61.33% and 13.57% in poor, medium and good body conditioned animals, respectively. The results of the present study indicated that infections in poor body condition animals were significantly higher ($P < 0.05$) than that of medium and good body condi- tion animals. This proves the importance of fasciolosis in caus- ing weight loss and emaciation to be a characteristic sign of the disease.

Additionally, this high prevalence of fasciolosis in poor con- dition animals could be justified by the fact given by Devendra and Marca, (1983) who indicated cattle of poor body condition are vulnerable to parasitic diseases. The current finding was seen to be higher than the study of Yohannis (2008) who re- ported 42.4%, 36.8% and 21.8 % for poor, medium and good body condition, respectively. This variation may be attributed to the variations in food availability and management system of the animals between the study areas [12,13]. From the total livers proved to be infected by Fasciola, 49% of them were found to be infected by F. hepatica whereas F. gigantic and mixed of Fasciola species were recorded to be 28.1%, 13% and 9.9%, respectively. Amsalu (2008) reported infection rate of cattle with F. hepatica (55.55%), F. gigantica (41.11%) and mixed infection (3.33%) at Damot woyide municipal abattoir. Wakuma (2009) showed prevalence of F. hepatica (64.5%), F. gigantica (24.8%) and mixed (10.7%) at Bedele municipal abattoir. Tadele and Worku (2007) at Jimma municipal abattoir recorded prevalence of F. hepatica (63.89%), F. gigantica (24.07%) and mixed (16.5%). This difference might be attributed due to differences in season of the study and geo- graphical differences of the study areas. The total economic loss encountered due to condemnation of infested liver from one-year data recorded from abattoir in this study was 122348 ETB per annum. These findings were relatively lower with the results reported by Adem (1994) and Daniel (1995) a total economic loss of about 154, 188 and 215,000 ETB per annum in cattle due to fasciolosis at Ziway and Dire Dawa municipal abattoir respectively. This is probably due to the similarities in ecological and climatic condi- tions between the two localities [14].

CONCLUSION AND RECOMMENDATIONS

This study has revealed that the prevalence of fasciolosis in Damot woyide woreda municipal abattoir was moderate. The present study confirmed that bovine fasciolosis was found prevalent and affecting the health and productivity of animals with an overall prevalence rate of (46.87%) in the study abattoirs. The occurrence of fasciolosis is linked within the presence of ecological and environmental condition which suitable for the development of snail intermediate host and parasite itself. The study confirmed that there was significant difference in the prevalence of fasciolosis within animal body condition or it's more prevalent in cattle with poor body condition scores than medium and good body conditioned animals. This result showed that fasciolosis is an important disease-causing considerable loss of revenue due to condemnation of affected liver in the study area [15-18].

Based on the above conclusion the following recommendations are forwarded:

- Control intermediate host snail by biological control or chemical(molluscides)
- Give awareness for the farmers how to control diseases and regular deworming of animal because prophylaxis is better than curative treatment.
- Further study on epidemiology of the disease, biology and ecology of the snail, intermediate host are useful in planning and programming control strategies
- A combination of control measure includes drainage, fencing and molluscides.
- Strategic anthelmintics treatment with appropriate flukicide drug should be practiced twice a year, before and after rainy seasons

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CONFLICTS OF INTEREST

The Author declares that there are no conflicts of interest.

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