

## Burden of Ovine Fasciolosis in Sherka Woreda Arsi, Ethiopia

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### Abstract

Fasciolosis is an important helminthic infection causing economic losses due to morbidity and mortality thereby contributing to loss in productivity to livestock industry in Ethiopia. A cross sectional study was, therefore, conducted from December 2015 to April 2016 to determine the prevalence of ovine fasciolosis in four peasant associations in Shirka Woreda, Arsi, Ethiopia. Sedimentation technique was employed to detect *Fasciola* eggs during the study. A total of 384 sheep were involved in the study amongst which 118 were found to be positive with an overall prevalence of 30.70 per cent. Zenbahahella, Hanu Jawe, Sole Ferekesa and HelaTijoSero peasant associations (PAs) accounted for 35, 30.8, 34.8 and 23.076 per cent, respectively. The prevalence of fasciolosis was associated with different variables. Young sheep (31.62%) showed higher prevalence rate than adult sheep (29.6%). Prevalence of fasciolosis by sex was 35% and 29.2% in male and female, respectively. In addition, sheep with poor body condition (34%) showed higher prevalence than their counterparts. Over all, none of the variables has shown statistical difference ( $p>0.05$ ). Therefore, based on the above information ovine fasciolosis was prevalent in the studied areas and could be potential basis for economic loss in these areas. Thus strategies aimed at the parasite and its intermediate host as well appropriate grazing management practices in the study area are recommended.

**Keywords:** Fasciolosis; Sherka Woreda; Ovine; Prevalence

### Introduction

In Africa the largest livestock population has been reported in Ethiopia, with an anticipated population of 26.10 million sheep, 21.70 million goats, 47.50 million cattle, 1 million camels and 39.60 million chickens [1]. Small ruminants play a major role in sustaining household stability by serving as sources of meat, milk, skin and generate income. Besides they play traditional social and religious roles [2]. In Ethiopia sheep are the dominant livestock providing up to 63% of income and 23% of the food subsistence value obtained from livestock production [3]. Regardless of the large size of sheep population and high potential of productivity in the country, the contribution of this sub-sector to national economy is relatively low due to multitude of constraining factors including malnutrition, diseases, improper healthcare and other management problems [4]. The annual loss due to ovine fasciolosis in central Ethiopia was estimated to be 48.4 million Ethiopian Birr of which 48.8, 46.5 and 4.7% were due to loss of productivity, mortality and liver condemnation, respectively [5].

Parasitic diseases are the common infections that affect productivity in small ruminants [6,7]. Vast number of parasitic diseases is incriminated to play a harmful effect for production of small ruminants leading to serious economic loss [8-10]. One of the helminthosis that causes immense direct and indirect losses especially in domestic ruminants is fasciolosis [5,11]. It is one of the most common helminth infections of ruminants in different parts of the world particularly in its sub-clinical forms [12,13]. Sub-clinical forms can cause reduced feed efficiency, weight gains, milk production, reproductive performance, carcass quality and condemnation of livers at slaughter [14]. In domestic ruminants *Fasciola* species are commonly found as a cause for liver fluke disease particularly in temperate parts of the world. Their life cycle requires the existence of a suitable snail intermediate host in which development of miracidium through metacercariae (infective stage) occurs. The factors that favour the production of metacercariae necessary for outbreaks of fasciolosis includes temperature ( $\geq 10^{\circ}\text{C}$ ), availability of snail habitat and moisture [15]. The two species usually implicated in causing the disease are *F. hepatica* and *F. gigantica*

[16]. The incidence of the disease has increased in the last few years as a possible consequence of changes in the global climate. Future predictions also suggest that this trend is likely to continue [17].

Though a lot of research work has been done on the prevalence and economic significance of ovine fasciolosis in Ethiopia, so far no information has been published on ovine fasciolosis in the present study areas where the local farmers consider sheep an important asset. Hence the current study aimed to determine the prevalence of ovine fasciolosis and associated factors in Sherka district, Arsi Zone, Ethiopia.

### Materials and Methods

#### Study area

The study area is found in south Eastern Oromia regional state in Arsi zone which is located 265 km south East of Addis Ababa. Its altitude is between 1500-3400 m with an average altitude of 2450 m above mean sea level. The average temperature is  $18^{\circ}\text{C}$  which varies between  $10^{\circ}\text{C}$  to  $25^{\circ}\text{C}$ , with an annual average rain fall of around 1000 mm. The livestock population of the district is estimated at 214111 cattle, 50220 sheep, 47203 goats, 15255 horse, 20819 donkeys, 8899 mules, 96363 chickens and 2557 beehive colonies [18].

#### Study animals and sampling method

Indigenous sheep kept under traditional extensive management

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system were used for the study and were distributed in different groups according to the body conditions, sex and age. The Sample size was determined according to the formula given by Thrusfield with a 50% expected prevalence (considering no previous study was undertaken), 95% confidence level and 5% precision [19].

**Sampling technique:** Four PAs namely: Zenbahahela, Hanu Jawe, Sole Ferekasa and Hella Tijo Sero were selected by considering the population size of sheep in the area. Individual animals were selected using simple random sampling technique. Accordingly, the sample size for each PAs was determined based on proportional allocation (Table 1).

**Body condition scoring:** Body condition of each animal was determined based on the criteria set by Thompson and Meyer [20]. Using the 5 point scale (1=very thin to 5=obese) animal were visually assessed followed by palpation of the area around the lumbar vertebrae between the back of the ribs and the front of the pelvic bones. However, for convenience, sheep were classified into groups with poor and good body conditions.

**Determination of age:** The age classification was based on dentition as indicated by Vatta et al. was conveniently categorized as adults and young [21].

### Sample collection, transportation and examination

Faecal samples were collected directly from sheep and placed in sampling bottles and preserved in 10% formalin. Sample was taken to Asella regional laboratory after labeling with animal identification, age, sex, owner name and site of sample collection. Carpalogical examination was performed to detect *Fasciola* eggs in the faeces by using the standard sedimentation technique described by Gupta and Singla [22].

### Statistical Analysis

Prevalence was defined as the percentage of sheep positive for *Fasciola* eggs. Chi-square ( $\chi^2$ ) was used to measure the association of fasciolosis with variables using SPSS V.15.  $P < 0.05$  was considered as statistically significant.

### Results

Over all prevalence of fasciolosis in the study was 30.75% (n=118). The prevalence of fasciolosis in the four PAs was 35, 30.8, 34.8 and

23.08% for Zenbahahella, Hanu Jawe, Sole Ferekasa and HellaTijo Sero, respectively. Prevalence rate among young (31.6%) and adult (29.6%) animals was compared but was not statistically significant ( $p > 0.05$ ). The overall prevalence of fasciolosis in male and female sheep was 35% and 29.2%, respectively. Although the prevalence was relatively higher in male sheep the difference was not statistically significant ( $p > 0.05$ ). The prevalence of fasciolosis in sheep with poor body condition was 34% while in those with good body condition was 27.8%. The difference in the prevalence among the two groups in body condition score was not statistically significant ( $p > 0.05$ ) (Table 2).

### Discussion

The overall prevalence of fasciolosis in the study areas was 30.7%. The finding was in agreement with Dinka [23] who reported prevalence of 32.7% in Asella. The prevalence of fasciolosis in this study was higher than the prevalence of 14.6% reported in Hirna [24], 13.4% in Nekemte [25] and 13.2% in middle awash river basin. The prevalence in the current study was lower than the one reported in Kemisse, 49% [26], in Holeta 53% [27], Eastern Gojam 63% [28] and in western Shoa 73%. The variation in prevalence might be due to the differences in rain fall, temperature, moisture, humidity, soil and other ecological factors that could influence the parasite lifecycle as well as the efforts exerted towards the control of the infection. No statistically significant difference was observed in the prevalence of fasciolosis in males and females. Aseged, Ahmed et al. and Ayalew also reported the absence of significant difference in the prevalence between the sexes [5,26,29]. The possible explanation for this could be due to similar exposure of the sheep in grazing areas irrespective of their sex. In the current study young sheep showed relatively higher prevalence than adult. Similar findings were reported by Eyerusalem et al. and Michael [30-32]. The possible explanation might be the repeated exposure to fluke infection that might cause development of certain level of immunity in the adults in contrast to younger ones, as a result hampering the establishment of infection in the adults.

The results of the study showed that higher prevalence of fasciolosis in sheep with poor body condition than in the animals with good body condition. Similar to our finding Molelegne et al., Yemisirach and Mekonnen also found that sheep with poor body condition had higher prevalence than their counterparts [33]. This could be explained by the fact that sheep with poor body conditions are less resistant and are consequently vulnerable to infectious diseases [34].

Peasant Association	Sheep population size	Proportional allocation
Zenbahahella	2000	100
Hanu Jawe	1040	52
Sole Ferekasa	2300	115
Hella Tijo Sero	2340	117
<b>Total</b>	<b>7680</b>	<b>384</b>

Table 1: Peasant association versus distribution of sheep in the study.

Category	Number of sheep	No. positive	Prevalence (%)	$\chi^2$ p value
PAs	Zenbahahella	100	35	0.194
	Hanu Jawe	52	16	
	Sole Ferekasa	115	40	
	HellaTijo Sero	117	27	
Age	Young	215	68	0.375
	Adult	169	50	
Sex	Male	103	36	0.168
	Female	281	82	
Body condition	Poor	215	73	0.068
	Good	169	45	

Table 2: Prevalence of ovine fasciolosis in relation to peasant associations, age, sex and body condition.

## Conclusion and Recommendations

The study has investigated the prevalence of ovine fasciolosis in Sherka Woreda Arsi, Ethiopia in four peasant associations and found overall prevalence of 30.7%. It was noted that fasciolosis was relatively higher in the sheep with poor body condition score than their counterparts. However, immunoassays together with faecal examinations need to be conducted to have more accurate data on the burden of ovine fasciolosis. Strategies aimed at deworming in the study areas have to be implemented to minimize the effect of fasciolosis in sheep. Training has to be given to farmers about the prevention and control of fasciolosis. Studies on the epidemiology of fasciolosis in order to expand and implement disease investigation and control strategy should be conducted.

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## Author's Contribution

Yoseph Cherinet Megerssa designed the study and helped in analyzing the data. Tafa Bekele Jima collected samples, done the laboratory analysis and completed his BSc degree using the data. Fanos Tadesse W/Mariam and Yemsrach Miressa Diriba assist in analysis and editing of the manuscript.

## Conflict of Interests

No conflict of interest or relevant financial disclosure.

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