BirEx JOURNAL
Budapest International Research in Exact Sciences
Medical, Biological, Argiculture, Engineering
Science and other related areas
e-ISSN : 2655-7827
p-ISSN : 2655-7835
http://www.bircu-journal.com/index.php/birex

# Prevalence and Financial Significance of Bovine Fasciolosis in Oda-Bultum District, West Hararge, Oromia Regional State, Ethiopia

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**Absract:** *A study was conducted from November 2010 to February 2011 to determine the prevalence and estimate the economic loss of bovine fasciolosis in OdaBultum district based on the carpological examination and abattoir survey. Out of total of 384 fecal samples taken from cattle and examined, 182 (47.39%) were found positive for fasciolosis ,prevalence on months basis revealed higher prevalence rate (48.78%) in January and the lower (43.47%) was observed in November. No statistically significant variation (p>0.05) was observed in the monthly occurrence of the disease. Among the three localities (Godahora, Odaroba and Odabiyyo) from which fecal samples were taken higher infection rate (48.75%) was recorded in Odabiyyo while the lowest (46.27%) was noted at Odaroba. Statistical analysis of the result revealed no significant differences in prevalence among the three localities. Prevalence among the age groups showed 48.32% and 46.75% in young and adult age groups, respectively. No statistically significant difference in prevalence was seen between the two age group (p>0.05). Prevalence on the basis of sexes indicated 50% in male and 45.53 in females but the difference was not statistically significant (p>0.05). A four month post mortem examination of 197 cattle slaughtered at baddessa town municipal abattoir revealed the overall prevalence of 47.68%. Statistical analysis showed that there was no significant variation in monthly prevalence during the study period (p>0.05). Analysis of economic losses associated with liver condemnation in the study abattoir indicated a total of 13,498 ETB has been estimated to be lost each year in the abattoir as a result of fasciolosis. The current study has indicated that disease is of considerable economic significance therefore, calls for implementation of an appropriate control measures.*
**Keywords:** *OdaBultum; Badessa; Fasciolosis; cattle; coropological examination; abattoir*

## I. Introduction

Ethiopia owns a huge livestock population but the productivity of these animals is very low and animal protein consumption of the human population is less than half a gram per person per day. The major problem that cause low productivity are related to malnutrition, low genetic potential, poor management practice, poor socio economic development and rampant disease (Azage et al., 1991; ILCA, 1991; Yilma and Molone, 1998).

Among the diseases causing serious problem, parasitism represent a major drawback on livestock production in tropics (Ogunrinade and Adog Oke.,1982). Among the parasitic disease, fasciolosis is important parasite which impose direct and indirect economic loss on livestock. In addition the disease occasionally affects humans, thus considered as a zoonotic infection (Okewole et al.,2000., WHO, 1995).

Fasciolosis is one of the most widespread ruminant helminthosis in the world caused by fasiciolidaetrematodes of the genus Fasciola,whichi migrate through the hepatic parenchyma, establish and develop to the adult stage in bile ducts, Fasciolosis, caused by Fasciola hepatica and Fasciola hepatica and Fasciolagigantica, is one of the most prevalent helminth infections

of ruminants in different part of the world including Ethiopia, it causes significant morbidity and mortality (Okewole et al., 2000; WHO, 1995).

Fasciolosis is characterized by weight loss; anemia and hypoproteinamia.The two most important flukes are Fasciolahepatica, which is found in temperate and cooler areas of high altitude and Fasciolagegantica which is predominant in the warmer tropical areas. It causes severe losses in many part of Ethiopia where suitable ecological conditions for the growth and multiplication of intermediate host snail are found especially in areas with seasonally flooded pastures. Grazing in the area of Lake Grove, slowly flowing water ways and banks of rivers are among the conductive environmental conditions for breeding of snail vector of Fasciolosis (Adem, 1994).

## II. Materials and Methods

### 2.1 Study Area

OdaBultum is one of the 13 districts of west Hararge Administrative zone of Oromia National Regional state. The Capital city of the district, baddessa is found 364 Km. East of Addis Ababa and 38 km from zonal city Chiro. OdaBultumworeda has a total area of 13042 Hektare. The altitude of area ranges between 1500 m a.s.l. (lowland) and 2250 m a.s.l. (highland). The temperature of the area ranges from 22c to 28c. Agro-ecologically the area is categorized as 4% highland, 31% midland and 65% lowland. OdaBultum district receives relatively high amount of annual rainfall which ranges from 900mm – 1200mm. It has Bimodal types of rainfall distribution which extends from May to September.

Like in other parts of the country, farmers in OdaBultum district practice crop-livestock mixed farming system. The livestock population data of the District is presented in table 1

**Table 1.** Livestock population in Oda Bultum District

| No. | Type of livestock | Population |
|---|---|---|
| 1 | Cattle | 96170 |
| 2 | Sheep | 12020 |
| 3 | Goat | 42132 |
| 4 | Horse | 131 |
| 5 | Mule | 163 |
| 6 | Donkey | 16710 |
| 7 | Camels | 7012 |
| 8 | Poultry | 54716 |
| 9 | Bee hives | 8642 |

Source: Oda Bultum District Livestock Production and Marketing Agency Office

### 2.2 Study Animals

Study animals comprise cattle that were grazing in damp areas, those cattle brought to the OdaBultum veterinary clinic for treatment, or accompanying sick animals, and for other veterinary service. All the samples were taken from local zebu breeds. In addition, a complimentary investigation on the prevalence of bovine fasciolosis in the study area was made on cattle slaughtered at Baddessa municipal slaughter house. All the cattle slaughtered were local zebu breeds. The animals used in this study originated from various areas around OdaBultumworeda. In all cases, approximate age and sex were recorded.

**A. Study Design**

A cross-sectional study was conducted from November, 2010 to February 2011 to determine the prevalence of bovine fasciolosis in OdaBultum district. The sampling technique utilized was total sampling of cattle encountered at grazing sites, Clinic (for carpological Survey) and cattle slaughtered at Baddessa town municipal abattoir (forabattoir survey) .

**2.3 Study Methodology**

**A. Coprological Examination**

This was done through field and clinical survey. Field Survey: during the field survey which was conducted from November 2010 to February 2011, fresh fecal samples were collected from cattle grazing in the various pasture fields. For this survey three sampling sites, (Godahora, Odaroba and Odabiyo) were selected. Fecal samples taken directly from the rectum of 236 cattle, put into sampling bottle and labelled. Approximate age and sex ofthe animals were recorded and the collected samples were taken to Baddessa veterinary clinic Laboratory. In the laboratory, coproscopic examination was performed according to the sedimentation technique described by Hansen and Perry (1992) (ANNEX I).

Clinical Survey; in this survey a total of 148 fecal samples collected from cattle brought at Baddesa Veterinary clinic for various reasons and examined according to the Laboratory procedure and technique described by Hansen and Perry, 1992 (ANNEX1).

**B. Abattoir survey**

During the period from November 2010 to February 2011, livers from 197 cattle slaughtered at Baddessa Municipal slaughterhouse were systematically inspected. The sex and approximate age of slaughteredanimals were registered.

The livers were examined by visualization, palpation and systemic incision, following routine meat inspection procedure and livers condemned unfit for human consumption do to fasciolosis were registered during the examination.

All affected livers were totally condemned, partial condemnation was not at all practiced in the abattoir.

The economic loss associated with condemnation of liver due to fasciolosis at Baddessa municipal slaughterhouse was estimated from the summation of annual loss from liver condemnation.

The annual liver condemnation rate was assessed considering the overall of the disease versus a function of the total annual slaughter rate. Annual slaughter rate was estimated from the retrospective abattoir record of the last two years, while retail market price of the average sized zebu liver was determined from interviews made with local butchers in baddessa Town. Information obtained was then subjected to mathematical computation using the formula set by Ogunrinade and Ogunrinade (1980).

**ALC=CSR X L C X P**

Where: ALC =Annual loss from liver condemnation
CSR=Mean annual cattle slaughtered at Baddessa Municipal Abattoir.
LC=Mean cost of one liver at present
P=prevalence of disease

*Budapest International Research in Exact Sciences (BirEx) Journal*
*Volume 1, No 4, October 2019, Page: 103-111*
*e-ISSN: 2655-7827 (Online), p-ISSN: 2655-7835 (Print)*
*www.bircu-journal.com/index.php/birex*
*emails: birex.journal@gmail.com*
*birex.journal.ga@gmail.com*

### 2.4. Data Analysis

The result obtained in different parts of the study were first entered in MS-excel, 2007 and subjected to statistical analysis using Stata version 10.0 statistical software (Stata Corp.2009).

## III. Results

### 3.1. Coprological Results

Coprological examination conducted from November 2010 to February 2011 Showed that from a total 384 feacal samples taken from cattle and examined, 182 (47.39%) samples were found to be positive for fasciola eggs. The higher monthly prevalence (48.41%) of fasciolosis was recorded in January, while the

Lower (43.48%) was seen in November. The difference in monthly prevalence was not statistically significant (p>0.05), (Table 2).

**Table 2.** Monthly Prevalence of Bovine Fasciolosis.

| Month | Number of Animals Examined | Number Prevalence (%) Positive Animals |
|---|---|---|
| November 43.48% | 46 | 20 |
| December 47.17% | 106 | 50 |
| January 48.41% | 123 | 60 |
| February 48.11% | 109 | 51 |
| Total 47.39% | 384 | 182 |

$X^2_{Cal}$*0.3595 p=0.948*

Clinical survey revealed that out of 148 cattle sampled for corpological examination, prevalence of 46.62% was not noted (Table 3).

**Table 3.** Prevalence of Bovine Faciolosis in Cattle Presented to Badessa Veterinary Clinic

| Number of Animal Examined | Number of Animals | Prevalence (%) |
|---|---|---|
| 148 | 69 | 46.62% |

The prevalence of bovine fasciolosis on locality basis indicated that from the three selected sampling sites, the higher prevalence (48.75%) observed at Odabiyyo and the lower prevalence (46.26%)were recorded in Odaroba (table 4).But the difference was not statistically significant.

**Table 4.** Prevalence of Bovine Fasciolosis at Three Selected Area

| Survey area | No. of Animals Examined | Number Positive Animals | Prevalence (%) |
|---|---|---|---|
| Godahora | 89 | 43 | 48.31% |
| Oddaroba | 67 | 31 | 46.27% |
| Oddabiyyo | 80 | 39 | 48.75% |
| Total | 236 | 113 | 47.88% |

**x2calcal=0.1007, P=0.951*
*The statistical analysis of the prevalence between age groups indicated that there is no significant difference in infection rate between the two age groups (>0.05)*

**Table 5.** Prevalence of Bovine Fasciolosis Verses Age Groups of Examined Animals

| Age Group | No.of Animals Examined | No.of positive Animals | Prevalence (%) |
|---|---|---|---|
| Young | 153 | 74 | 48.32% |
| Adult | 231 | 108 | 46.75% |
| Total | 384 | 182 | 47.88% |

The prevalence on sex basis infection rate of 50% and 45.53% were recorded in male and female animals respectively. Statistical analysis of the result indicated no significant variation in infection rate between two sexes (p>0.05).

**Table 6.** Prevalence of bovine fasciolosis verse sex groups

| Sex group | No. of Animal Examined | No. of positive Animals | Prevalance |
|---|---|---|---|
| Male | 160 | 80 | 50% |
| Female | 224 | 102 | 45.53% |
| Total | 384 | 182 | 47.39% |

*****$x^2_{cal=0.7461,p=0.388}$

### 3.2 Abattoir results

### 3.2.1Abattoir Prevalence

Out of total 197 cattle slaughtered at Baddessa municipal Abattoir, 90(45.69%) were found to be infected with liver fluke disease (Table 7) during the four months study period.

**Table 7.** Monthly prevalence of fasciolosis at Baddessa municipal abattoir.

| Month Slaughtered | No of cattle Animals | No. of positive | Prevalence (%) |
|---|---|---|---|
| November 45.66% | 36 | | 15 |
| December 49.27% | 69 | | 34 |
| January 45.09% | 51 | | 23 |
| February 43.9% | 41 | | 18 |
| Total 45.68% | 197 | | 90 |

**x2Cal=0.6523 ,P=0.884 Statistical analysis of this result indicated that there is no significant differences of liver flukes among the four months (P>0.05)*

### 3.2.2. Financial loss Assessment

Out of the total of 197 cattle slaughtered, 90(45.6%) of the examined livers from were condemned due to fasciolosis with corresponding estimated total loss of about 4,500 ETB during the four month of study period .the annual economic loss from liver condemnation due to fasciolosis was estimated to be 13,4958ETB considering prevalence of bovine fasciolosis (45.68%) mean annual cattle slaughtered at Baddessa abattoir to be 591 and retail price of liver in Baddessa Town as 50 ETB.

**ALC=CSRXLCXP**

Where; mean annual loss form liver condemnation.
CSR=Mean annual cattle slaughtered at Baddessa Municipal Abattoir.
LC=Mean cost of one livre at present.
P=Prevalence of disease.
Total annual loss=591x45.68x50=13,498.44ETB

## IV. Discussion

Coprological examination conducted on 384 cattle in OdaBultumworeda indicated that the prevalence of fasiolosis in the study area is 47.39%. This finding is almost similar to that reported by Haymnot, (1990) in eastern Hararge Administrative Region (42.9%), Wandowsan, (1990) in Arsi (51.7%) but higher than that reported by Ababe (1991) at Nekemte (34%), Rahameto (1992) at Woliso (34%) Adem (1994) at Zeway (34%) and Wassie (1995) in Nekemte and its surrounding area (18.99%), Seyoum (1987), (11.5%) in Bunoprovime in cattle, Hagos (2007), (38.8%), at Mekele municipal Abattoir and Aberra (2007), (25.04%), from ELFORA abattoir, Debrezeit. One of the reasons for this difference could be due to use of rivers and springs for irrigated crop production, tendency of the farmers to feed their animals in the marshy and damp areas because of feed scarcity. Such an increase in the present prevalence of the disease indicates the increasing propagation of the disease in the area requiring intervention at all levels.

The prevalence (47.68%) recorded in this study is lower when compared with previous reports in different parts of the country.Getechew (1987) (71%), in Addis Ababa, Bahiru and Ephraim (1997), (86%), in Kefa, Fekedu (1988), (84.7%) in Bahirdar, Roman (1987), (75%) in Gonder and Aberra (1990), (77.6%) in Dembedolo. Acomplete study seasonal variation and prevalence rate of fasciolosis was not possible because of the shortage of time. However, high infection rate (48.78%) was encountered in January and lower (43.47%) in November. The higher infection rate observed in January in because crop residues are exhausted and no other alternative grazing land available most of the animal are forced to graze on the marshy pasture field which is habitat for the snail intermediate hosts and provides a conducive environment for the fasciolosis infection.

No significant variation ($p>0.05$) was observed in monthly prevalence rate of bovine fasciolosis. This may be due to the fact that animals acquire infection from stocking of livestock in the same grazing areas, long live span of the parasite in the host, absence of regular deworming program and the presence of optimal temperature (220c-240c)of the area for the survival and multiplication of the snails. However, it is difficult to reach to such conclusion because of the short duration of the study period, smaller sample size and geographically limited sample sites.

Statistical analysis for the effect of age on prevalence indicated no significant variation ($p>0.05$) among different age group of animals. This may due to both the young and adult cattle grazed on the same grazing area have equal chance for acquiring infection.

As to the prevalence on sex basis, infection rate 50% and 45.53%in male and females were observed respectively. Statistical analysis of this result shows no significant variation ($p>0.05$) in infection rate between the two sexes.

Considering the prevalence rate in various survey areas.analaysis of result on locality basis showed no significant variation ($p>0.05$) inprevalence rate among the three localities selected for sampling. This may be all sites are ecological favorable for breeding and multiplication of snail intermediate host since they are found in the same agro-ecological zone.The current study revealed that fasciolosis is causing considerable direct and indirect economic loss in the woreda.

## V. Conclusion and Recommendations

The present study revealed that bovine fasciolosis is highly important disease of cattle affecting productivity as well as causing considerable economic losses through condemnation of liver in study area (OdaBultum District) which needs immediate planning for control measures.

Consequently the following recommendations are forwarded:

- In order to foster planning and implementation of sustainable control strategy, future detailed study on epidemiology of fasciolosis and ecology of intermediate host snails, as related to the specific husbandry practices, is recommended.
- Strategic anthelminthic treatment with appropriate flukicidal drugs should be practiced two times a year; i.e. after the end of dry season (March-April) and after the end of rainy season (October-November) disease should be carried out to reduce the prevalence.

- Control of snail through application of moluscicides on snail habitat, fencing and draining swampy area should be practiced.
- Public awareness should be created about the situation to make them participate in prevention of continuous cycling of the disease.
- Finally integrated and cost effective control strategy incorporative of strategic anthelminthic treatment against the parasite and other feasible control measures including drainage
- Grazing management and have to be used to ensure a satisfactory level of control in the long run and major tasks in eradication of the snail should be considered.

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