

# Cross sectional survey of equine gastro intestinal strongylosis and Fasciolosis in Goba District of Bale Zone, Oromia Regional State, Ethiopia.

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## Abstract

Equines are important draft power for poor communities in developing countries like Ethiopia. It play important role in agricultural economy of growing worlds. Equine uses for transportation, riding, carting and others depending community cultural and life style. Cross sectional study was conducted on Equine gastro intestinal Strongylosis and Fasciolosis in Goba district of Bale zone Oromia regional state, Ethiopia. Study involving a total of 384 (218 Horses, 107 Donkeys and 59 Mules) samples were conducted. These parasites are main parasitic disease affecting the wellbeing of horses, mules and donkeys with over all prevalence of 83.3% and 11.98%, respectively. The occurrence of equine Gastrointestinal Strongylosis and Fasciolosis in this study suggests the importance these parasites in the study area and the overall effect on drought power. There were statistically significant variation ( $P < 0.05$ ) between (male vs. female) and species of equines with regard to Equine Strongylosis. However, there was no statistically significant variation ( $P > 0.05$ ) between Equine Fasciolosis between male and female; species of equines (Horse, donkey and mule) and age groups of equines. This study revealed that equine Fasciolosis is an important parasitic disease of equine next to Strongylosis in study area. In conclusion, less attention given to equine in study area affecting the wellbeing of horses, mules and donkeys. For this reason, due emphasis should be given particularly in prevention and control of the parasitic disease in Equine using broad spectrum anthelmintic and management of equine should be improved.

**Keywords:** Equines, Fasciolosis, Goba District, Prevalence, Strongylosis, Survey.

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## Introduction

Ethiopia has the largest livestock inventories in Africa, including more than 38 million cattle, 30 million small ruminants, 1 million camels, 4.5 million equines and 4 million chickens [1]. It is also known that the country possesses about 5.02 million donkeys, 2.75 million horses and 0.63 million mules. There is one equine for every four people in the agricultural sector and for every five persons of the total population [2]. Ethiopia is home to the oldest feral horse population in Africa and the only wild horses left in east Africa. Arsi and Bale provinces of Oromia regional state are known with their densely populated equine population, mainly in high land of the areas [3].

Equines play a key role in the agricultural economy of the country and are used for pack transportation, riding, carting and threshing farm cultivation among others [4]. In the agricultural communities of Ethiopia, the mule own much of its popularity to the fact that it is more resistant than horse to adverse system of management. Mules are used as drought or pack animals occasionally for riding; they are capable of working and maintaining good condition [5]. Spending hundreds of years being used by man but despite this in past little attempt has been made to study any aspect of this animal. Vast sums of money have been spent on horse by its wealthy owner but the donkey owner has represented as poor populations throughout the world, often hardly able to afford medical care for the children, let alone veterinary care for donkey [6-8].

The mountains nature of Ethiopian landscape has also made travel time consuming and difficult which has resulted the back of pack animals to remain as the only suitable means of transport in the country terrain for centuries [6,9,10]. Equines play an important role in socio-economic development by providing drought power. Equines (donkeys, mules and horses) play an important role as working animals in many parts of the world, employed for packing, riding, carting and ploughing. Equine power is vital for both rural and urban transport system which is cheap and provides the best alternatives in places where the road network is insufficiently developed, the terrain is rugged and mountainous and in the cities where narrow streets prevent easy delivery of merchandise [9]. The optimum utilization of equine was hindered by a variety of diseases among which parasitic diseases are the major ones [8,11].

Equines are hosts to a great number of gastrointestinal parasite species, of which nematodes of the family Strongylidae, commonly called Strongyle nematodes or Strongyles, are the most important. These parasites are ubiquitous and live as adults in the large intestine of equids [8]. The large Strongyles recognized as being the most pathogenic to the equine spp. They belong to genus Strongyles and comprising of three species *S. vulgaris*, *S. edentatus* and *S. equines*. Strongylosis is a serious problem in young horses reared on permanent horse pasture, although cases of severe disease may occur in adult animals kept in suburban paddocks and subjected to overcrowding and poor management [4,11,12]. *Strongylus vulgaris* and

*Strongylus edentatus* are among the most common problems in Ethiopia and more rarely *Strongylus equines*. On the other hand, *Fasciola hepatica* is also common in many countries as an occasional parasite of equine and man. Horses and donkeys may get heavy infestation where such case usually discovered at routine postmortem examination [11].

In Ethiopia Equines are found in high lands and middle altitudes mainly using for packing and riding [13,14]. These altitudes are known by presence of Fasciolosis in livestock as reported by different workers [13,15]. Even though these parasites were reported as major Equine problem in different parts of the country Ethiopia, there was no report in Bale Zone of Oromia regional state particularly in and around Goba district. Therefore the objective of the study was:

- To determine the prevalence of equine Fasciolosis and gastro intestinal Strongylosis; and recommend relevant control options pertinent to local situations in study area.

## Materials and methods

### Study area

Bale Zone is located in the south east of Oromia regional state, southern Ethiopia. The area has high potential in wild life resource and conservations. Bale mountains national park the biggest national park in which endemic wild animal species like Nyala, the Red Fox and numerous species of endemic birds are found. The livelihood of people in and surrounding bale zone are based on mixed farming with same nomadic people/pastoralists living in low lands of the zone mainly depending on livestock production [4]. The altitude of the zone varies from 2,400-4,500 m above sea level with an annual rain fall of 1,200-1,400 mm and mean average temperature of 6–9°C. Goba is located 443 km to south east of Addis Ababa with altitude ranging between 2400-4375 m above sea level. The average annual temperature and rain fall ranges between 12-18°C and 900-1400 respectively.

The community in Goba district practice mixed farming (raising livestock and production of crops). They raise cattle, sheep, goats, Equines and poultry. Main crops produced in the districts are wheat, barley, teff, maize, sorghum, pulses, oil crops, horticultural and fruit trees [4]. The animal population in Goba woreda was estimated to be Bovine 88,038; Equine 189,746; Ovine 6334; Caprine 2229 and Poultry 10,851. The management system is extensive and there is high Equine population used for different purposes. Horses, mules and donkeys are mainly used for both riding and as the pack animals (Goba District Agricultural Bureau, 2008)

### Study animals

The Study was conducted on a total of 384 Equine brought to Goba Veterinary Clinic and Peasant Association (PA). The samples were collected from Horse 218; Donkeys 107 and 59 Mules including all age and sex groups managed under smallholder mixed crop-livestock farming system. All the animals were clinically examined and their age was determined. Equines less than two years of age were considered as young, while those more than two years old as adult as of methodology used by Yoseph et al. [16].

### Study design and type

The study was conducted using a cross-sectional study design to determine the prevalence of Equine Fasciolosis and gastro intestinal Strongylosis. Samples were collected randomly from equine that admitted to Goba veterinary clinic and from Peasant Association (PA) around Goba district. The PA's were collected purposively based on composition of Equine population and presence of all species (Horse, Donkey and Mule). At Goba clinic Equines were given number based on age, sex and species of equines separately. Every male, female, young, adult, donkey, horse and mule with even numbered selected for sampling. At PA Equines were grouped based on age, sex, and species of equines. From each group samples were collected simple random techniques.

### Sample size determination

The sample size was determined based on expected prevalence of 50% (as there was no previous report of the prevalence of these parasites in the specific study area); absolute desired precision of 5% at confidence level of 95% was used. The sample size was calculated using formula stated by Thrusfield [17].

$$n = 1.96^2 p_{ex} (1 - p_{ex}) / d^2$$

Where  $p_{ex}$ : Expected prevalence;

n: Required sample;

d: Desired precision;

1.96 z-values for 95% confidence level.

Accordingly, a total of 384 fecal samples were collected for cross sectional survey.

### Survey of the parasites

Fecal samples were collected from each animal selected for sampling to determine prevalence of Strongylosis and Fasciolosis in study area. A total of 218, 107 and 59 fecal samples were collected from Horse, Donkey and Mule respectively. The samples were collected directly from the rectum Equines by restraining in humane way of handling system. In addition, data concerning age, sex and species equine recorded properly while collecting fecal samples.

### Laboratory techniques

All collected fecal samples were examined under microscope applying sedimentation, flotation and direct examination.

### Direct fecal examination

In order to determine prevalence of gastro intestinal Strongylosis, a small quantity of fecal samples was taken and placed on slide, mixed with drop of water, spread out covered with a cover slip and examined directly under low power objective (40X) of microscope according to the method described Hendrx [15].

### Sedimentation flotation technique

Approximately 3 g of faces was taken and mixed with 42 ml of water. The mixture was poured to test tube and kept for 15-30 min. The supernatant was decanted off and the sediment was poured into test tubes. The test tube was filled with saturated

salt solution and inverted 5 or 6 times with the thumb over the open and a few drops of saturated salt solution was added until a convex meniscus stand above the top of the tube and allowed to stand for 15-30 min. Then cover slide was covered over the top of the test tube so that it is in contact with liquid. Finally, the cover glass was placed on slide and examined under low power microscope for the presence of Fasciola eggs.

**Data management and analysis**

All information regarding age, sex and species equine recorded in Microsoft Excel® Spread Sheet to analyses the data. The data was analyzed using SPSS version 15(SPSS Inc. © 2006 USA) data analyzing software analyses to compare and contrast the prevalence of Equine relative to age, sex and species of Equine. The descriptive statistics was used and cross tabulation were employed to determine p value and Chi-square. The prevalence was defined as the proportion of the animals (equines) positive for Fasciolosis and/or gastro intestinal Strongylosis to the total number of animals examined, which was expressed in percent. The difference in the prevalence Equine Fasciolosis and gastro intestinal Strongylosis among or between Equine species, age and sex groups was analyzed.

**Results**

Out of 384 examined animals, 321 (83.6%) were detected to be positive for gastro intestinal Strongylosis. Out of which, 171 (79.4%); 102 (96.3%) and 48 (81.4%) of horses, donkeys and mules were positive to Equine gastro intestinal Strongylosis. Meanwhile, the overall prevalence of equine Fasciolosis was 46 (11.98%); Out of which, the prevalence of horses, donkeys and mules were 23 (10.6%), 15 (14%) and 8 (13.6%), respectively (Tables 1 and 2).

**Discussion**

The study indicated that equine Strongylosis and Fasciolosis are major parasitic health problems of all *Equine* spp. in and around Goba with over all prevalence of 83.6% and 11.98%, respectively. This result is comparable to previous reports on both parasites in different parts of the country. For instance, on equine Fasciolosis in South wollo is 12.2% [18] and in Menagesha 9% [16]. The comparative prevalence of equine Strongylosis by

**Table 1.** Prevalence of gastro intestinal Strongylosis in different equine species in and around Goba District.

Species	Total examined	No. of positive	Prevalence (%)	95% Confidence Interval
Donkeys	107	102	96.3	0.89-0.98
Horses	218	171	78.4	0.72-0.84
Mules	59	48	81.4	0.69-0.90
Total	384	321	83.59	0.79- 0.87

**Table 2.** Prevalence of Fasciolosis in different equine species in and around Goba District.

Species	Total examined	No. of positive	Prevalence (%)	95% Confidence Interval
Donkeys	107	15	14	0.08-0.22
Horses	218	23	10.6	0.07-0.15
Mules	59	8	13.6	0.06-0.25
Total	384	46	11.98	0.09-0.16

sex was 78.6% in male and 91.6% in female with significance differences (p< 0.05). This significance difference might be due to the reason that almost all cart horses in and around Goba are males. These horses which use for cart traction are regularly deformed whereas females are left to graze on the field and use to transport farm products to market. The attention given to female horses are less, the owners treat their horse whenever they sick. Comparative prevalence of equine Fasciolosis where 11.45% for male and 8.38% for female with no significance difference in this value (p>0.05). This insignificance might be due to less attention given to Fasciolosis while treating horses. There were statistically significant difference (p<0.05) in prevalence of Equine Strongylosis between donkeys (96.3%), horses (79.36%) and mules (81.36%). This difference may be due to absence of regular deworming in donkeys relative to horses and mules. There were no statistically significant differences (p>0.05) in Equine Fasciolosis among donkeys (14.02%), horses (11.01%) and mules (11.98%). Admittedly, species of equine were equally susceptible and can be infected. There were no statistically significant difference (p>0.05) in different age groups of equines for Strongylosis young (87.8%) and adult (82.87%). for Fasciolosis young (14.03%) and adult (11.6%). That means all age groups can be equally infected. However, according to Urquhart et al., 1996 the sensitivity to the disease varies and young are highly susceptible to Strongylosis. A total of forty six equine: 23 (10.6%) horse, 15 (14.02%) donkey and 8 (13.6%) mule were infected by Fasciolosis. This result coincides with [18] who reported 13.1% donkeys, 12.8% horses and 6.5% mules in South wollo zone of Amara regional state. On the other hand [16] who reported 9% prevalence in donkeys in Menagesha district (Figure 1).

Three hundred seventy one equine: 171 (79.36%) horses, 102 (96.3%) donkeys and 48 (81.36%) mules were found infected with Strongylosis. This finding is in agreement with different previous reports [5,16,19] in different parts of the country with prevalence varying 50% to 100%. The maintenance of Fasciolosis in equine may be related with grazing field of equine with ruminants which are considered to be the prominent primary hosts of liver fluke and the environmental condition which allow multiplication and spread of intermediate host snails and presence of parasite in study area. And infection of equines by Strongylosis related to grazing field and contamination of pasture with egg of the parasite (Tables 3-6).

**Conclusions and Recommendations**

Through equines considerably contribute to the existing rural and urban economy of nation received less attention in terms of

**Table 3.** Prevalence of gastro intestinal Strongylosis by age in different Equine spp. in and around Goba District.

Equine species	Age group	Total examined	No. of positive	Prevalence (%)
Horses	Young	24	21	87.5
	Adult	193	150	77.7
Donkeys	Young	23	19	82.6
	Adult	84	83	98.8
Mules	Young	10	8	80
	Adult	49	40	81.6
Total	-	384	321	83.6

**Table 4.** Prevalence of Fasciolosis by age in different Equine spp. in and around Goba District.

Equine species	Age group	Total examined	No. of positive	Prevalence (%)
Horses	Young	24	4	16.7
	Adult	193	20	10.4
Donkeys	Young	23	3	13
	Adult	84	12	14.3
Mules	Young	10	1	10
	Adult	49	6	12.2
Total	-	384	4	11.9

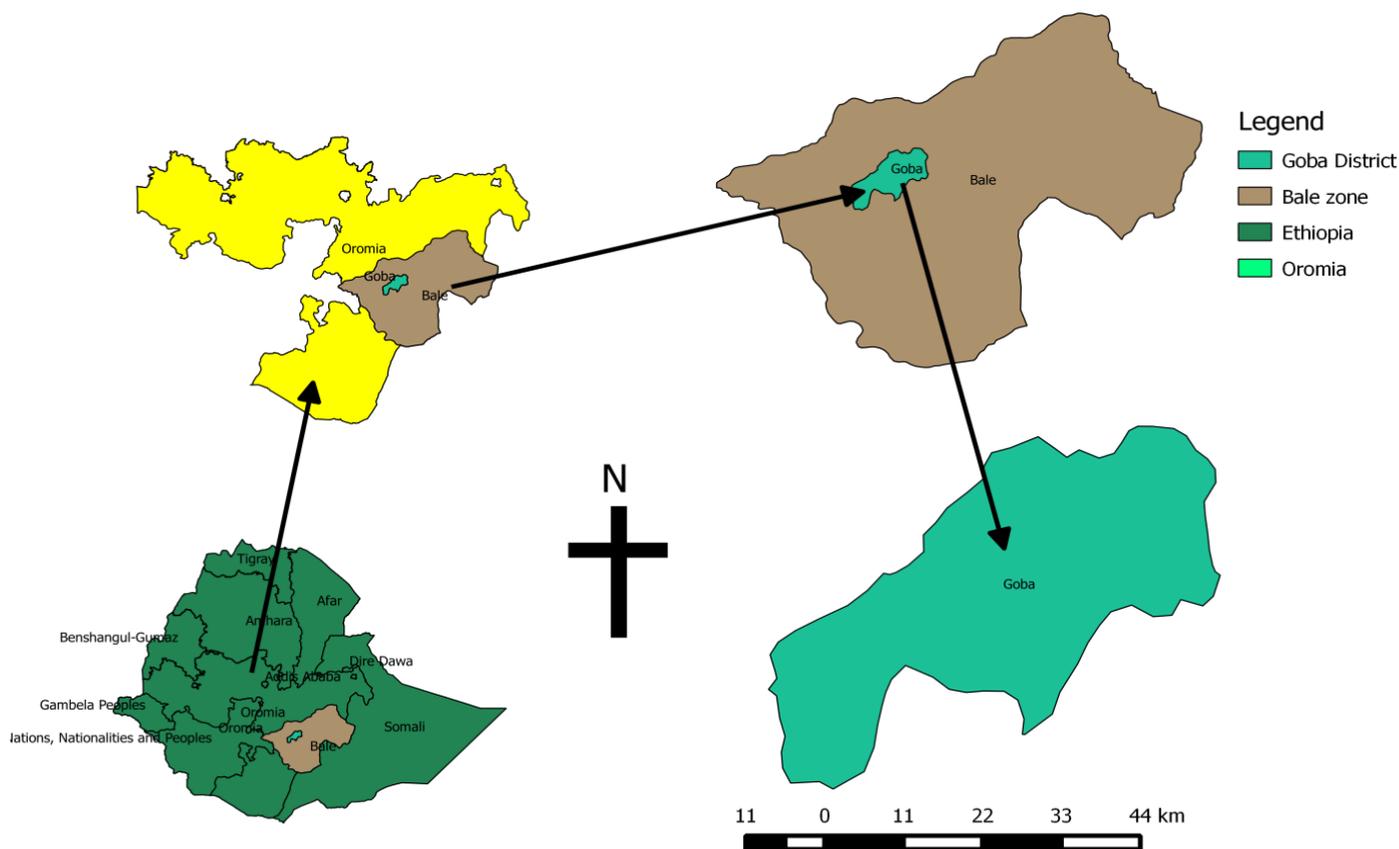
**Table 5.** Prevalence of gastro intestinal Strongylosis by sex in different Equine spp. in and around Goba District.

Equine species	Sex group	Total examined	No. of positive	Prevalence (%)
Horses	Male	154	117	75.9
	Female	64	54	84.4
Donkeys	Male	49	47	95.9
	Female	58	55	94.8
Mules	Male	15	8	53.3
	Female	44	40	90.9
Total	-	384	321	83.6

feeding, health and management cares. The optimum utilization of equine was hindered by a variety of diseases among which parasitic diseases are the major ones. The occurrence of equine Gastrointestinal Strongylosis and Fasciolosis in the study suggests the importance of the problem in the study area and the overall effect on drought power. The study result showed that Fasciolosis is prevalent next to Strongylosis which is most prevalent parasitic disease of Equines in study area. The study revealed that Gastrointestinal Strongylosis and Fasciolosis are the main problem of equines in in study area affecting the well-

**Table 6.** Prevalence of Fasciolosis by sex in different Equine spp. in and around Goba District.

	Sex group	Total examined	No. of positive	Prevalence (%)
Horses	Male	154	15	9.7
	Female	64	9	14.1
Donkeys	Male	49	9	18.4
	Female	58	6	10.3
Mules	Male	15	3	20
	Female	44	4	9
Total	-	384	46	11.98



**Figure 1.** Map of study area.

being of horses, mules and donkeys with over all prevalence of 83.3% and 11.98%, respectively. Therefore, epidemiology, seasonal dynamic of infection and economic importance of disease in study area should be studied to develop and practice integrated, cost effective and strategic treatment and control options pertinent to local situation.

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