

## Prevalence of Strongyle Parasites in Working Horses in Goba Woreda, Bale Zone, Ethiopia

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**Abstract:** 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. A cross-sectional study was carried out from June 2013 to January 2014 in four selected peasant associations of Goba wereda to investigate the prevalence of *strongyle* parasites in horses and to determine the risk factors associated with *strongyle* parasites infection. A total of 384 horses were randomly sampled from four different peasant associations in the study wereda, 40.6% of horses were found positive for *strongyle* parasites. Forty four (45.83%), 40 (41.67%), 37 (38.54%) and 35 (36.46%) horses were found positive for *strongyle* parasites in Machamana, area around Goba town, Misra and Wacho, respectively. Although not statistically significant, adult horses were found to have higher prevalence (43.10%) of *strongyle* parasite as compared to young horses (32.98%). The study has also showed variation in prevalence of *strongyle* parasites among different body condition scores, i.e. higher prevalence was recorded in poor body condition horses (62.62%) and this difference was found to be statistically significant ( $p < 0.05$ ). That strongyle parasite is one of the major health problems of the horses in the study wereda. In recommendation, strategic deworming using broad spectrum antihelmintic drugs and further education of the farmers should be implemented to control and prevent the disease.

**Key words:** Bale Zone • Ethiopia • Goba Wereda • Horses • Prevalence • Strongyle • Parasites

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### INTRODUCTION

Despite the increase in the mechanization throughout the world, Horses, Donkeys and Mules are still well used and give the name of 'beasts of burden'. They have a prominent position in the agricultural systems of many developing countries. This is shown by the wide spread use of equines in rural and urban areas in Africa [1].

The world equine population is 122.4 million consisting of 40 million donkeys, 15 million mules and 43.4 million horses. From global distribution of view, 98% of donkeys, 97% of mules and 1% of all horses are found in developing countries. The equine population in Africa is 17.6 million consisting donkeys 2.3 million mules and 3.7 horses [2]. In the last 30 years the population of horses were static, of mules have risen and population of donkeys are decline. In Africa, however, the donkey's population has increased from 8.5 million in 1949 to 13.7 million in 1994 [3].

Ethiopia possesses approximately half of Africa's equine population with 37%, 58% and 46% of all African donkeys, horses and mules respectively [4]. Equines are important animals to the resource poor communities in rural and urban areas of Ethiopia, providing traction power and transport services at low cost. The use of Equines indoor to door transport services also provides urban dwellers with the opportunity of income generation [5].

There is one Equine for every four people in agricultural sector and every five person of the total population [5]. The low level of road transport network and enough terrain of the country make equines the most valuable appropriate and affordable pack animals under the small holder farming system of Ethiopia [6] has revealed that in areas where draft power is a constraint for crop cultivation a pair of well conditioned equines could be used as an alternative draft power sources for secondary and tertiary land preparation.

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In our woreda, nearly all age group of horses are infected with nematodes. Most worm populations constitute a large variety of species, the most pathogenic of which belong to family of *strongylidae*. The egg of *strongyle* may be found in feces. Whatever these parasites is one of the diseases affecting horses previously there was no any research was done. So it was important to conduct this research on these study area. Therefore, this study was aimed to determine the prevalence of *strongyle* parasites in horses in selected peasant association of Goba woreda and the associated risk factor with *strongyle* parasites infestation.

## MATERIALS AND METHODS

**Study Area:** The study was conducted from June 2013 to January 2014 in Goba Woreda, Bale Zone and Oromia Regional state. The capital town of Goba Woreda is Goba. It is located at 14 km south of the capital town of Bale Zone, Robe and located at 444 km south east of Addis Ababa. The approximate geographical location of the area is between 7° 00" north and 39° 38" east. The altitude ranges from 2400 to 4377masl and the minimum and maximum temperature of 4°C and 20°C, respectively. The mean annual rainfall of the area ranges from 900mm to 1400mm. The estimated animal population of the area is 168,597 cattle, 48,562 sheep, 10,970 goats, 2,495 donkeys, 19,980 horses 3,760 mules and 38,470 poultry. According to the statistical data of 2012 the total human population of Goba Woreda was 409,954 (203,923 males and 206,031 females) [7]. To conduct present study four peasant associations were selected. These four sites includes: Misra (located at a distance of 12 km east of the capital town and the dominant species of animals in the area are sheep, cattle and equines), Machamana (The area is located outside the town at a distance of 10 km south east with a dominant livestock population of sheep, cattle and equine), Wacho (Which located at a distance of 21 km east of the capital town and the dominant species of animals are cattle, sheep and equine) and Around Goba Town (The is the area that is found surround the town which use an open air veterinary clinics found in Goba Town).

**Study Animals and Study Population:** The study was carried out on 384 horses in which samples taken from four different sites. Seven hundred twenty three, 698, 742 and 767 horses were found in Machamana, Misra, Wacho

and around Goba town, respectively [7]. From these populations of equine 96 horses were sampled from each of the above four peasant associations selected by random sampling techniques.

**Study Design:** A cross-sectional study was carried out to determine the prevalence of horses' *strongyle* parasites in Goba Woreda, Bale zone. The district was selected purposively and the peasant associations by lottery system. The animals were selected by simple random sampling technique.

### Sample Size determination:

Fecal sample were taken randomly from the horse in their respective area. To calculate the total sample size, the following parameters were predetermined 5% desired level precision and 50% expected prevalence of strongyle infection and the sample size was determined by using the formula of Dunn [8].

$$n = \frac{1.96^2 \text{ Pexp} (1 - \text{Pexp})}{d^2}$$

Where,

- n = Desired sample size
- Pexp = Prevalence expected
- d = Desire absolute precision

Therefore,

$$n = \frac{(1.96)^2 * 0.5 * (1-0.5)}{(0.05)^2} = 384$$

**Fecal Sample Collection and Examination:** The samples were collected directly from the rectum of the animals in to the disposal labeled container and transported to Goba parasitology laboratory soon after collection. During collection each sample was labeled with the identity number, body condition score, age and sex for individual sampled animals. Fecal samples were collected in plastic labeled cubs and were examined during the same day of collection by the concentration floatation technique [9].

**Age Estimation:** The age of horses are estimated from the dental teeth estimation methods and the age of the horses was classified as young (0-3 years) and adult (>3 years) [5].

**Data Management and Analysis:** The collected data was coded and entered in to the computer Microsoft excel and then analyzed using SPSS for windows version 20. Descriptive statistics was used to calculate prevalence; dividing the number of positive animals by the total number of animals and logistic regression to measure association between prevalence of the parasites, body condition and age and sex category of animals. In all the analyses, confidence levels at 95% were calculated and a p-value is less than 0.05 was used for statistical significance association between variables.

## RESULTS

A total of 384 horses were examined for the presence of *strongyle* parasites using floatation technique at Goba open air veterinary clinic. The overall prevalence was found to be 40.6%.

**Prevalence of Strongyle Parasite Based on Age Group:** of age wise prevalence of strongyle indicated that the difference in prevalence between the two age groups were relatively high in adult group (43.10%) than in young age groups (32.98%) with no statistically significant variation ( $P > 0.05$ ) (Table 1).

**Prevalence of Strongyle Parasites Based on Body Condition Score:** From the total of 384 examined horses 107, 203 and 74 were with poor, medium and good body condition score, respectively. Poor body conditioned

horses shown higher prevalence (62.62%) as compared to medium (38.42%) and good body conditioned (14.87%) animals. Horses with poor body condition were nine times ( $OR=9.078$ ) and horses with medium body condition were three times ( $OR=3.406$ ) more likely to be affected by the parasite as compared to horses with good body condition and it was found to be statistically significant ( $p < 0.05$ ) (Table 2).

**Prevalence of Strongyle Parasite Based on Sex Group:** Comparison was made based on the prevalence of strongyle between sexes. Out of animals sampled, 60.4% were males while about 39.6% of them were females. The prevalence between sexes was 40.5% and 40.8% in male and female, respectively. However, there was no statistical difference between the two sexes (Table 3).

**Prevalence of Strongyle Parasite Based on Different Pas of the Study Area:** On the other hand, different prevalence of strongyle parasite were observed among the horses of different peasant association (Kebeles) selected for the study namely, around Goba twon 40 (41.67%), Machamana 44 (45.83%), Misra 37 (38.54%) and Wacho 35 (36.46%). Relatively high prevalence record was observed in Machamana peasant association (45.83%) and the lowest prevalence of the parasite was recorded in Wacho peasant association (36.46%). However, there were no statistically significant difference among peasant associations selected for the study ( $p > 0.05$ ) (Table 4).

Table 1: Prevalence of *strongyle* parasites based on age groups.

Age	Total number of animals examined	Number of positive animals	P-value	OR	95% CI (Lower -Upper)
Young	94	31 (32.98%)	0.100	0.645	0.383-1.088
Adult	290	125 (43.10%)	-	-	-
Total	384	156 (40.63%)	-	-	-

Table 2: Prevalence of *strongyle* parasites based on body condition score.

Body condition	Total number of animals examined	Number of positive animals	P-value	OR	95% CI (Lower -Upper)
Poor	107	67 (62.62%)	0.000	9.078	4.271-19.295
Medium	203	78 (38.42%)	0.001	3.406	1.681-6.900
Good	74	11 (14.86%)	-	-	-
Total	384	156 (40.63%)	-	-	-

Table 3: Prevalence of *strongyle* parasite based on sexes

Sex	Total number of animals examined	Number of positive animals	P-value	OR	95% CI (Lower -Upper)
Male	232	94 (40.52%)	0.952	1.014	0.647-1.589
Female	152	62 (40.79%)	-	-	-
Total	384	156 (40.63%)	-	-	-

Table 4: Prevalence of *Strongyle* parasite based on peasant association

Peasant association	Total number of animals examined	Number of positive animals	P-value	OR	95% CI (Lower -Upper)
Around Goba town	96	40(41.67%)	0.696	1.134	0.604-2.129
Machamana	96	44 (45.83%)	0.317	1.373	0.737-2.557
Misra	96	37 (38.54%)	0.773	1.097	0.586-2.055
Wacho	96	35 (36.46%)	-	-	-
Total	384	156 (40.63%)	-	-	-

## DISCUSSION

A cross-sectional study was carried out to determine the prevalence of horses' *strongyle* parasites in Goba Woreda, Bale zone. The strongyle parasite's prevalence was investigated in four peasant associations (Around Goba town, Machamana, Misra and Wacho) by applying qualitative fecal sample analysis. The group of equine strongyle parasites is very diverse and consists of about 60 described species [10]. Climatic variations, pasture and stable management [11], anthelmintic treatment [12] and nutritional status of horses are the major epidemiological and management features which have been recognized. In the present study, prevalence of strongyle parasites in the four peasant associations of Goba woreda namely, around Goba town (41.67%), Machamana (45.83%), Misra (38.54%) and Wacho (36.46%) showed insignificant variation with logistic regression analysis. This might be associated with the similarity of the agro-ecological climate of the peasant associations.

The overall prevalence of strongyle parasite (40.6%) was recorded in horses of the study area which was different from the 100% prevalence of *stronglye* parasite in horse recorded by The FAO [13], 100% prevalence by Francisco *et al.* [14] and 98.2% by Khallaayoune [15]. This difference might arise because of awareness of the farmers on veterinary service, the good husbandry practice of the animals (management) and a culture of regular deworming of horses in the current study area.

Body condition score was significantly associated with the prevalence of the strongyle parasite and this agrees with the findings of FAO [13], Francisco *et al.* [14] and Khallaayoune [15]. This significant association might indicate that strongyle parasite is one of the factors for poor body condition score of the horses. On top of this, the difference might indicate that the poor body condition horses are at high chance of acquiring the parasite as compared to the medium and good body condition animals because of the poor immunity.

Although not statistically significant, the prevalence between adult and young was found to have variation. This was due to their grazing habit. Adult horses are highly grazer while young horses were feed on the milk of

their mother and less grazer as compared to adult horses. In addition, the sample sizes of adult horses were higher as compared to the young in the current study. Similarly no affect of age for the strongyle infections could be detected in other studies [16] and Michel [17]. Even though it was not statistically significant, an attempt has been made to compare the prevalence of *strongyle* parasite in different peasant association where the study was conducted.

Different prevalence of strongyle parasite were observed among the horses from different peasant association selected for the study namely, around Goba town (41.67%), Machamana (45.83%), Misra (38.54%) and wacho (36.46%) and relatively high prevalence record was observed in Machamana peasant association (45.83%) as compared to the rest of the peasant associations and the lowest prevalence of the parasite was recorded in Wacho peasant association (36.46%). This variation depends up on agro-climatic condition of the study area. This parasite was highly prevalent in areas with high humidity, low temperature and high altitude where the study was conducted. So in our case the agro-climatic was one of the risk factor for prevalence of *strongyle* parasite. The infection is more in animals grazing on the permanent grazing pasture than animals grazing on paddock rotation grazing system.

Regarding the sex of the host, parasitological differences are seldom reported in horses The absence of significant association ( $p > 0.05$ ) among sex was observed in current investigation of prevalence of strongyle parasite using logistic regression analysis and the prevalence between sex was almost similar (40.5%) and (40.8%) in male and female respectively. This phenomenon is also observed by other workers under different management and climatic conditions [16]. Similarly [17] indicated a lack of any difference sex related susceptibility to strongyle infections and gender does not seem to play a role in this regard.

## CONCLUSION

According to the results of this study, strongylosis is one of the prevailing health problems of working

equines in the study areas. In addition, the current study revealed that strongyle parasite is one of the major risk factor for the poor body condition of working horses in the study area.

Based on the above conclusions, the following recommendations are forwarded: The field veterinarian should aware horse owners on importance and burden of *strongyle* in horse, Regular de-worming program should be implemented using broad spectrum anthelmintics, Further epidemiological study should be conducted in the area including environmental factors like managerial conditions that helps to design an appropriate control measures and Quantitative method of study should be conducted to determine the parasite load and its effects on different body parameters.

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