

## The Prevalence of Strongyle Nematode Parasite Infections of Mule and Donkey at Mecha

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**Abstract:** A cross-sectional study was carried out from November 2015 to Jun 2016 to estimate the prevalence and the association of different risk factors with the disease in the study area of strongyle infection in donkeys and mules at mechaworeda, west Gojjam zone, northwest Ethiopia. Fresh fecal samples were obtained from 384 randomly selected donkey (n=190) and mule (n=194). The floatation technique was employed to know parasite eggs in the faeces and examined microscopically for presence of parasite oval eggs. The overall prevalence of strongyles infection in the study area was 77.6% (n=298). The prevalence of strongyles infection in mules and donkeys were 81.4%, 73.7%, respectively, while in male and female animals the rates were 74.8% and 79.6%, respectively. The prevalence of strongyle infection in poor, medium and good body condition was 85.4%, 75.8% and 75%, respectively. The infection rates of strongyles were 70.4% and 80.1% in young and adult, respectively. The prevalence of strongyle infection in the two species was 80.5%, 78.3%, 79.5%, 85.7%, 75% and 47.8% in Kudmi, Enashenfalen, Birakat, Addisalem, Addisamba and Merawi town, respectively. There was statistical significance difference in the prevalence of strongyle infection on the age and origin of equine (p<0.05). But there was no statistical significant difference in prevalence of strongyle infection among body condition, species and sex (P > 0.05).

**Key words:** Coprology • Equines • Flotation • Mecha • Strongyles

### INTRODUCTION

The equine population of the world is 122.4 million (40 million donkeys, 15 million mules' 43.3 million horses and 24.1 million Zebras and Camels). In the distribution pattern, 98% of all donkeys, 97% of all mules and 60% of all horses are found in the developing countries. The equine population in Africa is 17.6 million, 11.6, 2.3 and 3.7 million donkeys, mules and horses, respectively [1]. The equine population in Ethiopia is estimated to be 7.9 million (2.75 million horses, 5.02 million donkeys and 0.63 million mules) [2]. Equids (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 [3]. Most equines are found in the area of high human population density where the

production system is dominated by annual cropping with livestock production. This high number of equine in the production system shows the importance of equine species in the area [4].

Equids 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 [5]. Strongyle nematodes of equids (Horse, mule, donkey and zebra) are classified into the subfamilies Strongylinae and Cyathostominae, sometimes categorized as large and small strongyles, respectively [6]. Strongylosis has been reported from all parts of the world and almost affects more than 90% of horse population [7]. In Ethiopian studies, *S. vulgaris* was very common and highest in equids in mid and high altitude areas where the rain fall is relatively high and follows as a bimodal pattern [8].

The strongyles are nematode parasites which are classified under the family Strongylidae. These parasites live in the large intestine specifically caecum and colon of equines. The three most important species of large strongyles found in equines are *S. vulgaris*, *S. edentatus* and *S. equines* and the small strongyles are *Cyathostomum* spp [9]. Among the strongyle of horses, large strongyle infections, *S. vulgaris* has long been considered as one of the most common and pathogenic parasites of the horse. Adult large strongyles live in the caecum and colon. Fourth (L4) and fifth (L5) stage larvae are responsible for arteritis, necrosis and fibrosis of the cranial mesenteric artery and its branches. Severe colic and death of horses is the consequence of thrombosis and embolism leading to infarction of the intestinal tract [10].

The diagnosis of strongyle is by examination of feces for the detection of the strongyle egg, fecal culture for identification of strongyle larvae and per rectal examination reveals aneurysm of cranial mesenteric artery [11]. Equines are treated with anthelmintic drugs to eliminate adult strongyles from the large intestines and to prevent excessive contamination of pastures with eggs and larva three. The effective control programs of the large strongyles are applying a strategic treatment and improve pasture management [12]. Even though these works have been done, it is important to know the prevalence of the disease. Therefore, this study was carried out mainly to estimate the prevalence of strongylosis of mule and donkey at mecha woreda and to assess the associations between risk factors and strongyle infection.

## MATERIALS AND MTHODES

**Study Area:** The present study was conducted from November 2015 to Jun 2016 to estimate the prevalence of strongyle nematode infection in donkey and mule at mechworeda, west Gojjam zone, western Amhara Region, Northwest Ethiopia. Mecha is situated about 30 kilometers to the south-west of Bahir Dar town, Amhara Region's capital in north-western Ethiopia and approximately 524 km from Addis Ababa, Ethiopia's capital. It borders North Achefer in the North, South Achefer in the south and west and Yilmana Densa woreda in the east. Mecha lying on a latitude and longitude coordinate of 11°24'31"N 37°9'39"E/ 11.40861°N 37.16083°E with an elevation of ranges from 1800-2500 meters above sea level. The area receives a bimodal rainfall pattern with the annual precipitation rate being 820-1250 mm. The minimum and maximum temperatures of the area are 17 and 20°C respectively [13].

**Study Animal:** The sampling units of the study were donkey and mule of different age, sex, origin and body condition and, that were found at mechworeda west Gojjam zone. The ages of animals were determined using owners' information and dentition. Accordingly, animals were categorized as young (=2 years) and adults (> 2 years). The study animals were 384 local breeds of donkey (n=190) and mule (n=194) managed under traditional husbandry system. From these animals 163 males and 221 females selected randomly from different localities of mecha woreda. And also 98 animals were young and 286 animals were adult. According to body condition 200, 95 and 89 animals have good, medium and poor body condition respectively. The equine population of mecha woreda is estimated to be 23,106 equines [14].

**Study design:** A cross sectional study was conducted on local breeds of equine species particularly on the donkey and mule to estimate the prevalence of nematode strongyle infection in the study area. A systematic random sampling technique was used to select the study animals. The sample size was determined using the formula given by Thrusfield with a 50% expected prevalence, a 5% desired absolute precision and 95% confidence interval [15].

**Sampling and Coprological Examination:** Fecal sample was collected directly from the rectum with strict sanitation and placed in air and water tight sample vials and preserved by 10% formalin and then transported to Bahir Dar Regional Veterinary Laboratory. Samples were examined on the day of collection and stored in a refrigerator at 4°C for processing next day. The floatation technique was employed to know parasite eggs in the faeces and examined microscopically for presence of oval egg in the feces [16]. Information about the age, sex, species, body condition and origin was recorded. The age of selected equine was determined by dentition and body condition scores were estimated based on Pearson and Ouassat research [17].

**Data Analysis:** The data entry and handling was done using Microsoft Excel sheet 2007. Chi-square test was employed to treat comparable categorical variables. Measures of association were used for epidemiological studies and risk factors were assessed [18]. Statistical package such as SPSS version 20 was employed. Individual animal level prevalence was defined as the number of positive reactors divided by the total number of animals and multiplied by 100. The differences between parameters were tested for significance at probability levels of  $p > 0.05$  or  $p < 0.05$ .

## RESULTS

The overall prevalence was found to be 77.6% (298/384) and the species specific prevalence was 81.4% (158/194) and 73.7% (140/190) in mule and donkey respectively. The study animals were categorized in to two age groups, young less than or equal to 2 years and adults greater than 2 years. The prevalence on age bases was 70.4% (69/98), 80.1% (229/286) in young and adult respectively. Based on sex the prevalence was 74.8% (122/163), 79.6% (176/221) in males and females respectively and body condition scores of equines

were categorized as poor, medium and good and prevalence in different body conditions scores of equines were found to be 85.4% (76/89), 75.8% (72/95) and 75% (150/200) in poor, medium and good respectively. The prevalence of strongyle infection in the two species was 80.5%, 78.3%, 79.5%, 85.7%, 75% and 47.8% in Kudmi, Enashenfalen, Birakat, Addisalem, Addisamba and Merawi town respectively. There was significant difference on age and origin ( $P < 0.05$ ). However, in terms of species, sex and body condition, there was no significant difference ( $P > 0.05$ ).

Table 1: Prevalence of strongyle in mules and donkeys with associated risk factors.

Risk factor	No. of examined animals	No. of positive animals	Prevalence in (%)	$\chi^2$	P-value
Species					
Mule	194	158	81.4		
Donkey	190	140	73.7	3.32	0.068
Total 384	298	77.6			
Age					
Young	98	69	70.4		
Adult	286	229	80.1	3.920	0.048
Total	384	298	77.6		
Sex					
Male	163	122	74.8		
Female	221	176	79.6	1.239	0.266
Total	384	298	77.6		
Bcs					
Poor	89	76	85.4		
Medium	95	72	75.8	4.067	0.131
Good	200	150	75		
Total	384	298	77.6		
Origin					
Kudmi	133	107	80.5		
Enashenfalen	83	65	78.3		
Birakat	39	31	79.5	14.298	0.014
Addisalem	42	36	85.7		
Addisamba	64	48	75		
Merawi town	23	11	47.8		
Total	384	298	77.6		

## DISCUSSION

The overall prevalence of equine strongylosis among equine species in this study was count 298 equines were positive from the total of 384 equines and which count 77.6% prevalence. This survey was a first attempt to provide base line information on the occurrence of equine strongylosis in the study area. This finding was less than to the work of the reports of Basaznew *et al.* [17] around Bahirdar reported that with a prevalence of 100 % and 83.85% overall prevalence in mules and donkeys respectively and Getachew *et al.* [11] and Alemayehu [19]

from East Shewa and Adaa, Akaki and Bost of East Shewa that revealed 100% and 99% prevalence respectively and this could be due to the presence of different geographical and climatic conditions between the study area.

In this study the prevalence was lower than as compared with the results of Ayele *et al.* [3], Yoseph *et al.* [20], Belay [21], Fikruet *et al.* [22] and Tolla *et al.* [18] in which they reported, 100%, 100%, 100% and 98.2%, 87.7% in donkeys of, Wonchi, highland of Wollo province, Dugda Bora and western high land of Oromia and Gondar respectively. This study also lower prevalence of

strongylosis when compared with the study reported by Ayele and Yosef [20] they reported that 93% in Bereh, 87% in Boset and 95% in Adaa respectively. The prevalence recorded for strongyle parasite reported by Kassaye *et al.* [23] at Hawassa town was 64.9% in donkeys. This report is not in agreement with my study as there was a prevalence of strongylosis 73.7% in donkeys, this variation may be agro-climatic and management variation.

The data analysis showed no statistical significant difference in the prevalence of strongyle infections between mules and donkeys ( $p>0.05$ ) and species does not seem to play a role in this regard. The prevalence of strongyles in mules was 81.4% and in donkeys was 73.7%. Based on this, strongyle infection is slightly higher in mules than in donkeys. This high prevalence may be due to management and deworming activities on the study area. The prevalence of strongyle infection in donkeys is lower than with results of Ayele *et al.* [3] with a prevalence of 87% in donkeys in Boset, Central Shoa and samriawt *et al.* [24] in Ethiopia and Hassan *et al.* [13] in Sudan reported a higher prevalence of 99.15%, 70.1% in donkeys and 96.15% in mules of strongyle infection, respectively. This study is higher than the study of Molla *et al.* [9], Tesfu *et al.* [15], Samrawit [24] and Haimanot *et al.* [25] who reported 5.83%, 62.3%, 26.2%, 68.1% prevalence of strongylosis in donkeys in and around Dangila town, Menz Keya Gerbil district, Hawassa town and Mersa town of south wollo zone respectively. In this study the prevalence of the strongylosis in mule is higher than Molla *et al.* [9] who reported 41.7% in mule in Menz Keya Gebril district. This difference may be attributed due to the difference in equine management and agro-climatic conditions between the study areas.

The data analysis showed the presence of statistical significant difference in the prevalence of strongyle infections between adult and young ( $p<0.05$ ). This difference might be due to feeding and practice of deworming difference on the age groups of equines in the study areas. In this study the prevalence of strongyles in adult was 80.1% and in young was 70.4%. Based on this, strongyle infection is slightly higher in adult than in young. This result agrees with works of Chitra *et al.* [7] who reported that the level of strongyles and ascaris increased when the donkeys became older, but then decreased. It may be due to the development of age immunity to strongyles and ascaris in adult donkeys. But, no effect of age for the strongyle infection could be detected in other studies Basaznew *et al.* [17].

Analysis of data for sex related susceptibility to strongylosis indicates there was no significant difference among the two groups ( $P > 0.05$ ) and gender does not seem to play a role in this regard. This phenomenon is also observed by other works under different management and climatic conditions Basaznew *et al.* [17]. The prevalence was higher in females (79.6%) than males (74.8%). This could be associated with the more workload in males than females, which could create most of males get less chance for grazing the pasture but mostly get non pasture feeds when compared to females and, females usually have not more cares because females are mostly used as breeding purpose as a result females have high chance in grazing in the pasture in most of the days in the field.

Data analysis on body condition scores has no significance difference among the three BC groups ( $p>0.05$ ). In this study the poor body condition equines have a higher prevalence than the medium and good body condition equines. This could be due to the fact that animals with poor body condition might be immune-compromised probably due to malnourishment and higher workload and as a result be exposed to strongylosis. This study was disagreement with the study of Alemayehu [19] and Haimanot *et al.* [25] and similar to the studies of Molla *et al.* [9]. From the data analysis the origin has a significant difference ( $P<0.05$ ) among the five places and a slightly higher prevalence was recorded on the Addisamba and Kudmikebele when compared to the other kebele. This may be due to feeding and deworming activities of the area.

## CONCLUSION

The present study revealed that has a significant strongylosis is highly prevalent in the study area. This prevalence cause economic loss through reduce working ability, body weight gain and short life expectancy of working equines. These nematode parasites are and will continue to be the most damaging parasite helminthes in the study area and more common in untreated equines and exerting a significant economic impact when they are raised. In the investigation of potential risk factors for the occurrence of strongyle infection, age and origin were found to be significantly associated with the hazard of the disease. But sex, species and body condition of animals were not significantly associated with the occurrence of strongyle infection. Therefore this study was revealed that equine strongylosis was one of the major parasitic diseases contributed to the loss of productivity and

production of equine in the study area. Based on the present study appropriate management and sanitary standard through strategic deworming must be practiced now and in the future in order to prevent excessive pasture contamination.

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