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Prevalenceof Major Gastrointestinal Nematode Parasites of Donkeys in Selected Districts of Wolaitazone, Southern Ethiopia

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Abstract: This cross sectional study was undertakento determine the spectrum of species and prevalence of major gastrointestinal tract nematode parasites involved in donkeysin selected districts of Wolaita zone, Southern Ethiopia.Fecal samples of 384donkeys were examined using qualitative techniques. Of these, 42.7% of donkeys were infected. The species identified and their prevalenceswere,strongyles (34.4%), *Parascarisequorum* (3.1%) and *Oxyuris equi* (1.8%). The infections were single or multiple. Indeed, 92.07% of donkeys were infected by a single species and 7.9% by multiple species. No significant difference (p<?0.05) was indicated in terms of sex.However, there was a significant difference ($p < 0.05$) in the infection rate ofgastrointestinal tract nematode parasites among age groups of donkeys where higher prevalence was observed in older donkeys (81.0%) followed by young (35.7%) and adult (27.6%) donkeys. The prevalence of GI nematode parasite was significantly highest ($p<0.05$) in poor body condition donkeys (69.2%) followed by medium (34.1%) and good (23.5%). Thus,GInematode parasitic infection is an important parasitic disease of donkeys in the study area.It is suggested that the combination of strategic use of anthelmintics with good management practice could improve the control of GI nematode infections in donkeys in the study area.

Key words: Donkey · Gastrointestinal Nematodes · Prevalence · Wolaita Zone · Ethiopia

INTRODUCTION

Ethiopia has about 7.9 million equines, where 5.2 millions are donkeys [1]. There is one equine for every four people in the agricultural sector and for every five persons of the total population [2]. The low level of development of the road transport network and the rough terrain of the country make the donkey the most valuable, appropriate and affordable pack animals under the small holder farming system of Ethiopia [3, 4], has revealed that in areas where draft power is a constraint for crop cultivation a pair of well-conditioned donkeys could be used as an alternative draft power sources for secondary and tertiary land preparations. Donkeys have reduced the domestic burden of rural people, especially for women and have created employment and income generating opportunities for many people.

Even though donkeys have often been described as sturdy animals, they succumb to a variety of diseases and a number of other conditions [5]. Parasitic helminthes are one of the most common factors that constrain the health and working performance of donkeys and horses worldwide. The most common GI nematode parasites of equines include large strongyles, small strongyle, Ascarisand pinworms *Oxyuris equi* [6].

Despite the huge numbers and the increasing importance of donkeys in the Ethiopian economy, knowledge about the health problems affecting their welfare is limited for most parts of the country. The objectives of this study were to determine the spectrum of species and prevalence of major GITnematode parasites involved in donkeys.

MATERIALS AND METHODS

Study Area: The study was conducted from November, 2015 to April 2016 in Sodozuria, Humbo and Boditdistricts, Wolaita zone, southern Ethiopia.

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The altitude ranges from 1650 to 2980 m.a.s.l. and receive an annual rainfall of 450-1446 mm. The study areais characterized with bimodalrainfall with a longrainy seasonfrom June to September and short rainy seasonfrom February to April.The mean annual maximum and minimum temperature in the area ranges from 34.12 to 11.4°C [7].

Study Population: Donkeys under investigation were 10 months and 10 years of age, of different sexes and local breeds. The body condition score of equines were grouped into poor, medium and good [8].

Study Design and Sample Size Determination: A cross sectional study design was followed and a simple random sampling technique was employed to select study animals.Study sites were selected purposively. The sample size was determined using the formulagiven by Thrusfield [9] by assuming 50% expected prevalenceand 95%confidence interval.

Sample Collection and Examination: Faecal samples were collected on a single occasion per rectum from 384 donkeys and placed in air and water tight sample vials and then transported to the laboratory of Faculty of Veterinary Medicine, Wolaita Sodo University.Samples were preserved in 10% formalin and refrigerated at 4°C if examination is delayed. Floatation method was used to identify eggs of parasites [10, 11].

Data Analysis: The prevalence was calculated by dividing the number of animals harboring parasites by total number of examined animals. Statistical analyses were performed using statistical package for social science (SPSS) software, version 16.

Descriptive statisticwas used to determine the prevalence of endoparasites and percentage of health problems in the area. Chi-square (x^2) test was used to measure association between prevalence of the parasite risk factors. In all the analysis, confidence levelswere 95% andsignificance at $p<0.05$.

RESULTS

Prevalence: Among the examined donkeys, 164 were infected, yielding a prevalence of 42.7%. Three species ofGI nematodes were recorded:strongylespp. (Belonging to the large group of Strongylidae nematodes plus *Trichostrongylusaxei* eggs), *Oxyuris equi* and *Parascarisequorum* with a prevalence of 80.7%, 3.1% and 4.2% respectively. The difference in these prevalence rates was highly significant ($P<0.05$).Single and multiple infections were recorded where 92.1% donkeys were infected by a single species and 7.9% by multiple species (Table 1).

No significant differences in prevalence were recorded in terms of study sites and sex (Table 2, 3). Significant difference was observed among different age groups with a prevalence of 35.7%, 27.6 % and 81.0% in young, adult and old, respectively (Table 4).

Table 1: Prevalence of gastro-intestinal nematode parasites of donkeys in the study area.

Nematode parasite spp	No. positive	Prevalence (%)	P-value(x^2)
Strongylespp	132	80.4	<0.001 (384.000)
P.equarum	12	7.3	
O.equi	7	4.2	
Mixed	13	7.9	

Table 2: Prevalence of gastrointestinal nematodes of donkeys based on study districts.

Origin	No- examined	No- positive	Prevalence	P-value(x^2)
Sodozuria	162	73	45.1%	0.054(5.819)
Bodit	137	48	35.0%	
Humb	85	43	50.6%	

Table 3: Prevalence of gastrointestinal nematode infection based on sexcategories.

Sex	No. examined	No. positive	Prevalence (%)	P-value(x^2)
Male	310	125	40.3	0.067(3.742)
Female	74	39	52.7	

Table 4: Prevalence of gastrointestinal nematodes infection based on different age groups of donkeys.

Age	No- examined	No- of positive	Prevalence (%)	P-value(x^2)
Young	56	20	35.7	<0.001(82.225)
adult	228	63	27.6	
Old	100	81	81.0	

Table 5: Prevalence of gastrointestinal nematode infection in different body condition scored donkeys.

Body condition	No. examined	No. positive	Prevalence (%)	P-value(x^2)
Poor	120	83	69.2	<0.001(52.559)
medium	179	61	34.1	
good	85	20	23.5	

Additionally, the prevalence based on body condition grade was 69.2% (n=83), 34.1% (n=61) and 23.5% in poor, medium and good body condition respectively with significant difference (P>0.05) between them (Table 5).

DISCUSSION

Infection by GI nematodes is common among donkeys [12-15]. In this study, the overall prevalence of GI nematode infection of donkeys in the study area is relatively of high rate which indicated that GI nematodes are paramount diseases in equine.This result is in agreement with the studies of Sawsan *et al*. [16] in South Darfur state. However, Tesfu *et al*. [17] reported a higher prevalence than the present study in Hawassa town, Ethiopia. The contradiction between these resultscould be attributed to different geographical and climatic conditions between the study area, deworming practices and study periods.

In the previous studies of prevalence of helminthes among equines, strongyles were the most prevalent [18-22] which is in agreement with our works. Higher infections of strongy lescor respond with the biology and epidemiology of these parasites as they require longer period to complete the life cycle and significant change in worm population and their burden under different anthelmintic pressures over the years [23].

The current work is lower than the reports ofWorku and Afera [23], Getachew *et al*. [24], Mulate [26] and Fikru *et al*. [27] in different parts of Ethiopia. This may be due to the presence of different geographical and climatic conditions between the study area and deworming practices with effective drugs are routinely undertaken.

In the present study, the prevalence of *Parascarisequorum* among donkeys is lower than [28, 29] in Ethiopia.This difference could be due to compromised immune responses relating to concurrent disease, agro-ecological and climatic difference of the study areas.

The prevalence rate of *Oxyuris equi* in the present study area is in agreement with Mustafa [30], Alemayehu and Etaferahu [31] and Sultan *et al*. [32] who have reported in the central Black Sea region, Turkey and in Ethiopia. However, a higher prevalence was recorded byTsegaye and Chala [33] in Ethiopia. The low prevalence recorded in this study might be due to the effects of dry season which corresponds relatively with high temperature in the present study area that may desiccate the highly susceptible *O. equi* eggs.

Significant sex wise prevalence was not observed in female and male donkeys. This indicates that both sexes share equal chances of acquiring nematode infection, because they are reared and grazed on the same pasture without sex discrimination. This phenomenon is also observed by other workers under different management and climatic conditions [34].

In the present study, the prevalence of GI nematodes in donkeys was higher in older age thanyoung and adult age groups.The highest prevalence seen in donkeys of old age may be due to waning body condition and immunity. But, the work of Netsanet *et al.* [35] conducted in Hawassa town, Ethiopia, contradicts with our results.This variation may be due to the difference insampling size, nutritional status of the animal and over work stress in the respective study area.In general, the high prevalence of nematodes in donkeys of all age groups observed in the present study area might be due to the greater tendency of these donkeys to use permanent pastures.

In the present study and in other previous works, poor body condition scored donkeys were more affected by parasitic infections than other groups. This could be due to poor management, over work stress or caused by the parasites themselves. However, Haimanot *et al.* [36] reported a higher prevalence in good body conditioned donkeys. This might be due to the variation in sample size.

CONCLUSION

The gastrointestinal nematode infection in working donkeys is found to be widely prevalent and should be considered as one of the important disease of donkeys in the study area. Public awareness creation to equine owners on regular deworming, sufficient feed supply and decrease high work load are suggested.

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