

Full Length Research Paper

Gastrointestinal nematodes of donkeys and horses in Gondar town northwest, Ethiopia

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Received 30 December, 2012; Accepted 29 August, 2016

A study on the prevalence of gastrointestinal (GI) nematodes of equines was conducted from November 2011 to April 2012 in Gondar town to determine the prevalence and associated risk factors. A total of 103 horses and 281 donkeys were examined coprologically for the presence of GI nematode eggs using flotation techniques. Coprological result indicated horses and donkey harbor one or more nematodes infection in the total prevalence rate of 89.32% (92) and 98.22% (276) respectively. The two genera of parasite commonly encounter during the study period were strongyle type of egg (84.47 and 98.22%) and *Parascaris equorum* (43.69 and 23.35%) of horses and donkeys, respectively. Mixed infections were detected with prevalence of 76.9 and 40.8% in horses and donkeys, respectively. There was significant ($P < 0.05$) difference in prevalence of strongyle type of eggs and *P. equorum* between species. Body condition is one factor which shows significant different in the numbers of nematodes eggs both in donkeys and horses as both the species with poor body condition harbor more parasitic egg than good body condition. Because of their importance and impact of disease on the use of equine a compressive study for strategic parasitic control measures should be implemented.

Key words: Gastrointestinal (GIT), nematodes, donkey, horse, Gondar, Ethiopia.

INTRODUCTION

Ethiopia has the largest livestock population of Africa country with estimated 35 million tropical livestock unit. This includes 2.03 million horses, and 7.43 million donkeys (CSA, 2015). According to CTA (1997) and Tegegne et al. (1999), 50% equine population of Africa is still found in Ethiopia. Equine play an important role in rural communities providing power and transport at low cost they can be used for various agricultural operations and also provide the much needed transport in rural areas for activities such as carrying water, building materials, agricultural products and people. Horses and mules are faster and more powerful animals for work but,

on which is more costly to buy and maintain than a donkey (Pearson et al., 2003).

Despite its huge population size, equine remains marginal due to high prevalence of malnutrition, management constraints and disease like parasite. Parasitism represents a major obstacle to development of the livestock farming system in the country (Jobre et al., 1991) and characterized by high morbidity and mortality rates are to be mentioned.

Gastrointestinal nematodes are serious health hazards, contributing to poor body condition, reduced power output, poor productive performance and short life span

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(Pandey et al., 1994). Similarly, horses, donkeys and other equines is host for large numbers of internal parasites including blood protozoan parasites (Sumbria et al., 2014; Sumbria et al., 2015a, b; Sumbria et al., 2016). The vitality and other well-being of all ages are threaded by variety of internal parasites and the use of control measures ensures vigor and the best performance. The most common internal parasites are strongyles, *Parascaris*, pin worms (*Oxyuris equi*), and bots. Additionally, less important parasitic infection belongs to cestodes, lung worms, trematodes and intestinal thread worms (*Strongyloides*) (Powel and David, 1992; Hendrix and Charles, 2006). Despite the huge numbers and the increasing importance of equines in the Ethiopian economy, knowledge about the health problems affecting their welfare is limited for most parts of the country more over no previous study done on equine nematodes in and around Gondar town. Hence, it is necessary to examine the status and impact of these diseases and existing control measures (William and Masiga, 1998). Therefore, the objective of this study was to determine the prevalence of horses and donkeys gastrointestinal nematodes in the study area.

MATERIALS AND METHODS

Study area

The study was conducted in Gondar town and located 727 km North West of Addis Ababa. North Gondar zone located at an altitude ranging 1500 to 3500 m.a.s.l.. Numerous mountains, plateaus, hilly and sloppy areas, rivers, streams and lakes mark the topography of the zone. This zone is divided in to sub humid ("Wurch and Dega"), semi-arid ("Woynadega") and arid ("Kola"). The Gondar town is located at latitude of 12° 40'N and longitude of 27° 25'E with "Weyenadega" climate zone. The average minimum and maximum daily temperature of the area varies between 22, 30.7 and 12.3°C, respectively. The region receives a bimodal rain fall, the average annual precipitation rate being 1000mm. the short rains occur during the months of March, April and May while the long rains extend from June to September. The production system observed in the area combines mixed crop livestock production type. This zone had a livestock population of, 2.03 million cattle, 0.6 million sheep, 0.54 million goats, 0.25 million equine species and 1.9 million poultry (CSA, 2015).

Study population

The study animals were equines of two species (donkeys and horses) in Gondar town. All donkeys and horses were considered irrespective of age, sex and body condition score. These age classes were based on age of first work, productive age and the life span of Ethiopian donkeys (Svendsen, 1997). Donkeys were also grouped into different body condition score according to Svendsen (1997).

Study design

A cross-sectional study was carried out from November, 2011 to April, 2012 by collecting data on events associated with gastrointestinal nematodes of equines that are found in Gondar

town.

Sample size determination

Simple random sampling strategy was followed to collect feces from individual animals. The sample size was decided based on the formula described by Thrusfield (2005) with 95% confidence interval at 5% desired absolute precision and by assuming the expected prevalence of 50%. The estimated sample size was calculated by the formula.:

$$N = \frac{1.96^2 P_{exp} (1-p_{exp})}{d^2} = 384$$

Where N = required sample size; P_{exp} = expected prevalence; d = desired absolute precision.

Methodology

Fecal sample was collected directly from the rectum of each animal using glove/freshly defecated feces with strict sanitation for each species, age and sex group and the sample placed in air and water tight vials and taken to the University of Gondar Veterinary Parasitology Laboratory. In the laboratory the sample was subjected to flotation technique and for identification of GIT nematodes egg of equines.

Parasitological examination

Saturated saline flotation technique

From collected sample, 3 g of fecal sample weighted and put into universal bottle and 42 ml of floatation fluid (NaCl) was added then mixed thoroughly. The presence of egg was appreciated using cover slip and test tube method (Urquhart et al., 1996).

Data management and analysis

The collected sample was entered into Microsoft excel and was analyzed using statistical software packages for social science (SPSS). Descriptive statics like percentage was used to determine the prevalence of GIT nematode and chi-square (χ^2) was used to look into the association of between prevalence of GIT nematodes and risk factors. In the analysis, confidence level was held at 95% and p<0.05 was set for significance.

RESULTS

The overall prevalence of GI nematodes was found as 368 (95.83%) as shown in Table 1. As indicated in Table 2 the prevalence of gastrointestinal nematodes on the basis of species shows 92(89.32%) and 276(98.22%) in horses and donkeys respectively. Out of the recorded eggs, 363(94.53%) was strongyle-type and 105(27.34%) of *P. equorum* eggs was recorded nematode eggs. The study also shows the prevalence rate of parasitic infection in different body condition of the animals. The result indicated the highest infection rate was recorded in poor body condition animals which was 99.07% but

Table 1. The overall prevalence of gastrointestinal nematode parasites.

No. of animals examined	No. % of positive animals	Prevalence
384	368	95.83%

Table 2. The prevalence of nematode parasites eggs on the basis of species and the type of nematode eggs.

Species	No. examined	No. of positive animals	Strongly type egg	<i>Parascaris equorum</i> egg
Horse	103	92(89.32%)	87(84.47%)	45(43.69%)
Donkey	281	276(98.22%)	276(98.22%)	60(21.35%)
Total	384	368(95.83%)	363(94.53%)	105(27.34%)

Pearson $\chi^2(1) = 14.9524$; $Pr = 0.001$.

Table 3. Prevalence of gastrointestinal nematode parasites on the basis of body condition.

Body condition score	No. of examined No. of positive	
	animas	animals
Good	67	54(80.6%)
Medium	210	208(99.05%)
Poor	107	106(99.07%)
Total	384	368(95.83%)

Pearson $\chi^2(2) = 47.1848$; $Pr = 0.001$.

medium and good body condition animals were relatively resistant for the nematode infection and the result was statically significant $P > 0.05$ (Table 3)

The study indicate horses and donkeys were harboring one or mixed infection for strongyle and *P. equorum* parasite egg with the most frequently identified parasitic egg of strongyle type followed by *P. equorum* and there was significant difference in the prevalence rates of *P. equorum* and strongyle type of egg. Out of the total 103 donkey examined, 42(40.8%) were infected with strongyle type and *P. equorum* while out of the 281 horse examined, 216(76.9%) harbor both strongyle type and *P. equorum* egg type as described in Table 4.

DISCUSSION

Gastrointestinal nematode infection is the main disease condition affecting donkeys and horses in tropical and sub-tropical areas of the world (Svendsen, 1991). In the present study, microscopic fecal examination showed that the GI nematode parasite was an important health problem in the study area with over all prevalence rates of 95.83% which was 89.32 and 98.22% in horse and donkey, respectively (Table 2). This is not much less than with the report by Tegegne et al. (1999) who indicated that no animal was found free out of 1340 examined from Adami Tulu, Ethiopia.

In the present study, the prevalence of strongyle species was 84.47 and 98.22% in horses and donkeys, respectively (Table 2) which was lower than those reported by Ayele et al. (2005) and Mulate (2005) who reported 100% prevalence in donkeys at Dugda Bora District and high land of Wollo provinces, respectively and Getachew et al. (2010) who reported 99% prevalence in working donkeys of Ethiopia. The prevalence was higher in the present study than the report of Saeed et al. (2010) and Seid (2011) who reported 65.51% on horses and 65.1% on both horses and donkeys, respectively. This difference may be due to ecological difference of those areas and deworming of animals when they went to the clinic for other bacterial diseases in the study areas.

In the present study, the prevalence of *P. equorum* was 43.69 and 21.35% in horses and donkeys respectively (Table 2). Similar report was generated by Ayele et al. (2005) at Dugda Bora District, Ethiopia. This is in agreement with the 34% prevalence reported by Tegegne et al. (1999) at Adami Tulu on donkey and also 32.5% prevalence reported by Ayele and Dinka. This might be due to the fact that horses were more frequently used in cart; also, they do not have enough time to graze on field only often in evening for one to two hours whereas donkeys have more time to graze on field. In this study age, and sex wise prevalence was not assessed because of the horses and donkeys were all adults and males that

Table 4. Prevalence of mix infection of GIT nematode based on egg type.

Species	No. of examined animals	No. of positive	Strongyle and <i>Parascaris equorum</i> mix found
Donkey	103	92(89.32%)	42 (40.8%)
Horse	281	276(98.22%)	216 (76.9%)

found in Gondar town working on cart and carrying of sand and stone besides the number of horses and donkeys are much vary because of few number of cart horses in the area.

CONCLUSION AND RECOMMENDATION

Besides the managerial problems from the owners there is also lack of knowledge on periodic deworming and treatment equines by taking to veterinary clinics when they get sick. Because of this reason almost all horse and donkey were positive for strongyles and moderately infected with *P. equorum*. In line with above conclusion, the following recommendations are recommended:

1. Periodic deworming program shall be implemented for some animals by government for showing the importance until the community adapts.
2. Awareness should be created by teaching peoples in the meeting, by dramas on radio or television (mass media) about managerial systems and on the importance of GIT nematodes of equine.
3. Mixing of horses and donkey grazing should be avoided.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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