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Study on Major Gastrointestinal Parasites in Donkeys in Tullo District, Eastern Oromia, Ethiopia

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Abstract: A cross sectional study was carried out from November 2011 to April 2012 to determine the prevalence and risk factors associated with donkey gastrointestinal parasite infections in Western Hararghe Zone, Tullodestrict, eastern part of Ethiopia. Fecal examination was conducted on total of 384 donkeys randomly selected from different sites of the study area. Out of total sample, 288 (75%), CI [70-79.3] were found positive for gastrointestinal parasite infections. Taking the overall prevalence of infection in to consideration *Strongyles* 130 *(*33.9%) are the highest prevalence followed by 53 (3.8%) *Ascaris,* 36 (9.4*%)* Strongyloid, 31(8.1%) mixed infection, 20 (5.2%) *Oxyuris, 14 (*3.6%) *Fasciola* and 4 (1*%) Trichuris.* The prevalence of gastrointestinal parasite in different age group showed that there a significant difference ($p<0.05$) between young and adult age groups and animals with different treatment frequency ($p<0.05$), those with no treated were highly infected. There was no significant difference ($p>0.05$) in prevalence between age and body condition of the animals in the study areas. Gastrointestinal are important disease of donkeys in the study area.

Key words: Donkey · Figure · Gastrointestinal Parasite · Percentage · Prevalence · Risk Factors

INTRODUCTION

Ethiopia possesses the largest livestock population of 47.5 million cattle, 26.1 million sheep, 21.7 million goats, 7.8 million equines, 1 million camels and 39.6 million chickens [1]. Throughout Ethiopia donkeys are used to transport goods between home stead and market. In remote rural areas of the country where modern transportation is not available, the contribution of donkey in facilitating marketing of agricultural product is of per amount importance [2]. Donkeys are one of the most important animals and most intimately associated with man. Besides, the low level of development of the road transport importance, the rough terrain of the country make the donkey the most valuable, appropriate and affordable pack neglected animals under the smallholder farming system [3].

The donkey population in Ethiopia is a good indicator of the economic importance of equine species. However, thousands of households do not own or have not an access to a donkey for economic reason [4]. Donkeys are most commonly found in dry and mountain area [5]. The mountainous nature of the Ethiopia landscape has made travel time consuming and difficult, which has resulted the back of pack animal to remain as the only suitable means of transport for Ethiopian terrain for centuries [6]. Also donkey appear to be an effective entry point for assisting women not only in domestic responsibilities but also enabling women to be engaged in income generating activities [2]. Donkey are often described as hardy and resistant animals, they do suffer a number of health problem. The most important one are parasitic disease, especially, gastrointestinal parasite, harness sore, sarcoids and infectious disease such as anthrax [2].

Helminthes parasite of donkeys are one of the most common factors that constrain the heath and working performance of donkeys with many tropical and sub-tropical environment of the world. The parasite causes various degree of damage depending on the species and number present, nutritional and immune status of eqiuds [7]. Gastrointestinal parasite are the most serious health problem of donkeys, contributing to poor body condition, reduced power output, poor reproductive performance and short life span. In Ethiopia, donkeys generally harbor gastrointestinal parasite such as Strongylus*,* Ascarids, pin worm, bots, stomach worm, tape worm and liver fluke [2].

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Strongyles are parasite of large intestine. The adult parasite lives in cecum and colon. The possible source of Strongyles infection in donkeys is the wet season herbage infection and long rain season pasture contamination. The dry season restrict the acquisition of larvae because this time is a characteristic of low rainfall and minimal herbage coverage. Of all parasites Strongyles are considered as important and pathogenic helminthes in donkey and are very prolific [8].

Parascaris equorum is a very large ascarid parasite of equine, heavy infection with adult ascarid causes moderate enteritis and subnormal growth through interference with digestion and absorption of nutrient that produces a malnourished, under sized, sicky individual with little stamina and reduced resistance to disease [9]. Strongyloides are unique being capable of both parasitic and free living reproductive cycle. The parasitic phase composed entirely of female worm in small intestine and these produce larvated egg by parthenogenesis. *Fasciola* are commonly known as liver flukes. The adult liver flukes live in the bile duct and shed the egg in to the bile which inters the intestine. The adult body of *Trichuris* is whip-shaped, hair like and embedded in the wall of large intestine. The egg is lemon shaped with distinct plug at each pole. Infective stage is L_1 within the egg which develops in one or two month of being passed in feces depends on the temperature.

Studies conducted in Ethiopia regarding to the gastrointestinal parasite of donkeys indicated that the parasitic diseases are important in the different areas. Previously, research was not under taken in Tullo district. The objective of this study were to determine the prevalence gastrointestinal parasite of donkeys and identify the associated risk factors for the occurrence of parasite infection

MATERIALS AND METHODS

Study Area: The study was conducted in peasant association of (PA's) of Tullo district, Western Hararghe of Oromia region, eastern Ethiopia. The district is located at 375 km east of Addis Ababa along the road to Harar (Fig. 1). The climatic condition of the area is 47% highland and 53% midland which is located at altitude of 1600-2700 meter above sea level (m.a.s.l). The annual mean temperature is 18.5°C (minimum) and 23.5°C (maximum) and the relative humidity of the area varied from 21.9-65%. The long rains occur during the months of June to September and the short rainy season occurs during April to May with the average annual rainfall of 980 mm. The district has 30 PAs and one town with total population of 120,953. The main agricultural products of the areas are maize, coffee and chat. The total livestock populations in the district include 119422 bovine 13177 ovine, 37973 caprine, 6517 equine and 171,499 poultry.

Study Animals: Randomly selected donkeys were sampled from PAs of Tullo district and subjected to qualitative coprological examination to estimate the prevalence of gastrointestinal parasite of donkeys. The age, sex, body condition and treatments frequency were included in this study as risk factor. Donkeys less than two years are considered as young and more than two year was considered as adults [10]. These animals are used by the community to transport home consumables, goods and service and people from one area to another area.

Study Design: Cross sectional study design using simple random sampling was conducted from November 2011 to April 2012 on 384 donkeys to assess the prevalence of gastrointestinal parasite of donkeys in different PAs by coprological examination. Data about age, sex and body condition of the study animals were congregated from the owners. The age of animals was determined by using owners' information and dentition. The Body condition score (BCS) were subjectively estimated based on the guides published by Svendsen [11].

Sample Size Determination: The required sample size of donkey was determined by the formula given by Thrusfield [12] with 50% expected prevalence, 95% of confidence interval and 5 % desired precision in study animals. Accordingly 384 animals were sampled for the study.

Sampling Method and Examination of Fecal Samples: A simple random sampling technique was employed to selected peasants association, households and animals. From total of 30 PAs in the district, 12 PAs were randomly selected. Fecal samples were collected directly from the rectum of donkeys with universal bottle using sterile disposable gloves. Each sample was labeled with necessary information and transported to Hirna regional veterinary laboratory for processing. Samples were kept in refrigerator at 4°C if immediate processing cannot be possible, but it was processed within 24 hours for coproscopy and coproculture to identify the eggs in feces

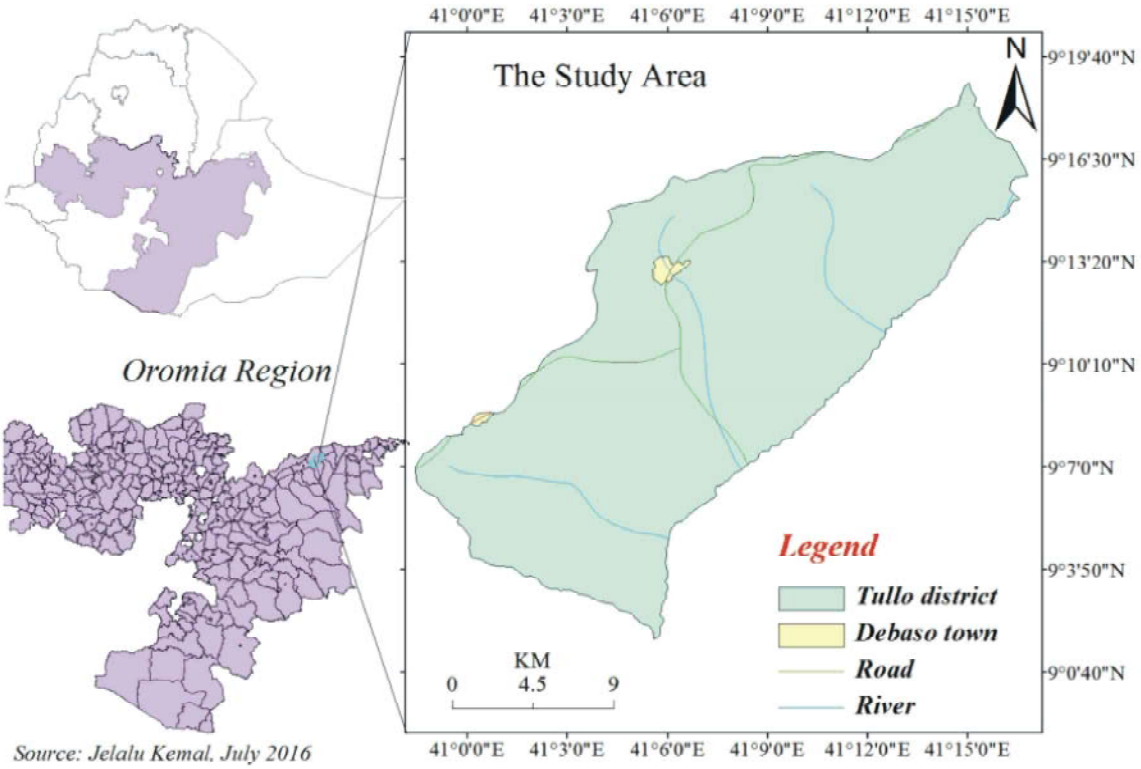

Fig. 1: Diagrammatic representation of Tullo district, Oromia, Ethiopia

and for identification of Strongylelarvae, respectively. Floatation technique was used for qualitative test to detect nematode and cestode eggs in the faeces. Sedimentation technique was used for detecting trematode. Sodium chloride and magnesium sulfate were used as flotation fluid for this study.

Fecal Culture, Larvae Recovery and Identification: Those samples positive to flotation technique were subjected to fecal culture to see the Strongyle larvae profile in the study area. The samples were cultured according to Kaufmann [13]. Approximately 10 g moist and crumbly feces were broken up finely using spatula. Wide mounted plastic jars were filled with the feces, closed with the lid and left at biochemical incubator for 4-7 days stirring the feces each day to prevent the growth of fungi in the culture and L3 (Third in star) larvae were recovered using the Baerman technique. A drop of lugol's iodine was added to the sediment to differentiate the larvae which stains the free living nematode yellow, while parasitic 3rd instar larvae remain unstained. The larvae was then identified under low power microscopy (10x objective), based on the shape and number of gut cells, relative size of sheath tail and shape of larvae's tail [13].

Data Analysis: The result obtained were recorded and entered in to Microsoft excel spread sheet. The data fed in to excel sheet were coded and analyzed by STATA 11.0 version. Chi-square tests was applied to test the statistical association exists among the risk factor such as age, sex and body condition scoring with the presence of the parasite. A statistical significant $P<0.05$ were used to test the association of the risk factors with the disease prevalence.

RESULTS

Parasitologicalsurveyandparasite Composition: Out of total 384 donkeys examined d uring the study period, 288 were found positive for gastrointestinal parasite and the overall prevalence of 75% (95% CI, 70.4-79.3%) was recorded. The species composition of gastrointestinal parasites identified by cooprological examination showed that Strongyle were the most prevalent followed by *Ascaris*, *Strongyloid*, *Oxyuris*, *Fasciola, Trichuris* and mixed infections (Fig. 1).

Prevalence of Gastrointestinal Parasite Infection in Different Variables: The prevalence on ages is adult and young was showed a significance difference ($P<0.05$)

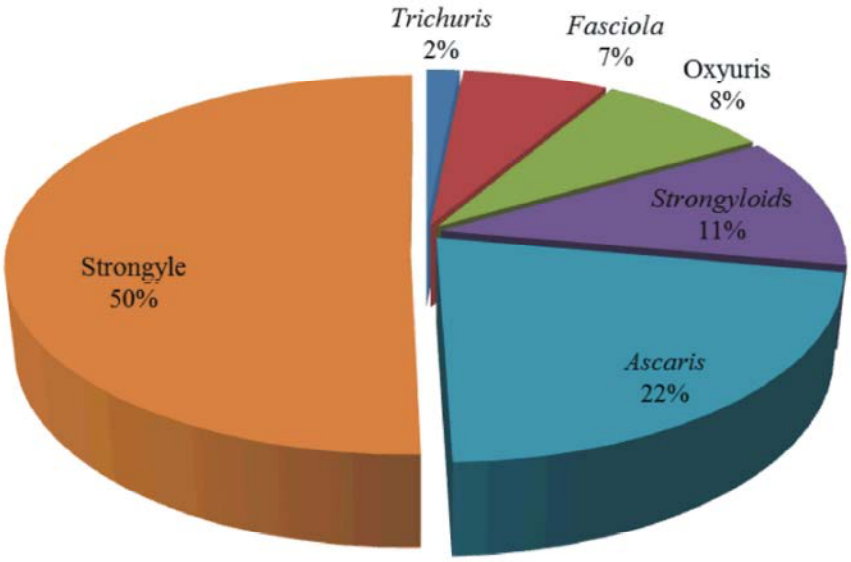

Fig. 1: Gastrointestinal parasite composition of donkeys in the study area

Table 1: Prevalence of gastrointestinal parasite infection based on age, sex, body condition and treatments frequency

Variables	Categories	Number examined	Number positive	Prevalence (%)	95% CI	χ^2	P-value
Age	Adult	268	212	79.1	89.8-96.6%	7.97	0.005
	Young	116	76	65.5	56.1-74.1%		
	Total	384	288	75	70.4-79.3%		
Sex	Male	245	179	73.1%	67-78.5%	1.4	0.244
	Female	139	109	78.4%	70.6-84.9%		
	Total	384	288	75%	70.4-79.3%		
BCS	Good	296	218	73.6%	68.2-78.6%	1.26	0.26
	Poor	88	70	87.5%	69.6-87.4%		
	Total	384	288	75%	70.4-79.3%		
Treatment	Treated	82	51	62.2%	50.8-72.7%	9.12	0.003
	Non treated	302	237	78.5%	73.4-83%		
	Total	384	288	75%	70.4-79.3%		

Table 2: The prevalence of gastrointestinal parasite

Parasite identified	No- of animals examined	No- of positive animals	Prevalence (%)	95%CI
Strongyle	384	130	33.9	33.3-34.4
Ascaris	384	53	13.8	13.43-14.17
Strongyloid	384	36	9.4	9.09-9.71
Mixed infection	384	31	8.1	7.82-8.38
Oxyuris	384	20	5.2	4.97-5.43
Fasciola	384	14	3.6	3.41-3.79
Trichuris	384	4	1	0.9-1.10

(Table 1). Parasitic infections between sexes were compared. The prevalence of male and female indicated that, there is no significance difference (P>0.05) (Table 1).

Prevalence of Gastrointestinal Parasite Infection Based on Body Condition: Based on body condition of the animals, the prevalence of parasite in donkeys grouped as poor body condition was higher than those in good body condition; however, the difference was not statistically significant (Table 1).

Prevalence of Gastrointestinal Parasite Based on Treatments Frequency: Parasitic infections were evaluated based on treatment frequencies. Animals treated at least once during the last one year had significantly lower prevalence of gastrointestinal parasites than those who received no treatment at all (Table 1).

The Prevalence of Gastrointestinal Parasite: The prevalence of individual species of parasite in the study area was different in figure (Table 2). The mixed infection

parasites are *Ascaris* and Strongyle 16(4.2%), *Fasciola* and Strongyle 8(2.1%), *Oxyyuris* and Strongyle 6(1.5%) and *Trichuris* and Strongyle 1(0.3%).

DISCUSSION

During the present study an overall prevalence of 75% (95% CI, 70.4-79.3) was resulted. The result of present study was similar to the report of [14]. In the present study the prevalence of Strongyle was 33.9%. This result is lower than the report of different workers such as Ayele *et al.* [3] who reported 100% prevalence in donkeys at Dugda Bora district. Getachew *et al*. [18] and Asefa *et al*. [7] reported 99% and 99.5% prevalence in working donkeys of Ethiopia and at Sululta and Gefersa of central Oromia respectively. This all findings are higher than the findings of present study. This could be because of the different animal management in the study area, where grazing area is more of individual than communal.

The prevalence of Ascaris 13.8% in the present study area agrees with the report of Fikru *et al.* [19] and Yoseph *et al.* [20] who reported prevalances of 15.7% and 17.3% respectively. However, it is lower than the reports of Getachew *et al.* [18], Shrinkhand *et al.* [21] at Nappur and Asefa *et al*. [7] who reported the prevalence of 34%, 24.5% and 53% respectively. This difference may be the difference in population age structures between donkeys in the study areas.

The prevalence of strongyloid in the study area, 9.4% is similar with the report of Getachew *et al.* [18] with the prevalence of 11% in gastrointestinal of working donkeys in Ethiopia. However, our result is different from 24.5% prevalence by Shrinkhande *et al.* [21] in the incidence of helminth parasite in donkeys in Nappur. This difference is arising from variation in environmental temperature and humidity since warm and moistures favor their development.

The 5.2% prevalence of *Oxyuris* was closed to the report of 6% prevalence by Abebaw *et al.* [17], Fikru *et al.* [19] 2.1% and 3% reported by Ayele *et al.* [3]. But it was higher when compared with the work of Yoseph *et al.* [20] who report 32.4% in Wonchi. This difference is may be due to the temperature of the study area which desiccates the highly susceptible Oxyuris egg.

The 3.6% prevalence of *Fasciola* species is in the present study. This result was related with the report of 1.5% prevalence by Ayele *et al.* [3] and 7.5% report of Abebaw *et al.* [17]. This result was lower than 80% prevalence reported by Getachew *et al.* [18] and 11.7% prevalence reported by of Mulate [15]. This difference is may be due different in ecological condition for development of intermediate snail. This also indicted that *Fasciola* species are common in the highland where donkeys share the same grazing area with ruminants and favorable environmental condition which allows the multiplication and the spread of intermediate snail in the study area [16].

The 2% prevalence of *Trichuris* egg was found during the study period in areas. *Trichuris* require a warm moist environment for embryonation that provide by rain socked soil. There was significant difference ($P<0.05$) in the prevalence of gastrointestinal parasite infection in different age groups where, higher parasitic infection were recorded in adult animals compared to young animals. This variation may be associated with the young animals are kept properly in house area and most of the time they do not use as pack animals and young donkeys move from area to area for pack purpose.

There was statistically significant difference ($P<0.05$) in the prevalence of gastrointestinal parasite infection in treatment frequency at present study area. The highest prevalence was recorded in non-treated animals (78.5%) and the lowest prevalence was recorded in the treated animals (62.2%).This variation arise from slight use of animal heath extension services and access to antihelminthics treatments, reduce stress and proper nutritional gain of donkeys that reduce fecal worm and remain significantly low level period. This is in agreement with the report of Abebaw *et al*. [17].

There was no statistically significant difference ($p>0.05$) in gastrointestinal parasite infection between sex. Similar report has been reported by Ayele *et al.* [3]. The prevalence indicated in 73.1% in male and 78.4% in female. This could be due the fact that animals were grazed and managed under similar management system.

There was no statistically significant difference ($p>0.05$) in infection of gastrointestinal parasite on the basis of body condition. This is different with the report of Yoseph *et al.* [20]. The body condition were higher in donkeys which are living under similar environmental condition and similar management system and due to the small sample size in the study area compare to good body condition.

CONCLUSION

The present study was based on coproscopic examination of for detection of gastrointestinal parasite egg. It has an insight to current prevalence ad associated risk factors. It is suggested that gastrointestinal parasite are impotent helminthosis in donkeys of Tullo district. Among Age, sex, body condition and treatment

frequencies considered as risk factors significance difference in prevalence was observed only for age and treatment frequency associated with gastrointestinal parasite of donkeys. The present study indicated that gastrointestinal parasites cause an important health problem in donkeys. Based on the above conclusion the following recommendations are include: support the role of veterinarians and animal health extension services in giving professional advice regarding the preventive and control measure against gastrointestinal parasite of donkeys, there should be strategic deworming of donkeys using antihelminthics that are highly effective against gastrointestinal parasite of donkeys, the farmers should be made aware of the effect of parasite on donkeys. Further epidemiological studies should also be carried out on gastrointestinal parasite and its associate risks.

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