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RESEARCH PAPER

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Prevalence of Major Gastrointestinal Parasites in Donkeys in Tullo Woreda, Western Hararghe, Oromia Regional State

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ABSTRACT

A cross sectional study was carried out from November 2011 to April 2012 to determine the prevalence and risk factor of associated with donkeys gastrointestinal parasite infection in Western Hararghe Zone, Tullo destrict, eastern part of Ethiopia. Fecal examination was conducted on total of 384 donkeys randomly selected donkeys from different site of the study area. Out of total sample 288(75%) CI [70-79.3] was found positive for gastrointestinal parasite infection. 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.

Keywords: Donkey, Figure, Gastrointestinal parasite, Percentage, Prevalence, Risk factors and Tullo.

INTRODUCTION

Ethiopia has an enormous livestock resource with total contribution of 15% gross domestic product and 33% of the agricultural output (DACA, 2006). Ethiopia possesses the largest livestock population of 47.5 million. Cattle, 26.1 million sheep and 21.7 million goats, 7.8 million equines, 1 million camels and 39.6 million chickens (CSA, 2009).

Ethiopia basically constitutes an agrarian society; the socio-economic activities of about 85% of the population are based on farming and animal husbandry system. Livestock plays a critical role for majority of the Ethiopian population. Domestic animals mainly used as drought animals, source of milk meat, hide and skin and as pack animals (Solomon, 1994).

The domestic donkey of Ethiopia traces its ancestry to the wild asses found in Egypt, the Sudan and Ethiopia. Namely *Equus asinus africanus* and *Equus asinus somalicus* (Feseha, 1997). 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 (Yoseph *et al.*, 2005).

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 (Ayele *et al.*, 2005).

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 access to a donkey for economic reason (Tefaye and Martin, 2005). Donkeys are most commonly found in dry and mountain area (Alemu *et al.*, 2004). 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 (Hassen, 2000). The majority of them are found in highlands of showa, Gonder, Tigray, Gojam, Wollo and Arsi having highest population that have enormous contribution through their involvement in different social and economic sector (Getachew *et al.*, 2002). 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 (Yoseph *et al.*, 2005).

Donkeys have poor husbandry practice (Mekuria and Abebe 2006) and traditional attitude toward donkey in many part of the world have been negative and have in some instances, inhibited the adoption of donkeys power. Also, they have low social status probably arising from their low productivity as a single purpose animal compared to cattle that can provide milk, power and meat (Tefaye and Martin, 2005). Although, donkeys are known to survive with little management, their body condition may fluctuate during the year as feed supply fluctuates. Proper feed of adult donkeys can enable them to resist disease challenge, live longer and have high rate of reproduction to provide replacement animal (Pandy *et al.*, 1994).

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 (Yoseph *et al.*, 2005). Helminthes parasite of donkeys are one of the most common factors that constrain the health and working performance of donkeys with many tropical and sub tropical environment of the world. Although those parasites are widely prevalent the clinical sign they cause in infected animals can be less obvious. The parasites cause various degree of

damage depending on the species and number present, nutritional and immune status of equids (Asefa *et al.*, 2011).

Partly for this reason infectious with gastrointestinal disease and other helminthes parasite are among the most neglected areas of veterinary care in much of developing world (Krecek *et al.*, 1994).

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 (Feseha, 1997). In Ethiopia, donkeys generally harbor gastrointestinal parasite such as *Strongylus*, Ascarids, pin worm, bots, stomach worm, tape worm and liver fluke (Yoseph *et al.*, 2005).

The parasitic phase of *Oxyuris* (pin worm) begins with ingestion of an embryonated egg containing infective L₃. Larvae hatch in small intestine and come to inhabit the mucosal crypt of cecum and colon (Smith, 2009). The gravid female of *Oxyuris equi* migrate downward the colon and rectum and out through anus to cement her egg to the skin of anus and its immediate surroundings (Bowmans, 2003).

The control of parasite involves pasture management and regular deworms using appropriate anti helmentic. In relation to stable management droppings should be regularly and thoroughly removed and deep litter bedding avoided because of the egg and larval stages of most parasites are long lived and resistant to desiccation (Hickman, 1998).

Strongyles are parasite of large intestine. The adult parasite lives in cecum and colon. The egg pass in feces and development from egg to the L₃ require approximately two weeks. The L₃ penetrates the intestinal mucosa and moult to L₄ in submucosa (Urquhart *et al.*, 1996). Migration of even a few larvae in mesenteric arteries can produce pathological changes (thrombi and emboli) severe enough to block blood supply to significant portion of large intestine results in acute colic (Taylor *et al.*, 2007). The possible sources of strongyle infection in donkeys are 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 (Love, 1999).

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, sickly individual with little stamina and reduced resistance to disease (Bowmans, 2003). The life cycle is direct and the eggs produced by adult female worm are passed in the feces and can reach the infective stage containing L₂ in 10-14 days (Urquhart *et al.*, 1996).

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. After hatching, larvae develop through four larval stage in to free living adult female and adult male worms (Taylor *et al.*, 2007). However under certain condition, possibly related to temperature and moisture, the L₃ become parasitic, infecting the host by ingestion and develop into adult female worm in small intestine (Urquhart *et al.*, 1996).

Genus *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 enters the intestine. Egg passed in the feces the mammalian host develop and hatch releasing motile ciliated miracidia. This takes 9-10 days at optimal temperature of 22-26 °C and little development takes place below 10 °C (Taylor *et*

al., 2007). The miracidia seek certain species of lymnaeid snails in which they develop and multiply through one generation of sporocyst and two radia. The second generation of radia produces free swimming cercariae that leave the snail and encyst as metacercariae on various vegetation (Bowmans, 2003).

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 L₁ within the egg which develops in one or two month of being passed in feces depends on the temperature. After ingestion the plug are digested and released L₁ penetrate the gland on ceecal mucosa and all four moults takes place in this gland (Urquhart *et al.*, 1994).

A different study was conducted in Ethiopia regarding to the gastrointestinal parasite of donkeys. These studies 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 will be therefore:

- To determine the prevalence gastrointestinal parasite of donkeys in the study area.
- To identify the associated risk factors with the occurrence of parasite infection

MATERIAL AND METHODS

Study area

The study was conducted in peasant association of (PAs) of Tullo woreda, Western Hararghe of Oromia region, Eastern Ethiopia. The woreda is located at about 375 kms east of Addis Ababa along the road to Harar. The climatic condition of the area is 47% highland and 53% midland which are located at altitude of 1600-2700 meter above sea level (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 up to September and the short rainy season occurs during April up to May with the average annual rainfall of 980 mm. The woreda has 30 (Peasant association) PAs and one town with total population of 120,953 (TWARD, 2010). The main agricultural products of the areas are maize, coffee and chat. The total livestock populations in the woreda include 119422 bovine 13177 ovine, 37973 caprine, 6517 equine and 171,499 poultry.

Study animals

Donkeys were randomly from randomly selected PAs of Tullo woreda and subjected to qualitative coprological examination to determine 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 (FAO and IRLI, 1993)

Study design

Cross sectional study design using simple random sampling was conducted from November, 2011 to April, 2012. Fecal sample were collected from Tullo woreda to assess the prevalence of gastrointestinal parasite of donkeys in different PAs by coprological examination.

Sample size determination

The required sample size of donkey was determined by the formula given by Thrusfield, 1995 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

A simple random sampling technique was employed to selected peasants association, households and animals. From total of 30 PAs in the woreda, 12 PAs were randomly selected.

Fecal sample was collected from study area from donkeys from different age and sex groups and preserved in universal bottle of 10% formalin and transported to Hirna Regional veterinary laboratory for processing. Floatation technique was used a qualitative test for detection of nematode and cestode egg in the faeces and the procedure is included under (Annex 1). Sedimentation technique was used a qualitative method for detecting trematod such as *Dicrocolium*, *Fasciola*, and *Gastrodiscus*. Most trematode egg is relatively large and heavy compared to nematode egg and the procedure is (Annex 2).

Data analysis

The result obtained were recorded and this data were entered in to Microsoft excel spread sheet. The data fed in to excel sheet were analyzed by STATA 11.0 Version. Descriptive statistics like percentage, Pearsons χ^2 or (x^2) test and p- value were used where ever they apply.

RESULT

Parasitological survey

A cross sectional study was conducted on 384 randomly selected donkeys to determine the prevalence of gastrointestinal parasite and to evaluate the associated risk factors. The result show that out of total donkeys examined during the study period, 288 donkeys were found positive for gastrointestinal parasite and the overall prevalence of 75%(95% CI, 70.4-79.3%) was recorded.

Parasite composition of donkeys in the study area

The species of gastrointestinal parasite identified by coprological examination showed that strongyle were the most prevalent followed, by *Ascaris*, *Strongyloid*, *Oxyuris*, *Fasciola*, *Trichuris* and mixed infections (Figure 1).

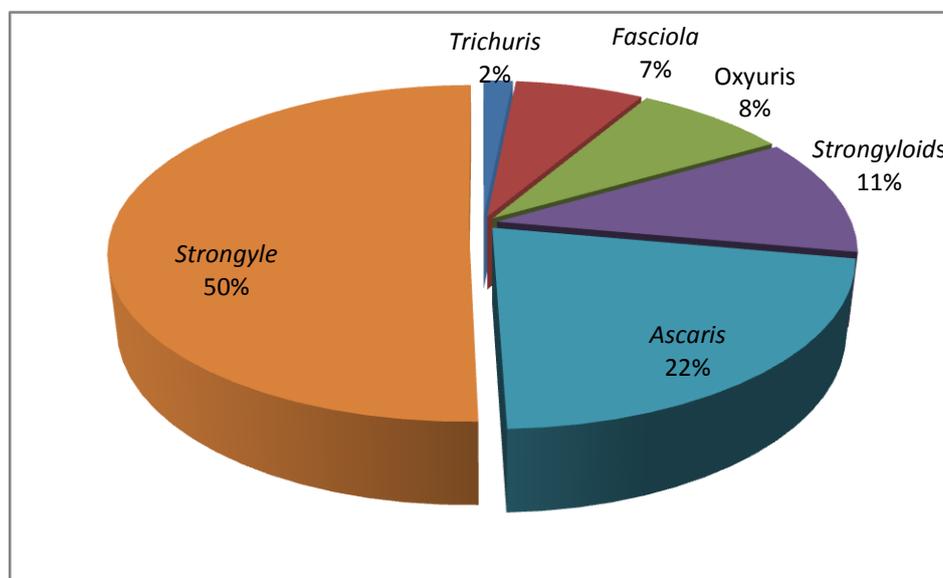


Figure 1. Parasite composition of donkeys in the study area.

Prevalence of gastrointestinal parasite infection in both ages

The prevalence on ages is adult and young was showed a significance difference ($P < 0.05$) (Table 1).

Table 1. Prevalence of gastrointestinal parasite infection in both ages.

Age	Number of animals examined	Number of positive animals	Prevalence (%)	95% confidence Interval
Adult	268	212	79.1	89.8-96.6%
Young	116	76	65.5	56.1-74.1%
Total	384	288	75	70.4-79.3%

$$X^2=7.97 \quad p=0.005$$

Prevalence of gastrointestinal parasite infection on both sexes

Parasitic infections between sexes were compared. The prevalence of male and female indicated that, there is no significant difference ($P>0.05$) (Table 2).

Table 2. Prevalence of gastrointestinal parasite infection on both sexes.

Sex	Number of animals examined	Number of positive animals	Prevalence (%)	95% confidence Interval
Male	245	179	73.1%	67-78.5%
Female	139	109	78.4%	70.6-84.9%
Total	384	288	75%	70.4-79.3%

$$X^2= 1.4 \quad p= 0.244$$

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 3).

Table 3. Prevalence of gastrointestinal parasite infection based on body condition.

Body condition	Number of animals examined	Number of positive animals	Prevalence	95% Confidence Interval
Good	296	218	73.6%	68.2-78.6%
Poor	88	70	87.5%	69.6-87.4%
Total	384	288	75%	70.4-79.3%

$$X^2=1.26 \quad p=0.26$$

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 4).

Table 4. Prevalence of gastrointestinal parasite based on treatments frequency.

Treatments	Number of animals examined	Number of animals positive	Prevalence (%)	95% Confidence Interval
Treated	82	51	62.2%	50.8-72.7%
Non treated	302	237	78.5%	73.4-83%
Total	384	288	75%	70.4-79.3%

$$X^2=9.12 \quad p=0.003$$

The prevalence of gastrointestinal parasite

The prevalence of individual species of parasite in the study area was different in figure (Table 5). The mixed infection of parasites are *Ascaris* and strongyle 16(4.2%), *Fasciola* and strongyle 8(2.1%), *Oxyuris* and strongyle 6 (1.5%) and trichuris and strongyle 1 (0.3%).

Table 5.

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

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 (Mahfooz *et al.*, 2008).

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* 2005 and Mulate, 2005 who reported 100% prevalence in donkeys at Dugda Bora district and high land of Wollo provinces respectively. Getachew *et al.* (1999) and Asefa *et al.* (2011) 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.* (2005) and Yoseph *et al.* (2002) who reported prevalence of 15.7% and 17.3% respectively. However, it is lower than the reports of Getachew *et al.* (2005), Shrinkhand *et al.* (2009) at Nappur and Asefa *et al.* (2011) 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.* (2005) with the prevalence of 11% in gastrointestinal of working donkeys in Ethiopia. However, our is different from 24.5% prevalence by Shrinkhande *et al.* (2009) 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 el.* 2001, Fikru *et al.* (2005) 2.1% and 3% reported by Ayele *et al.* (2005). But it was higher when compared with the work of Yoseph *et al.* (2002) who report 32.4% in Wonchi. This difference is may due 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* (2005 and 7.5% report of Abebaw *et al.* (2011)). This result was lower than 80% prevalence reported by Getachew *et al.* (1999) and 11.7% prevalence reported by of Mulate. (2005). 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 (Radostitis *et al.*, 2007). 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 soaked soil. But once embryonated are exceptionally resistant to environmental condition (Smyth, 1994). 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 health 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.*, (2005). There was no statistically significant difference ($p > 0.05$) in gastrointestinal parasite infection between sex. Similar report has been reported by Ayele *et al.* (2006). 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 sytem. 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* (2002).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.

CONCLUSSION AND RECOMMENDATONS

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 the impotent helminthosis in donkeys of Tullo woreda. 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 parasite is important health problem in donkeys.

Based on the above conclusion the following recommendations are forwarded:

- 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 be carried out on gastrointestinal parasite and its associate risks.

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