World Journal of Animal Science Research
Vol. 3, No. 3, May 2015, pp. 1 - 10, E-ISSN: 2333 - 8946
Available online at http://wjasr.com/

Research article

PREVALENCE OF MAJOR GASTROINTESTINAL PARASITES OF HORSES IN AND AROUND MEKELLE (QUIHA AND WUKRO)

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ABSTRACT

The prevalence of major gastrointestinal parasites of horses in and around Mekelle (Quiha and Wukro) was carried out from November 2009 to March 2010. Fresh fecal samples collected from 400 horses and examined by coproscopic (direct, flotation and sedimentation) methods. The overall prevalence of gastrointestinal parasites was found to be 59.3%; including mixed parasitic infections. Among the parasites determined, the prevalence of strongyles spp, *Oxyuris equi*, Anoplocephala spp, *Parascaris equirem*, Gstrophilus sp.,*Strongyloid weste*ri, Fasciola spp, Eimeria species and mixed infections was 108(27%), 35(8.8%), 8(2%), 7(1.8%), 5(1.3%), 3(0.8%), 2(0.5%), 2(0.5%), and 67(16.8%), respectively. From the identified gastrointestinal parasites, Strongyles spp 108(27%), has the maximum and Fasciola and Eimeria species 2(0.5%) has the minimum prevalence values obtained. The prevalence of gastrointestinal parasitic egg with the age group was not significantly associated but a strong

significant association was observed in body condition of the animals and months of the study period. As the result indicated the infections caused by helminthes, especially strongyles were common in the study area, so greater emphasis should be given to this situation.

Key words: Coproscopic, Gastrointestinal, Prevalence, Strongyles

1.INTRODUCTION

According to FAO [10] 600 million of horses are found throughout the world, of which 8% is found in Africa. Ethiopia is one of the developing countries in Africa which has a very large equine population, approximately, 5.02 million of donkeys 2.75 million of horses and 0.63million of mules [9].Of the total population of Ethiopia, 5110 are found in Tigray region [26].Most equines are found in zone of high human population (highland) when agricultural system in which livestock involves and where these animals are used as source of draft power [4]. In contrast, only 20% of all equines are known to live on low land in pastoral areas. Equine provides of power source for transportation, field operation and post harvest activities. Donkey and mule in history have been the most used animals for all manners of draft purpose [23].

It was estimated that working animals including equines, produced 75% of traction energy in the developing world [27] and it has been suggested that more than half of the world's population depends on animal powers its main energy source [30]. Thus working equidae, mainly horses, are used for carting goods and people, caring packs, bricks, and other construction materials, tillage's, weeding and festivals [19].

Gastrointestinal parasites are one of the greatest limiting factors to successful horse rising throughout the world [13]. They are worldwide problem for both small and large scale farmer with a greatest impact in sub-sharan Africa due to the availability of a wide range of agro-ecological factors suitable for diversified hosts and parasitic species [15]. The majority of nematodes and other notable internal parasites such as cestodes, trematodes and coccidian are the major gastrointestinal parasites of horses [17]. The nematodes are the most numerous and most diverse group having unsegmented, elongated round on both ends, circular in cross section and bilaterally symmetrical bodies [7]. Trematoda and cestoda, all typically soft body's flattened dorsoventrally and hermaphroditic. The trematoda of important veterinary medicine may be found as adult in the intestine, bile duct, blood vessel or other organ of their final host. Adult cestodes are parasite of the intestine of vertebrate. Three species within the family anoplacephalidae infect the gastrointestinal tract of horse and donkeys are *Anoplocephalus perfoliata, Anoplocephalus magna and Anoplocephalus mammillana* [29]

The development and survival of helminthes egg of larvae with faces and on pasture are depending on temperature and moisture thus forming suitable environment for development of larvae of nematode and trematode to infected stage. Inadequate quality of water stored in the dam from which livestock area using directly for drink may also

form suitable way for transmission of cestoda and coccidian [8]. Many factors are known to influence the transmission and prevalence of gastrointestinal infection in grazing animals [29]. Broadly the three influencing factors that can determine the occurrence of gastrointestinal tract infection could be mentioned as environmental host interaction, environmental parasitic interaction and host parasitic interaction [20].

The most frequent disorders caused by gastrointestinal parasites in horse are related to infection with *parascaries equirum*, the most species of cyatostomes (small strongly), the large strongly (primarily S.vulgaries), and *Anoplocephala* species [21].Horses are said to have the largest collection of parasites of all domestic livestock. Since horses tend to bite, chew or nibble at their surroundings often consuming parasite infected bedding and horses normally graze closer to the ground than cattle, easily picking up large number of infected larvae while they graze [5].

The effects of gastrointestinal parasites are more evident in young and under nourished horses. The migration of worm parasites in the horse is, to a large extent, unstoppable. Virtually all horses are infected with parasites to some extent. Small numbers causes minimal damage, but large number pose a risk for colic and other symptoms. The situation is different for weakened, debilitated or immune-compromised horses, which succumb to small numbers of parasites. As a rule, older horses appear to develop immunity against the common gastrointestinal parasites and tend not be affected by parasite related problems as commonly as younger horses [5]. The economic losses caused by internal parasites include, losses through reducing working capacity (performance), a reduction in food intake and lower weight gains, treatment cost and mortality in heavy parasitized animals [15]

The objectives of this study were:-

- To determine the prevalence of common gastrointestinal parasites affecting horses.
- To identify or assess the risk factors associated with parasitic status in horses in the study area.

2. MATERIALS AND METHODS

2.1Study area

The study was performed in Mekelle town and its surroundings (Quiha and Wukro). Mekelle is the capital of Tigray region located 785km north of Addis Ababa. It is located at latitude of 13^{o} 20’ 50”N, Longitude 39^{o} 32’ 38”E. with an altitude range of 2150-2270m.a.s.l. the weather condition is arid to semi-arid. The mean annual rainfall varied from 200mm to 1200mm. temperature also varies according to altitude and it ranges from 12.5^{oc} to 27.5^{oc} [26]

Wukro is located in the eastern administrative zone in Tigray a distance 45 km from Mekelle. It is situated in the area having an elevation of 1977 m.a.s.l with clearly defined rainy season from July to September followed by long dry season from October to June. The annual temperature ranges from 11.1 ^{oc} – 28.3 ^{oc} [6]

Quiha is located 10 km east of Mekelle city, have a cool tropical semi-arid climate with mean annual temperature of around 18 ^{oc}. The mean annual rainfall is about 650mm and varies considerably between years [6].

The region covers an area of 54,548.32km^2. the livestock resource of the region consist of 3,596,649 cattle, 1,646,752goats, 1,064,501 sheep,364,940 equines, 13,661 camels and 2,570,833 poultry , representing nearly 10% of the livestock population of the country [25]

2.2 Study Animal and Study Design

A cross-sectional epidemiological study was done for the prevalence of common gastrointestinal parasites in horses from November 2009 to March 2010. 400 horses were randomly selected from different localities in and around mekelle(Quiha and Wukiro). Information about age, body condition and management system of the study animals were gathered from the owners. The ages of animals were determined using owners' information and dentition Payne [18]. Accordingly, animals were categorized as young (<4 years) and adults (>5 years). Body condition score (BCS) was subjectively estimated based on the guides published by Svendsen [23] as 1 (emaciated), 2 (thin), 3 (good), 4 (fat) and 5 (obese). These were categorized into three groups as poor (≤2), medium (3) and good (≥4) to represent BCS 1 and 2, 3, 4 and 5respectevily.

2.3 Sampling and Sample Processing

For this study, fresh fecal sample of horses were collected directly from the rectum with disposal glove and sent to Veterinary parasitological laboratory, university of Mekelle, for coproscopical identification of gastrointestinal parasites using direct, flotation and sedimentation techniques [22]

2.4 Data Analysis

The data collected was loaded in Microsoft excel and the independent variables; ages, body condition and months of the year were analyzed by SPSS version 15. Percentage (%) to measure the prevalence and Chi-squire to measure the association between prevalence of the parasite and age, body condition of the animals and season were the statistical tools applied.

3. RESULTS

3.1 Over all Prevalence of Gastrointestinal Parasitic infections

Out of 400 horses 237 animals were positive for single and mixed gastrointestinal parasitic infections, indicating that the prevalence was 59.3%. According to fecal examination, the prevalence of parasitic infections are listed on (table 1 and 2) bellow.

Table 1: Over all Prevalence of Gastrointestinal Parasitic infections

Parasites	**frequency**	**Percent (%)**
Strongyles spp.	108	27
Oxuris equi	35	8.8
Anoplocephala spp.	8	2
Parascaris equirum	7	1.8
Gastrophilus spp.	5	1.3
Strongyloid westeri	3	0.8
Fasciola spp.	2	0.5
Emeria spp.	2	0.5
Total	**107**	**42.5**

Table 2: Prevalence of various (mixed) parasitic infections

Infection status	**Total animals examined**	**Prevalence (%)**
Infection with one spp.	170	42.5
Infection with two spp.	54	13.3
Infection with three spp.	13	3.3
Total	**237**	**59.3**

3.2 Relative prevalence of gastrointestinal parasites in three study areas (Quiha, Mekelle and wukiro)

There was no significant association (P=0.11) between origins (areas) and parasitic prevalence. As shown in table 3 bellow the relative prevalence was 73.3%, 59.4% and 48.9% Quiha, Mekelle and wukiro respectively.

Table 3: Relative prevalence of gastrointestinal parasites in three study areas (Quiha, Mekelle and wukiro)

Areas(sites)	**Total animals examined**	**No of positive**	**Prevalence (%)**
Quiha	30	22	73.3
Mekelle	323	192	59.4
Wukiro	47	23	48.9

X^2=4.54; p=0.103

3.3 Prevalence of gastrointestinal parasites in relation to age, BCS and month risk factors

Age wise prevalence analysis indicates no significance difference (P=0.51) between different age groups of horses. Higher prevalence was seen in ages of horses grouped under 4 years (59.4%) than above 5 years (59.1%). There was strong significance difference (P=0.00) between body condition of animals and month risk factors to parasitic infections as follows (in table 4).

Table 4: Prevalence of gastrointestinal parasites in relation to age, BCS and month risk factors

	Total animals examined	**No of positives**	**prevalence**	**X2**	**P**
Age	<4 years	180	107	59.4	0.05;0.51
	>5 years	220	130	59.1	
	Poor	54	47	87	
BCS	Medium	187	131	70.1	58.6;0.00
	Good	159	59	37.1	
	November	150	107	71.3	
	December	99	68	68.7	
Month	February	100	44	44	34.5; 0.00
	March	51	18	35.3	

3.4 DISCUSSION

In this study, the overall prevalence of gastrointestinal parasites was found to be 59.3%; including mixed parasitic infections. Among the parasites determined, the prevalence of strongyles spp, Oxyuris equi, Anoplocephala spp, Parascaris equirem, Gstrophilus sp.,Strongyloid westeri, Fasciola spp, Eimeria species and mixed infections was 108(27%), 35(8.8%), 8(2%), 7(1.8%), 5(1.3%), 3(0.8%), 2(0.5%), 2(0.5%), and 67(16.8%), respectively. From the identified gastrointestinal parasites, Strongyles spp 108(27%), has the maximum and Fasciola and Eimeria species 2(0.5%) has the minimum prevalence values obtained. The current result is lower than work of Fikru et al. [11] who reported 91%. The lower prevalence in the present study could be due to the difference in geographical location of the area; which is arid and semi- arid and most of horses of this study were cart horses that are less exposed from pasture.

The prevalence of strongyles spp (27%), was lower as compared with the results of Yoseph et al. [31], Mulate [16] and Ayele *et al*. [3], Fikru *et al*. [11] and Ayele and Dink [2] in which they reported 100%, 100%, 100, 98.2% and 93% in donkeys of Wonchi, highland of Wollo province, Dugda Bora, western high land of Oromia and central shewa respectively. The difference among these findings might be due to geographical location of the areas,

variation in management system, sample size and sampling method differences. About 8.8% prevalence of *Oxyuris equi* in this study was agree with the work of Aftab *et al.* [1] in horses of Lahore-Pakistan who reported 6.3%.

The prevalence of *Anaplocephala* species was 2%, which was agree with the study of Ayele, et al. [3], who reported 7.6% in Kurfa Chale District, East Hararghe, Ethiop**ia**.

The prevalence of *Parascaris equorum* was 1.8%. This result is lower than the prevalence reported in Ethiopia by Yoseph *et al.* [32], Fikru *et al.* [11], Getachew *et al.* [12] who reported 15.7%, 7.3%, and 16.2%, respectively

1.3% prevalence of Gastrophilus in this study was lower than the work of Yoseph et al [31] who reported 5.8% in Equine of Wonchi. This might be due to environmental difference between the study areas.

The prevalence of *strongloid westeri* in the present study was 0.8%, which is lower than the work of Uslu and Guclu [27] in Turkey who reported 7.2 %. This might be due to difference geographical location, management and level of community awareness about de-worming.

The lower prevalence 0.5% of fasciolla and Eimerie species in this study is slightly agrees with 1.5% of Ayele, et.al reported from Dugda Bora distinct of Ethiopia [31]. The lower prevalence of Fasciola eggs is due to the geographical location of the area which is not comfortable for the snail population, the intermediate host of Fasciola.

In current study mixed parasitic infection were 6.8%, which is lower than the finding of Uslu and Guclu [27] in Turkey who reported 50%. These could be due to variation in management, sample size and sample method used might responsible for such variation.

There was no significant association (P=0.11) between origins (areas) and parasitic prevalence, which was 73.3%, 59.4% and 48.9% Quiha, Mekelle and wukiro respectively.the higher prevalence showen in Quiha(73.3%) could be due to lower manage mental activities and poor access off anti-helminthes medication because of the distance of the place away from the capital city(Mekelle).in addation to this, most horses of Mekelle and Wukiro are cart horses which has no access of grazing land which allows animals for continuous exposure.

The prevalence of gastrointestinal parasitic egg with the age group was not significantly associated. Even though, statically not significant ($p>0.05$), the relative prevalence was higher in ages of horses grouped between 5-10 years than 11-16 years. This is supposed to be due to the immunity developed after exposure in adult groups [29]. As a rule older horses appear to develop immunity against the common gastrointestinal parasites than younger horses. [5, 14] reported that the naturally acquired immunity against parasitic infection is slowly develops with age. Highly significant difference ($P<0.05$) was recorded in prevalence rate of gastrointestinal parasites among different body condition score. 87%, 70.1%and 37.1% of prevalence rate was observed in poor, medium and poor body condition scored animals, respectively. This might be due to the species of the parasites involved and the existence of more

than one parasite in a single host has an additive pathogenic effect for decreasing the body condition of the hosts [20].

Statistically significance difference was seen in prevalence of parasites among the study months. The coproscopic finding showed significance difference ($P<0.05$) in late autumn [November (71.3%)] and the lowest was observed in cool and dry month of the study period [March (35.3%)]. This increase in coproscopical point prevalence might be related to animals harboring encysted larvae acquired during the previous grazing rainy seasons [29].

4. CONCLUSION AND RECOMMONDATION

The study demonstrated the prevalence of parasitic infections in horses in Mekelle and its surroundings (Quiha and Wukiro) was 59.3%. From this result parasitic infections found more prevalent in Quiha than Mekelle and Wukiro. The major parasites identified during the study period were Strongyles spp, oxyuris equi, Anoplocephala spp., Parascaris equirum, Gastrophilus spp., Strongyloid westeri, Fasciola and Eimeria species. This study has highlighted the presence of large ranges of parasites in horses of Mekelle and its surroundings. Among the identified gastrointestinal parasites, prevalence of Strongyles has the maximum and Fasciola and Eimeria spp. has the minimum prevalence values obtained. This is the first coprological survey; up to the knowledge of the researcher no previous research on parasites of horses was done in the region. Based on the above conclusions the following recommendations are for warded:-

- Further study should be done covering large and different agro-ecologies of the region
- Improved basic animal management system should be practiced in the study areas.
- Educate the horse owners regarding correct way to improve animal management system, importance of parasites and its preventive and controlling systems.
- Strategic timed deworming of horses should be done to reduce parasitic contamination of the environments as well as infection of horses.

5. ACKNOWLEDGEMENTS

The authors acknowledge the co-operation of the Faculty of Veterinary Medicine, University of Mekelle and the horse owners of Wukiro, Mekelle and Quiha enabling this study to be undertaken.

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