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Prevalencia de nematodos en equinos en y alrededor del sur de Wollo Kombolcha, Ethiopia

Prevalnce of equines nematodes in and around kombolcha south wollo, ethiopia

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RESUMEN

Se realizó un estudio regional cruzado en el periodo comprendido de noviembre de 2010 a diciembre de 2011 con el objetivo de determinar la prevalencia de nematodos e identificar las especies más comunes en y los alrededores de Kombolcha, realizando un método cualitativo de análisis fecal en caballos de tiro. Se le tomó muestras a un total de 384 animales durante el período de estudio. La prevalencia global de nematodos gastrointestinales fue de 52 .1 % de la cual, el 32.6 % , el 6.5 % y el 2.9 % correspondió a los géneros strongilus, áscaris, y oxiuros respectivamente. Además de haber infestación mixta por strongilus y áscaris, strongilus y oxiuros así como áscaris y oxyuris con una prevalencia de 4.9 %, 4,4 % y 0,8 % respectivamente. Hubo diferencia significativa para en los porcentajes de nematodos diferentes (p< 0.05)..La prevalencia atendiendo a la edad de los animales resultó ser de 9.4 %, 27.6, y 15.1 % en jóvenes, adultos y viejos respectivamente fue estadísticamente significativa (P<0.0.5). Atendiendo a la condición, considerada como mala, media y buena, la prevalencia fue de 18.5%, 27.1% and 6.5% respectivamente, siendo estadísticamente significativa (p<0.05). Estos resultados muestran que no existe un control sistemático mediante desparasitación y adecuado manejo de los pastos.

Palabras claves: edad; condición corporal; caballo de tiro; parásitos gastrointestinales; nematodos y Prevalencia.

ABSTRACT

A cross sectional study was conducted from November 2010 to April 2011 to determine the prevalence of nematodes and identify common GIT nematode species in and around Kombolcha using qualitative fecal analysis method in cart horses. A total of 384 animals were sampled during the study period via collection of the fecal sample to examine GIT nematodes and the overall prevalence of GIT nematode was 52.1% of which 32.6%, 6.5% and 2.9% infested with strongyle, ascaris and oxyuris respectively. In addition, there were also mixed infestation like strongyle and ascaris, strongyle and oxyuris and strongyle, ascaris and oxyuris with a prevalence of 4.9%, 4.4% and 0.8% respectively. There is statistical significance difference in the rates of the different nematodes ($P<0.05$). Age specific prevalence of the parasites was observed and its rate was 9.4%, 27.6% and 15.1% in young, adult and old horses respectively. And the prevalence was found to be statically significant ($P<0.05$). Body condition rates also showed that the prevalence were 18.5%, 27.1% and 6.5% in poor, medium and good body condition horses respectively where statically significant difference was observed among the different body conditions ($P< 0.05$). This result showed that nematode parasites are more prevalent in the area hence, regular deworming, pasture management are used to reduce the warm burden in the cart horses.

Key words: Age; Body condition; Cart horses; GIT parasite; Nematodes and Prevalence.

INTRODUCTION

Ethiopia is one of the developing countries in Africa, which is predominantly an agricultural country with over 85% of its population engaged in agricultural activity (FAO and EARO, 1999). The country has the highest gets equine population probably with the highest density per square kilometer in the world and (Alemayehu, 2004) and it has a total of 6.9% and 42.4% in the world and Africa equine population respectively (Wilson, 1991). Ethiopia possess about 5.02 million donkeys, 2.75 million houses and 0.63 million mules (EARO,1999) equine play in important role in the transportation of form products, fodder, fuel, wood ,agricultural in puts and construction and waits materials equine power is both a rural and urban transport system which is cheap and viable if provides the best alternative in palace where the good network is insufficiently developed, other terrains gagged and mountains and cites where narrow streets prevent easy delivery of Merchandise (Fesseha,1997).

Although equines play a significant role in the economy of the country, the government lives look development programmes and those of aids agencies are aimed to wards in meat, milk, egg and wool production equines have been completely neglected or omitted from the pastoral livestock programmes. This is because of the contribution of equines power in the agricultural system and their role in the productions not yet well recognized and magnified (Belay, 2005).

The vitality and well being of horses of all age are thread by a variety of internal parasites and the use of control ensures and the best performance (power, 1992). Internal parasites are one of the greatest limiting factors to successful horse rising throughout the world. All horse at pasture become infected and suffer a wide range of harmful effects ranging from impaired development and performance to death despite the availability of large array of modern anthelmintic , parasite controls often fail to safeguard horse health. The main reason for these break downs are errors the choice of anthelmintic and in the time of treatment (Herd, 1987).

The most common internal parasite of equines includes large strongyles, small strongyle, Ascaris and pinworms (*Oxyuris equi*). Additionally less important infection tapeworms, lungworms and the intestinal thread worms (strorngyliod) distributed to appropriate site of the country (Power, 1992).

A numbers of factors which available for the existence of internal parasite to be found within the animal or not from which the most important factor is age. The age of the horse is important diagnostic consideration because susceptibility to parasite varies which the horse age and degree of exposure to the worms. Foals are the most susceptible to the threat worms (*strongyloid westeri*) in the first few months of life following infection via mare's milk. Ascaris infection (*parascaris equorum*) occurs mainly in foals and yearling rarely mature house (Tayer, 2008).

Heavy infection of *parascaris equorum* causes impaction and perforating leading to peritonitis (Urquhart *et al*. 1996). An acquired resistance to parascaris aquarium usually develops before second years of life and there for cases is highly reported from younger animals (Urquhart *et al*. 1987).

Most of pathogenic effect of *oxyuris equi* in the intestine is due to inflammatory responses. The presence of parasite cause intense purities around the anus cause the animal to rub, resulting in broken hair and inflammatory of the skin over the rumba and tail of head (Urquhart *et al.* 2003).

Even though, such parasite affect the equine species few studies were carried out to determine the prevalence of those nematode parasites and the efficacy of drugs against these parasites and in some of the country of the world very few studies were carried out to determine the prevalence of the different endoparasites which affects equine species in general and almost no study were carried out to determine the prevalence of nematodes in cart horses and in the study site a number of horses were used by the people as means of cart horses to transport people and other goods and the way the animals were managed is very poor as they used their horses for long period of time without giving the sufficient rest and feed.

Hence, the objective of this study was

- To determine the prevalence of GIT nematode and its species in cart horses.

MATERIALS AND METHODS

Study Area

The studies were conducted in and around Kombolcha, which is found in Amhara region south wallow zone. It is found 380 km away from Addis Ababa and 403 km from Mekelle. It has latitude and longitude of 11°4′N 39°44E and11.06°N 39.733°E from an elevation between 1842 and 1915 m.a.s.l. The area is characterized by bimodal rainfall with the average rainfall of 6000 mm and the minimum and maximum temperature varies from 11.7°cto 24°c and the soil type of the area consists of vertisoil and sandy type of soil with vegetation type which varies from large tree to bushes (CSA,2005).

Study Population

The study populations were cart horses which are located in and around Kombolcha district which were used by the people to transport goods and people from one area to another area.

Sampling Methodology

Cross sectional study were used to determine the prevalence of nematodes in horses in and around Kombolcha. Simple random sampling was utilized for individual animals for collection of fecal samples. During sampling the sex, age and breed of the animal were identified and recorded. In addition, the body condition of the animals were also be recorded and categorized as (poor, medium and good) based on the criteria given by (Cooper and

Thomas, 1985). The body condition of the animal was poor: when the individual spinous process was sharp to touch and easily distinguished. In addition, the bony structure of horse was easily noticeable, medium (when the spinous process examined is very firm when we apply pressure and they were round rather than sharp) and good (when the top and sides of the back bone in lion are immediately behind the last rib and active kidney were covered with muscles).

Sample Size Determination

For sample size determination the total equine population in South Wollo were used and the expected prevalence of 50% for GIT nematode were used and absolute precision of 5% with 95% confidence level were used hence, according to the formula given by Thrustfield (1995) which were given below and the total sample size was estimated as 384.

$$n = \frac{(1.96^2[Pexpe(1-Pexpe)]}{d^2}$$

Where;

n= required sample size
Pexpe= expected prevalence of nematode parasites
d= desired absolute precision
1.96= the value of "z" at 95% level of confidence

Hence, a total of 384 horses were sampled from the site. In this work horses of different age group, sex, body condition and breeds were included and horses < 3 years were considered as young, while those 4-10 years were considered as adults and above 11 years were considered as old Saead *et al*. (2010).

Study Methodologies

Coproscopic examination

Fresh fecal sample were collected randomly from cart horses from selected sites in and around Kombolcha. The samples were collected from the rectum and during defecation when circumstance allow. The sample were collected in clean test tube that contain preservative materials potassium dichromate which were tightly closed until examination will be performed each sample is labeled with the animal number and species corresponding to owner's name, data, age, breed, sex, body condition and place. The labeled samples were submitted to Kombolcha regional Veterinary laboratory.

All fecal samples were grossly visualized for the presence of parasites and then kept in potassium dichromate and subjected to microscopic examination for the presence of eggs of nematode parasite. Fecal examination were done by qualitative fecal examination technique this is conducted by using floatation, direct smear and fecal egg count to estimate the presence and to quantify the warm burden of the parasites were conducted during the study period.

Data Management and Analysis

The data collected from the study area were entered in to Microsoft Excel spread sheets and the data were coded appropriately and analyzed using SPSS version 17 statistical software's. Chi-square tests were applied to test the statistical association exists among the risk factor such as age, body condition scoring with the presence of the disease. For all the analysis a statistical, significant $P<0.05$ were used to test the association of the risk factors with the disease prevalence.

RESULT

In this study 384 horses were examined and out of these horses 200 (52.1%) which consists of different species of gastrointestinal nematodes with highest prevalence of strongyles 32.6% (125/384) and lowest mixed type of parasites such as strongyles, ascaris and oxyuris 3(0.8%) were observed (Table 1)

Table1. The prevalence of different nematodes in cart horses

GIT nematode parasites	Total number of animal examined	No of positive animals	Prevalence (%)	P-value
Strongyles	384	125	32.6%	**P=0.000**
Ascaris	384	25	6.5%	
Oxyuris	384	11	2.9%	
Strongyle+ascaris	384	19	4.9%	
Strongyles+ oxyuris	384	17	4.4%	
Strongyle +ascaris +oxyuris	384	03	0.8%	
Total	384	200	52.1%	

Age specific prevalence showed that the rate was 9.4%, 27.6% and 15.1% in young, adult and old horses respectively. The rate of these parasites among the different age groups were statistically significant where (P< 0.05) as indicated in (Table 2). Similarly, the GIT parasites of the different species of the nematodes were also identified in the different age category of animals where adults were mostly affected by strongyles parasites with the rate of 75 (30.9%) and the young animals have rate of 10 (20.8%). In addition, none of the old animals were affected by ascaris even though the young horses have the rate of 17 (35.4%). More ever, mixed types of parasites were observed in all age groups of the horses (Table 2).

Table 2. The rates of the different GIT nematode according to age of cart horses

Types of GIT parasite	Young	Adult	Old	Over all	P-value
Strongyles	10(20.8%)	75(30.9%)	40(43.0%)	125(32.6%)	0.000
Ascaris	17(35.4%)	8(3.3%)	0(0%)	25(6.5%)	
Oxyuris	0(0%)	7(2.9%)	4(4.3%)	11(2.9%)	
Strongyle+ ascaris	7(14.6%)	10(4.1%)	2(2.2%)	19(4.9%)	
Strongyles+ oxyuris	2(4.2%)	5(2.1%)	10(10.8%)	17(4.4%)	
Strongyle+ascaris +oxyuris	0(0%)	1(0.4%)	2(2.2%)	3(0.8%)	
Over all	36 (9.4%)	106(27.6%)	58 (15.1%)	200(52.1%)	

The body condition of animals was also classified as poor, medium and good body condition scores respectively. The prevalence according to body condition grade was 18.5%, 27.1% and 6.5% in poor, medium and good body condition horses respectively, (Table 3). In addition, the different species of theses parasites were also identified where horses with medium body condition animals were affected by strongyle nematode with the rate of 79 (38.9%), followed by poor condition with the prevalence of strongyle parasites 27 (33.8%). Other parasites and mixed type of the parasites were also observed in all body condition animals even though the horses having good body condition horses were not affected by mixed parasites such as strongyle, ascaris and oxyuris as shown in and the existence of such

parasites among the different body condition of these horses were statistically significant (P<0.05) (Table 3)

Table 3. The prevalence of GIT nematode species with regard to body condition scores

Types of GIT nematode	Poor	Medium	Good	Over all	P-value
Strongyles	27(33.8%)	79(38.9%)	19(18.8%)	125(32.6%)	0.000
Ascaris	9(11.2%)	12(5.9%)	4(4.0%)	25(6.5%)	
Oxyuris	3(3.8%)	6(3.0%)	2(2.0%)	11(2.9%)	
Strongyle+ascaris	16(20.0%)	3(1.5%)	0(0%)	19(4.9%)	
Strongyles+ Oxyuris	14(17.5%) 2(2.5%)	3(1.5%) 1 (0.5%)	0(%) 0 (0%)	17(4.4%) 3 (0.8%)	
Strongyle + ascaris +oxyuris	71 (18. 5%)	104 (27. 1%)	25 (6.5%)	200(52.1%)	
Over all					

DISCUSSION

There is sufficient potential in most grazing animal to permit the development of a major outbreak of helminthosis. Whenever correct circumstance is provided and appearance of clinical helminthosis indicates that proportionate losses due to sub clinical level of infestation are also occurring in the same group. In the present study, the overall prevalence of gastro intestine nematode in horses were 52.1% and majority of the animal were harboring nematodes like Strongyle, Ascaris and oxyuris with the rate of 32.6%, 6.5% and 2.9% respectively. Mixed type of infestation was also observed in a single animal with the prevalence of 4.9%, 4.4%, and 0.8% of strongyle plus Ascaris, strongyle plus oxyuris and strongyle, ascaris and oxyuris respectively. The current result of the different nematodes of these parasites were lower compared with Robenson (2009) who reported 54.84%, 10.4% and 4%, of strongyle, ascaris, and oxyuris, respectively but as compared to the mixed type of infection the current finding was higher than the previous study where the rates of strongyle plus ascaris was 3.2%, strongyle plus oxyuris was 1.4% and strongyle, ascaris and oxyuris have the rate of 0.9% in equine in and around Asella. Similarly, the result of the

present study is in agreement with Saeed *et al*. (2010) who described infections with multiple species of nematodes were more frequently diagnosed as compared to single specie infections. The difference of the prevalence of these parasites were statistically significant (P<0.05).

Strongyle-type eggs were reported with a prevalence of 58.50% according to the report of Saeed *et al*. (2010) and this finding was higher than the current study. Helminthes infections are most common and a significant health concern due to morbidity and mortality. A greater proportion of sampled horses were found infected with various helminth parasites and this result is consistent with the findings of (Riaz, 1984, Francisco *et al*., 2009). Lower infection rates have been recorded in other studies where regular de-worming practices with effective drugs are routinely undertaken (Capewll *et al*., 2005). Low infection rates can also be attributed to a diagnostic technique of poor sensitivity (Chaudhry *et al*., 1991).

Many studies have reported widespread occurrence of helminth species in horse population across the world and grown under varied management and climatic conditions (Chapman *et al*., 2002 and Boxell *et al*., 2004).

The prevalence of strongyle in the present study revealed 32.6% and this study was lower than that of Chaudhry *et al.* (1991) who examined fresh fecal sample from horse in Faisalabad, Pakistan and reported a prevalence of 40%. The difference in the prevalence of these parasites in the different places may be due to climatic condition, grazing pattern of the horse and animal number examined. The prevalence of GIT nematode parasite with regard to age in the present study was 9.4%, 27.6% and 15.1% in young, adult and old horses respectively.

The current prevalence in young and adult animals is lower than that of Alemayehu (1995) who reported prevalence of 80% and 51.4% in young and adult respectively in and around Arsi and bale region. Similarly, higher proportion of young animals (≤ 10 years of age) was found positive for strongylosis as compared with older horses (≥ 11 years of age). More ever, no affect of age for the strongyle infections could be detected in other studies (Francisco *et al*., 2009). In one study, small strongyle infections were more common in young horses as compared with mature animals (Bucknell *et al*., 1995). Higher infection rates and more severe infections indicate a lack of immunity in younger population (Urquhart *et al*., 1996). The difference in the rates of the parasites was statistically significant (P<0.05).

Higher infections of strongyloids in the current study correspond with the biology and epidemiology of these parasites as they require longer period to

complete the life cycle and slow or partial development of immunity. Studies over the years have indicated a significant change in worm population and their burden under different anthelmintic pressures over the years (Dunsmore and Jue Sue, 1985, Herd, 1990, Chapman *et al*., 2002).

The current study also revealed that the prevalence was 15.5%, 27.1% and 6.5% in poor, medium and good body condition horses respectively. Body condition of cart horses in this area was mostly medium as they provide adequate food and water supply. Similar study in different sites also showed that the prevalence of these parasites in animals with medium body condition was lower where as the rate in the poor and good body condition animals were lower and lower than the previous study conducted by Robenson (2009) with the rates of 54.2%, 29.4% and16.4% respectively. This result showed that statistical significant was observed in the different body condition horses regarding the load of the parasites ($P<0.05$).

CONCLUSION AND RECOMMENDATIONS

The major finding from the study revealed that the common nematodes affecting the cart horses in the area were strongyles, ascaris and oxyuris. Mostly the disease affect young animals having poor and medium body condition animals due to the inadequate development of the immune system in young animals as well as their grazing habit and feeding condition of the medium body animals and use of the animals for longer period of time during working hours. In addition, absence of prophylactic and control strategic against invading parasite, poor management practice and the presence of favorable climatic situation for the development of this parasite in the study area are some of the conditions which predispose the horses for such type of parasites. The highest prevalence of GIT parasites in the study area was a serious threat to the cart horses; hence, an immediate professional's intervention is required in the study area.

Based on the above conclusion the following recommendations are forward.

- Strategic and regular anthelmintic treatment of equine population.
- Pasture management to control GIT nematode parasite of horses.
- Extensive extension service including health education and animal welfare must be launched to create awareness among equine owners and attendants.

- Detailed study should be carried out to estimate the economic of anthelmithcs parasite in cart horses.

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ANNEXES

Annex 1. Direct fecal smear examination procedure

Fecal sample that were taken from the rectum of cart horse and transported regional veterinary laboratory and individual sample processed by the following procedure.

- Several drops of saline or fecal flotation solution were placed on microscopic slide with an equal amount of feces.
- Mix the solution and feces together with wooden applicator until the solution was homogenous.
- Smear the solution over the slide in to other films. The film should be thin enough to read print through.
- Remove any large pieces of feces.
- Place a cover ship over the smear

Examine the area of the slide under cover slip with the microscope and record any protozoan cysts, eggs, larvae or gross parasite seen (Hendrix, 2006).

Annex 2. Fecal sample flotation procedures

Fecal sample that were taken from the rectum of cart horse and transported to kombolcha regional veterinary laboratory and individual sample processed by the following procedure.

- 3gm of fecal sample was placed in mortar and crushed using pistle gently which was for prevention of breakdown of eggs with in the fecal sample.
- 40ml of flotation were added to the sample in mortar and mix the tow thoroughly.
- Pour to the test tube till it form convex meniscus
- Rotate in upward direction and place cover slip

Examine under low power objective of microscope

- Wait for 20 minutes
- Put microscopic slide on the top of convex meniscus and remove immediately and rotate in upward direction.
- Examine under low power microscope.

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