



## Research Paper

# Incidence of gastrointestinal helminth of Donkeys in Sokoto Metropolis

\*Mohammed, A. A., Lawal M.D., Alayande, M.O., and Mahmuda A.

Department of Veterinary Parasitology and Entomology, Faculty of Veterinary Medicine, Usmanu Danfodiyo University, Sokoto, Nigeria.

\*Corresponding author E-mail: [aminu280@yahoo.co.uk](mailto:aminu280@yahoo.co.uk)

Received 20 November 2017; Accepted 9 December, 2017

A total of 50 donkeys were examined for gastrointestinal helminth using floatation method. The only worm eggs detected were those of nematode (strongyle and *Strongyloides* species) and neither cestodes nor trematode eggs were detected. A total of 39 (78%) samples were positive, 26 (52%) males and 13 (26%) females. From the results obtained at present study, it is clear that nematodes are the major helminths affecting donkeys in Sokoto.

Donkey owners should be educated about the control strategies that are practicable and inexpensive for the well-being of their donkeys. Government should help in providing adequate nutrient by way of subsidizing animal feed and concentrates.

**Keywords:** Donkey; gastrointestinal helminth, cestodes; trematode; strongyle, *strongyloides* species

## INTRODUCTION

Like other domestic animals Donkeys also are infested with various kinds of parasites. A parasite is any living organism that lives on or within another living organism (the host) at whose expense it obtains some advantages and causes some damage. The donkey, or ass (*Equus asinus*), is a member of the horse family equidae. The ancestors of the donkeys, wild ass, lived in arid areas. They are the descendants of the African wild ass. Related to the donkey is the domesticated wild ass *E. haemionus* a descendant of Asian ancestors (ATNESA (1997; Hendell, 1977, 1981) the donkey is a draught animal used for many purposes such as transportation of loads and goods, farm product to various markets, carrying water from rivers, in some places donkeys are used for farming and / or transport of sandy soil/stones or gravel. To these people donkey has become a necessity without which life could be very difficult being a hardworking and patient animal. Unfortunately the donkey is the most abused, for most part they are over worked, underfed, has no shelter and their health neglected (Akumonyo, 1997). While much is being spent

on horses by their owner's however, in the case of donkey, owners represented the poor population throughout the world and are hardly able to afford medical care for their children, let alone veterinary care for the donkey (Svendson, 1986). Reports indicated that donkeys exist in million all over the world (FAO, 1954) estimate: 55 million donkeys and mules. This study intend to investigate the prevalence and to some extent the degree of infection with helminths of this aspect of equine. Efforts will also be made to establish a standard diagnostic procedure, for proper identification of these parasites within Sokoto and its environments.

External (Ectoparasites) of donkeys include ticks, mites, mosquitoes and internal parasites (Endoparasites) include worms (Helminths), arthropod maggots such as Warble fly and Bot fly (*Gastrophilus* species) maggots, protozoans such as *Babesia* and trypanosomes (Haemoparasite).

Helminthiasis in donkeys is of great importance. Severe worm infestation with other factors such as poor management and health care greatly affect the productivity,

performance and life span of this unfortunate animal. Work conducted by the international Donkeys protection trust (Svendson, 1986) in Turkey, Egypt, Tunisia, Jamaica, Ecuador and Peru noted that the average of donkeys and mules in these countries was (Eleven) years, whereas the average age taken from 1,600 donkeys in the United Kingdom was 37years. These surveys also indicated that nearly all donkeys or mules examined for parasitism were infected (Bliss, 1986). Among the parasites that affect donkeys helminths are the most prominent.

There are wide variety of helminths affecting donkeys the most common and important ones are Viz-large strongyles (*Strongylus Species*), small strongyles (*Triphonema species*) Ascarids (*Parascaris equorum*), pin worms (*Strongyloides*), Lung worms (*Dictyocaulus*), *Oxyuris* and Hydatid tape worm (*Echinococcus*). Physically, a severely infected donkey is usually emaciated with hollows in front of its hips, but with an enlarged abdomen, hair is usually rough and dull, and is often listless and irritable. Appetite might probably be depressed (Morris, 1988, 1997).

The effect of these parasites on donkeys cannot be over looked this is because they cause so much problem not only on the animal but the entire locality that benefit from this animal.

Despite the fact that studies have been conducted to check for gastrointestinal helminths infection, there is still need to check for different species of helminths from different areas that affect donkeys around Sokoto metropolis. Determination of different species of helminths that affect donkeys is of significant importance in clinical diagnosis of diseases as many species of helminths result to number of diseases, hence the need to validate the method to be used in achieving this purpose to avoid having false positive and false negative results and also to have specific drugs for the treatment of the species of helminths involved.

The aim of the work is to determine the level of gastrointestinal helminths infection in donkeys around Sokoto metropolis, with an objective to estimate the mortality due to gastrointestinal helminthes and recommend measures to the lowest level of gastrointestinal helminths infection around Sokoto metropolis.

## **MATERIALS AND METHODS**

### **Study area**

The study was conducted in Sokoto, northwestern part of Nigeria. With a land area of 28, 232, 37 sq kilometer, Sokoto state is located between longitude 11° 30" to 13° 50" east and latitude 4° to 6° north. It's bordered in the north by the Niger republic, Zamfara state to the east and kebbi state to the south and east. The state falls within

two vegetation zones; the Sudan savanna and Northern guinea savanna. The climate is semi-arid and characterized by alternating wet and dry seasons with a short cool and dry period 'harmattan'- which starts in late October and ends in late February. The mean monthly temperature is generally high, 20 - 38°C, with the highest temperature occurring in April. Relative humidity ranges from 12 to 71% with the highest occurring in August (Sokoto State, 2000). Agriculture is the major means of livelihood.

### **Sample collection**

Fresh faecal samples were taken from 50 donkeys of different sex. Faecal samples were taken and subjected to quantitative coprological examination to identify the major gastrointestinal helminths involved.

### **Sampling technique**

Faecal samples were taken directly from the rectum or from freshly voided on the ground with strict sanitation when the animals were seen defecating and placed in gloves. Each sample was labeled with animal identification sex (male and female) and then brought to Parasitology Laboratory, Faculty of Veterinary Medicine, Usmanu Danfodiyo University Sokoto. Samples were kept in refrigerator at 4°C to be examined later. Sodium chloride solution was used as flotation fluid for this study. Flotation method was used to identify egg of Helminths parasites (Soulsby, 1982; Urquhart et al., 1987;1996a,b).

## **Methodology**

### **Flotation technique**

This is basically a concentration and qualitative technique. The basis for flotation is that when worm eggs are subjected to a solution of higher specific gravity they will float. The salt used as flotation media is sodium chloride. Ideal specific gravity range for nematodes, cestodes eggs and coccidia oocyst is 1.10-1.20, whereas, in trematodes eggs the specific gravity range from 1.30-1.35. The procedure of flotation method was as described by (Hendrix, 1998). Approximately 3 g of faeces was put in a beaker. Fifty milliliters of flotation fluid were poured to the beaker containing 3 g of faeces. The flotation fluid (sodium chloride) was mixed with faeces thoroughly with stirring device (mortar and pestle). The resulting faecal suspension was poured through a mesh sieve (tea strainer) into another beaker. The faecal suspension was poured into a test tube from the second beaker, then placed in a test tube rack, leaving a convex meniscus at the top of the tube and a cover slip was

carefully placed on top of test tube. The tube was left to stand for 8-10 min. The cover slip was lifted off from the tube vertically together with the drop of fluid adhering to it and immediately placed on microscope slide and examined under the microscope.

### Microscopic examination of faeces for helminth eggs

This was done as described by Hendrix (1998). Compound microscope with the objective lens with a magnification power of 10X was first used to examine the prepared faecal smears. Mechanical microscopic stages were used for smooth and uniform movement of the slides. All the area under the cover slip was thoroughly and uniformly searched for the presence of parasitic eggs. When a parasite egg was observed at low magnification power (10X), high power object (40X) was used to examine it more closely and for the identified eggs.

### Preparation of floatation media

Sodium Chloride  
NaCl 320 g  
Tap water 1000 ml  
Dissolve salt in water, warm to dissolve, check specific gravity.

## RESULTS

During the study period, samples were collected from donkeys at Kara market area of Sokoto metropolis. A total of 50 samples were examined for the presence of helminth egg or larvae using floatation method. The only worm eggs detected were those of strongyles and *Strongyloides Species*. The study revealed that 78% of the samples examined were positive for helminths eggs while 22% were negative. More than half of the males (52%) were positive and 26% of the females were positive. Based on the class of helminth, nematodes were found to have the highest percentage (78%), but neither cestode nor trematode egg was detected in entire samples examined (Tables 1 and 2).

**Table 1.** Incidence of Gastrointestinal Helminths During the Study Period (July to August 2016) in Male and Female Donkeys.

Gender	No of animal examined	Positive	Total
Male	34	26	60
Female	16	13	29
Total	50	39	89

**Table 2.** Comparison of association between male and female donkeys.

Gender	Positive	Negative	Total
Male	26	8	34
Female	13	3	16
Total	39	11	50

## DISCUSSION

The results obtained from the study indicated that almost all the donkeys in Sokoto metropolis examined were infected with helminths parasites with a percentage of 78%. Taking into consideration the time when this survey was conducted which was the period of peak rainfall and most likely the system of management practiced (semi-intensive) which predominates in this environment. These factors favor the development of these parasites and increase the rate re-infection to the donkeys; this implies that they favor the increase in the number of infective stages of parasite, contamination of the environment, their development and survival. Strongyles and *strongyloides* proved to be particularly important as parasitic helminths of donkeys in Sokoto. The overall prevalence of different helminthic parasites was found to be 78% in males and females, this might be associated with negligence, kept under poor management conditions, it might also be associated with (1) suitable humidity and moisture provided by warm and wet conditions throughout the year for the eggs to develop to larval stage (L3) (Andrew, 2003). (2) Temperature that was favorable for the development and maturation of the larvae of the most helminthic species (Lima et al., 1990). (3) Ample provision of water that facilitated the migration of larvae as well as poor management system, for example lack of antihelminthic treatment, over working time and allowing the donkey for open grazing after work which facilitates ingestion of the eggs of helminths in the study area (Lima et al., 1990). The finding of the current study was not in line with the previous reports in other countries. Mattioli et al. (1995), Paudel, (2007), UMUR and Acici, (2009) have reported 84.4%, 80.4% and 93.5% prevalence of parasites in equine of Gambia, Nepal and Turkey respectively. The current finding, however, was lower than the other findings reported by other workers in Ethiopia. Shiferaw et al. (2001), Fikru et al. (2005), Mulate (2005), and Gizachew et al. (2006) have reported the prevalence of helminthic parasites to be 100%, 100%, 98.2% 100% in donkeys of Wonchi, Highlands of Wollo province, Western highlands of Oromia and Dugda Bora district respectively. One report from Nigeria was from borno state 27.6% (Ahmed et al., 2008). The relative low occurrence of helminthic parasites in Sokoto might be associated with the agro-ecological differences and environmental condition where the temperature is very high during the dry season; female donkeys were found

to have significantly higher infestation (compare to their total number) than their counterpart males as they might have lower immunity due to gestation, lactation and stresses occurred during this period (Sapakota, 2009). However in this study there was no significant difference observed between the two sexes ( $p > 0.05$ ), which could be attributed to the absence of pregnant and lactating Jennies in the study. Generally, it is assumed that sex is determinant factor that influences the prevalence of parasitism (Pal and Qayyum, 1992).

## Conclusion

The results obtained from the present study show clearly that helminthiasis is one of the major disease affecting donkeys in Sokoto. In the study, strongyles and *Strongyloides Species* were detected. The study revealed that 78% of the samples examined were positive for helminths eggs while 22% were negative. More than half of the males (52%) were positive and 26% of the females were positive. Helminthiasis constitute a serious menace to the productivity and life span of these animals which can be controlled simply by deworming these animals bi-annually; probably before and after the raining season, since the scant food eaten is digested by the donkey rather than the parasite, so the animal is able to increase its body weight. The management system has to be improved through proper hygiene and sanitary measures, and proper restraint at working places. It is clear that owners are not aware of the importance of helminthiasis since losses are not apparent.

## Recommendations

- (a) There is need to create awareness among donkey owners on the importance of helminthiasis in the well being of their donkeys as it relates performance and life span
- (b) There is need to develop control strategies and scientific programmes for general helminthiasis control in donkeys.
- (c) The control strategies should be practicable and inexpensive to the donkey owner.
- (d) Helminth control should be encouraged through active Veterinary Ambulatory Service by government at reasonable cost.
- (e) Government should help the owner and provide adequate nutrient by way of subsidizing animal feeds and concentrates.
- (e) It is also recommended that more work on the incidence of parasite of donkey using other diagnostic method (sedimentation, Mc master and direct fecal smear) in other to have deep sense of conclusion should be done.

## REFERENCES

Ahmed MI, Tijjani AN, Mustapha AR (2008). Survey for common

- disease and Management Practice of Donkeys (*Equus asinus*), in Borno State, Nigeria. *Nigerian Veterinary Journal* Vol. 29(3): 1-5.
- Akumonyo J (1997). Working with donkeys with emphasis on hoof care, Draught animal news. 26:6
- Andrew GW (2003). Assessing the efficacy of an anthelmintic programme on the health and welfare of working equines in Morocco. In: a Drought Animal. 39:6-14.
- ATNESA (1997). Improving donkey utilization and management. Report of the international ATNESA workshop held 5-9<sup>th</sup> May, 1997, Debrezeit, Ethiopia.
- Bliss DH (1986). The Professional Handbook of the donkey. First edition. Sovereign Printing Group, England, P. 86.
- FAO (1954). Food and Agriculture Organization Monthly Bulletin of ec and Agriculture start, F.A.O. Rome p.35.
- Fikru R, Reta D, Bizunesh M, (2005). Prevalence of Gastrointestinal parasites in western highlands of Oroia, Ethiopia. *Bulletin of Animal Health and production in Africa*, 53(3): 161-166.
- Gizachew A, Gebreab F, Endebu B, Joe A (2006). Prevalence of gastrointestinal parasites of donkeys in Dugba Bora District, Ethiopia, Livestock Research for Rural Development. 18:11. (<http://www.cipav.org.co/irrd/irrd18/10/aye/18136.htm>).
- Hendell EC (1977). The world book. U.S.A: Field enterprises education corporation, 5: 254.
- Hendell EC (1981). Encyclopedia Americana. Danbury incorporated U.S.A., 9: 288.
- Hendrix C (1998). Diagnostic Veterinary Parasitology, 2<sup>nd</sup> edition, Mosby. <http://campus.iss.ni> (accessed on 17.02.2011) ISBN 978-0-8018-0.OCLC62265494
- Lima JD, Lima WS, Guimaraes AM (1990). Epidemiology of Bovine nematode parasites in South Eastern Brazil. In: proceedings, MSD., AGUET Symposium, (Guerrero, J., Leaning, WHD. (Eds.), Epidemiology of Bovine Nematode parasites in America., Bahia Brazil. Pp. 49-63.
- Mattioli L, Apollonio M, Mazzarone V, Centofanti E (1995). Wolf food habits and wild ungulate availability in the Foreste Casentinesi National Park; Italy. *Acta Ther.* 40: 387-402.
- McCarthy G (1986). The Professional Handbook donkey. England: Sovereign Printing group 26pp.
- Morris D (1988). Looking after a donkey. First edition white book ltd, London pp 10, 90.
- Morris D (1997). A life line for working donkey. *International Veterinary Student Journal.* 10, 10.
- Mulate B (2005). Preliminary study on helminthosis of equines in south and north Wolto zones. *Ethiop. Vet. J.*, 9, 25-37.
- Pal RA, Qayyum M (1992). Breed page and sex wise distribution of helminthes of sheep and goats in and around Rawalpindi region. *Path. Vet. J.*, 12:60-63.
- Paudel, S., (2007) Prevalence of Gastrointestinal parasites in horses with special reference to *Strongylus* species of Sainik Stud Farm Centre Bharatpur, Chitwan. *Blue – Cross Annu. Bull. NVSA*, 9, 104-105.
- Sapakota CR (2009). A Report on Prevalence of Helminthes Parasites in Mules of Brick Kiln P.160. Shiferaw, Y., Gebreb, F. and Wossene, A., (2001). Survey on helminthosis of equines in Wonchi, Ethiopia. *Ethiop Vet. J.*, 5, 49-67.
- Soulsby E.J.L (1982). Helminths, Arthropods and Protozoa of Domestic Animals. 7<sup>th</sup> (ed), Bailliere, Tindall, London,. Pp 650-770.
- Svendsen ED (1986). The Professional Handbook of The Donkey. England: Sovereign Printing group, .26.
- Umur Ş, Açıci M (2009). A survey on helminth infections of equines in the Central Black Sea region, Turkey. *Turk J. Vet Ani. Sci.*, 33(5): 373-378.
- Urquhart GM, Armour J, Duncan JL, Dunn AL, Jennings FW (1987). Veterinary Parasitology. First (ed) U.K English Language Book Society/Longman U.K Ltd. 8, 41-45, 63-64, 71-72, 75-77, 111, 270.
- Urquhart GM, Armour J, Duncan JL, Dunn AL Jennings FW (1996a). Veterinary Parasitology. Second (ed) Blackwell Science, Pp. 42-47.
- Urquhart GM, Armour J, Duncan JL, Dunn AL Jennings FW (1996b). Veterinary Parasitology 2 ed. Blackwell Science Ltd, pp: 42-47, 276-277.