PREVALENCE OF GEOHELMINTH PARASITES OF HORSES IN DUTSINMA METROPOLIS, KATSINA STATE NIGERIA

ABSTRACT

This study was carried out to investigate the prevalence of geohelminth parasites of horses in Dutsinma metropolis between May to August, 2016. Fresh fecal sample were obtained from the rectum of 48 randomly selected horses. A floatation technique was used for the lab work experiment. From the result, out of the total sample collected 6 (12.50%) were positive with two parasites *strongyloides stercoralis* and *Ascaris lumbricoides* with the prevalence of (6.25%) for each. Among the three points of sample collection, the highest prevalence was recorded at Kadangaru (20.00%) followed by Unguwa Yandaka (18.18%) and no case recorded at Hayingada. X^2 cal = 36.84 at P=0.05 and 2df. The highest prevalence was recorded among the males (18.52%) while only 1 female was affected with the prevalence of (4.76%) X^2 cal = 36.57 at P=0.05 and 2df. Prevalence was recorded in adult of 14.29% while young horses recorded a prevalence of 10.00%, X^2 cal = 36.84 at P=0.05. *Ascaris lumbricoides* and *Strongyloides stercoralis* were recognized as important Geohelminth parasites in Horses, and a public health problem in Dutsinma Local Goverment Area of Katsina State with various rates of infection (12.50%). Managerial control tools should be integrated to improve prevention of geohelminth parasites by communication, information and health education.

Key words: Prevalence, Feacal samples, Geohelminth, Parasites, Horses

Introduction

Geohelminth parasites are soil-transmitted helminths which are groups of parasitic worms causing human and other Animals infection through contact with parasite eggs or larvae that thrive in the warms and moist soil of the world's tropical and subtropical countries. As adult worms, the soil-transmitted helminths live for years in the human gastrointestinal tract. More than a billion people are infected with at least one species of geohelminth parasites worldwide. Among them are roundworms (*Ascaris lumbricoides*), whipworms (*Trichuris trichiura*), and hookworms (*Necator americanus* or *Ancylostoma duodenale*) (Abbott, 2008.). They are considered together because it is common for a single individual, especially a child living in a less developed country, to be chronically infected with all three worms. Such children have malnutrition, growth stunting, intellectual retardation, and cognitive and educational deficits.

Parasitic diseases are the major obstacle in the growth and development of animal health all over the world. Horses, among most domestic animals are reported to be more susceptible to large number of parasites and may harbour different species at any time. An apparently healthy horse can harbour over one half million geohelminth parasites, trematodes, cestodes and nematodes (Martins *et al*., 2009). This is because, the gastrointestinal tract provides favorable environment for the survival and proliferation of many of these parasites.

Horses (*Equus feruscaballus*) are one of the two extant sub species of horse *Equus ferus* (Getachew, *et al.,* 2010).They evolve over 45-55 million years. Humans began to domesticate horse around 4000 B C. Horses and humans interact in a wide variety of sport competition and man competitive activities.

Intestinal parasites such as helminths usually produce insidious diseases in animals. Infected horse may show signs of weakness, emaciation, restlessness, unthriftiness, diarrhea, anemia and sometimes intestinal obstruction or perforation.

The aim of this Study is to determine the Prevalence of geohelminth Parasites of Horses in Dutsinma Metropolis, Katsina State with the following objectives:

- To determine the prevalence of geohelminth parasites of horses in Dutsinma metropolis
- To identify the geohelminth parasites among horses in the study area
- To isolate the geohelminth parasites species in the Horses

Materials and Methods

Dutsinma (Lat 12^0 27'01.18" N/ Long 7^0 29'.29" E), Katsina State, Nigeria Dutsinma Local Government covers an area of 527 km squares and has a population of 16971, at the 2006 census. Total annual rainfall around Dutsinma is about 800mm Retrieved 10th July 2011 from www.albarkablog.com.The inhabitants of the local government are predominantly Hausa and Fulani by tribe. Their main occupations are farming and animal rearing.

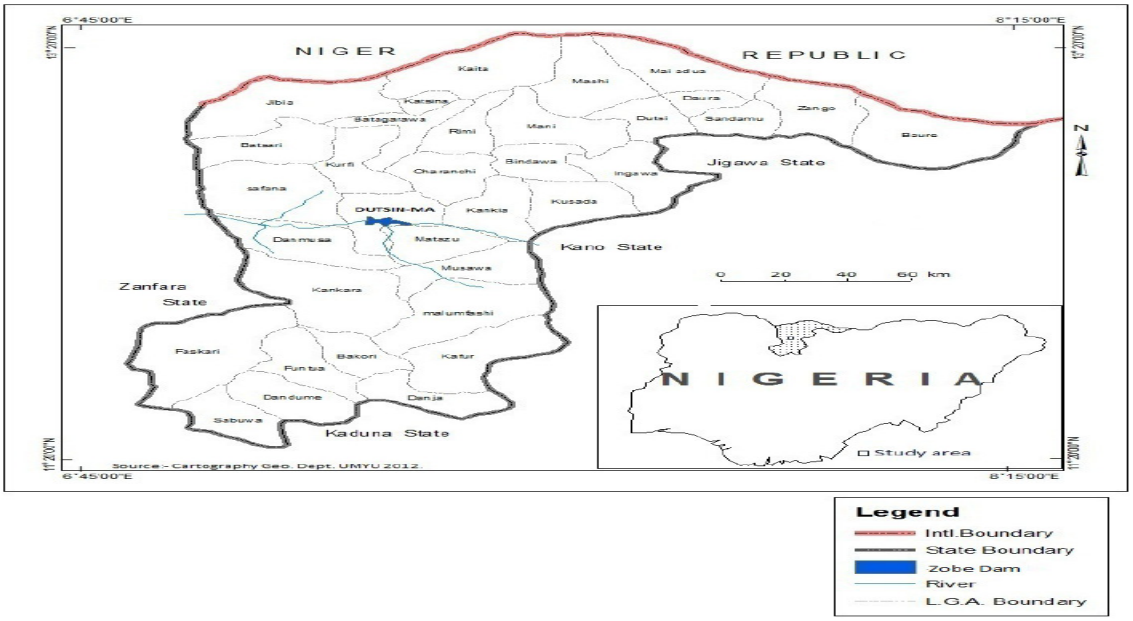

Fig 1 Map of Katsina locating Dutsinma at the centre.

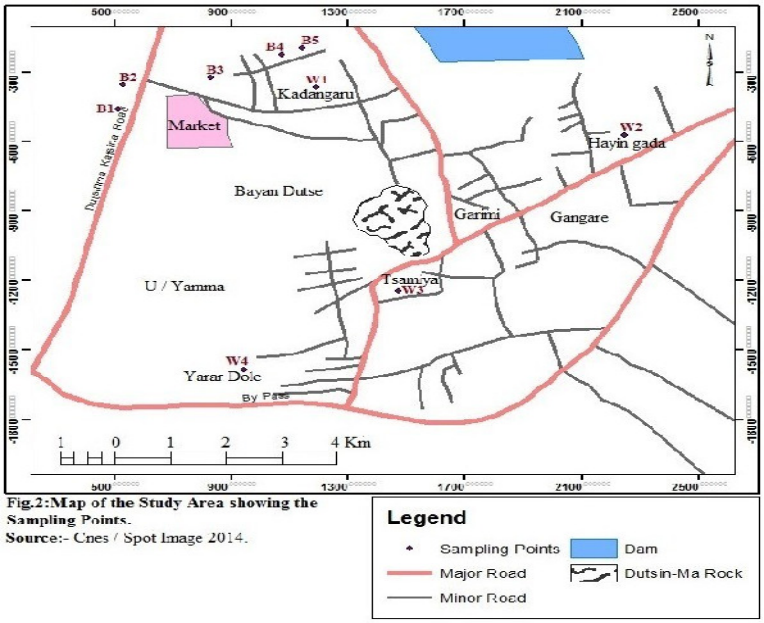

Fig.2:Map of the Study Area showing the Sampling Points.
Source:- Cnes / Spot Image 2014.

Fig. 2 Map of Dutsinma

Sample Population

A total of 48 faecal samples of horses were collected from different places within Dutsinma metropolis including Unguwar Yandaka, Hayin gada, and Kadangaru areas

Sample Collection

Samples were collected between the periods of May to August, 2016. Faecal samples were randomly collected from the rectum of horses in each place of the study area during the early hours of the day while owners restrained the animals (Ayele 2006). Aseptic measures were maintained during collection. Each sample was collected into a clean polythene bag while wearing gloves, labeled, noting the sex and age of the animal. These samples were immediately conveyed to the Biology Laboratory of Department of Biological Science, Federal University Dutsinma for examination.

Sample Examination

All faecal samples collected from the rectum of the large ruminants were screened eggs/oocysts of the parasite using the floatation technique. A technique with a principle where the floatation medium (Saturated salt NaCl solution) aids the rise of eggs and/or oocysts of geohelminth parasites by virtue of the medium's high specific gravity, allowing the faecal material to settle to the bottom.

Preparation of Floatation Medium

To prepare the floatation medium, 10grams of NaCl was dissolved in 500ml distilled water contained in a beaker. A stirring rod was used to stir the mixture until the NaCl dissolved completely. The solution was made up to 1½ liter by addition of distilled water (Jorgen and Brain, 1994). For each of the faecal sample collected, 3 grams was weighed into a crucible add 50ml of the floatation fluid was added. This was gently emulsified using a pestle and the resultant faecal suspension was poured into a 60ml universal bottle through a strainer (sieve), more of the solution was added until a convex meniscus was formed. A clean, dry and grease-free slide was placed over the mouth of the universal bottle, ensuring contact with the filtrate. This was allowed to stand for 5 minutes to allow the parasite eggs/oocysts to float. The slide was carefully removed and a cover slip was placed on the slide suspended sample and examined for geohelminth parasite under low (×10) and high (×40) power objectives of a microscope (Yagoob 2015).

Results

Prevalence of Geohelminth Parasites

A total of 48 Horses were screened for the research, in which 6(12.50%) were harboring one or more Geohelminth parasites. Among the three point of sample collection, the highest prevalence was recorded at Kadangaru (20.00%) followed Unguwa Yandaka (18.18%) and no case recorded at Hayingada.

Table1. Prevalence of Geohelminth Parasites in the study area

Location	No. screened	No. positive	Prevalence	E	X^2
Hayin Gada	16	0	0.00	0.00	0.00
Unguwar Yandaka	22	4	18.18	0.50	24.50
Kadangaru	10	2	20.00	0.25	12.25
Total	48	6	12.50	0.75	36.75

X^2 cal = 36.75 > X^2 tab = 10.60, therefore significant difference exist at $P \leq 0.05$ and 2df.

KEY

X^2 = Chi-square, and E = expected value,

Prevalence of Geohelminth Parasites in Relation to Sex

Out of the 48 horses examined, 27 male were and 21 female were horses. The highest prevalence was recorded among the males (18.52%) while only 1 female was affected with the prevalence of (4.76%).

Table2. Prevalence of Geohelminth Parasites in relation to the sex of horses

	MALE					FEMALE				
Location	**No. scre.**	**Positive**	**%**	**E**	**X^2**	**No. scre.**	**Positive**	**%**	**E**	**X^2**
Unguwar Yndaka	12	4	33.33	0.74	14.17	10	0	0.00	0.00	0.00
Hayin gada	9	0	0.00	0.00	3.45	7	0	0.00	0.00	18.05
Kadangaru	6	1	16.67	0.19	0.00	4	1	25.00	0.05	0.00
Total	27	5	18.52		17.62	21	1	4.76	0.05	18.05

X^2 cal = 36.57 > X^2 tab = 10.60, therefore significant difference exist at P≤ 0.05 and 2df.

Key

X^2 =Chi-square, E = expected value, and % = prevalence and No = number screened

Prevalence of Geohelminth Parasites in Relation to Age

28 (58.33%) adult and 20 (41.67%) young Horses were examined. Slightly highest prevalence was recorded at adult with the prevalence of 14.29% while low prevalence was founded at young horses with the prevalence of 10.00%.

Table3. Prevalence of Geohelminth Parasites in relation to the age of horses

	ADULT					YOUNG				
Location	**Adult**	**Positive**	**%**	**E**	**X^2**	**Young**	**Positive**	**%**	**E**	**X^2**
Unguwar Yandaka	13	3	23.08	0.43	15.36	9	1	11.11	0.10	8.10
Hayin gada	9	0	0.00	0.00	0.00	7	0	0.00	0.00	0.00
Kadangaru	6	1	16.67	0.14	5.28	4	1	25.00	0.10	8.10
Total	28	4	14.29	0.57	20.64	20	2	10.00	0.20	16.20

X^2 cal = 36.84 > X^2 tab = 10.60, therefore significant difference exist at P ≤ 0.05 and 2df.

Key

X^2 =Chi-square, E = expected value, and % = prevalence

Geohelminth Parasites Identified in the Study Area

Eggs and larva of two parasites were identified in the study area including *Ascaris lumbricoides* and *Strongyle* spp with the same prevalence of (6.25%) each.

Table4. Quantitative prevalence of geohelminth parasite identified in the study area

	Strongyloides steercoralis					***Ascaris lumbricoides***				
Location	**No. screened**	**Positive**	**%**	**E**	**X^2**	**No. screened**	**Positive**	**%**	**E**	**X^2**
Unguwar Yandaka	22	1	4.55	0.06	14.73	22	2	9.09	0.13	**26.90**
Hayin gada	16	0	0.00	0.00	0.00	16	0	0.00	0.00	0.00
Kadangaru	10	2	20.0	0.13	26.90	10	1	10.00	0.06	14.73
Total	48	3	6.25	0.19	41.63	48	3	6.25	0.19	41.63

X^2 cal = 83.26 is significant difference exist at P ≤ 0.05 and 2df.

Key

X^2 =Chi-square, E = expected value, and % = prevalence

PLATE 2. Egg of Strongyloides

PLATE1: Ascaris larvae

Discussion

This study was designed to investigate the Prevalence of Geohelminth Parasites of Horses in Dutsinma. A total of 48 Horses from Unguwar Yandaka, Hayingada and Kadangaru were screened for the research, eggs and larva of two species of geohelminth parasites were recorded 12.50% (*Strongyloides stercoralis* and *Ascaris lumbricoides*). This agrees with previous studies by (Saeed *et al*., 2010, and Wannas *et al*., 2012) which further explained the predomination of Strongyle and *Ascaris* eggs with prevalence rates of 58.5%, 57.14%, and 66.67%, respectively. The overall geohelminth prevalence appears to be low, in which only 6(12.50%) were harboring one or more Geohelminth parasites. Among the three point of sample collection, the highest prevalence was recorded at Kadangaru (20.00%) followed Unguwa Yandaka (18.18%) and no case recorded at Hayingada, table 1. This is low when compared to that of studies in Ethiopia (Fikru and Bizunesh, 2005) estimating prevalence in horses to be 91%, and similar estimates of 80% (Burden *et al*., 2010) and 81% (du Toit *et al*., 2008) in Mexico. Potential variation arising from management differences and differences with respect to topography, climate, animal working conditions and seasonality make direct comparisons difficult. The differences in intensity of infection could be due to variations in parasite biology relating to climatic conditions, pasture infection intensity relating to grazing practices and/or differences in use of anthelmintics; detailed information on such variables would be required to determine their importance

Out of the 48 horses examined, 27 were males and 21 were female horses. The highest prevalence was recorded among the males (18.52%) while only 1 female was affected with the prevalence of (4.76%).

This difference in the prevalence is statistically significant ($P < 0.05$), table 2. Which is in line with the work of (Hinney *et al.,* 2011*),* who reported a higher prevalence of (22.09%) male than that of the female Horses (13.56%).

28 (58.33%) adult and 20 (41.67%) young Horses were examined. Slightly highest prevalence was recorded at adult with the prevalence of 14.29% while low prevalence was founded at young horses with the prevalence of 10.00%, table 3. This is not in line the work of (Marariu *et al*., 2012) who recorded a slightly higher rate among young (100%) horses than adult (97.8%) This might be associated with apparent inability of the adult younger age groups to develop adequate acquired immunity predisposing them to high risks of severe infection with geohelminth parasites when compared with adult donkeys. Higher infection rates and more severe infections reflect lack of immunity in younger population (Urquhart *et al*., 1996).

The low prevalence we found (12.50% of horses) is similar to the findings of the 2009 survey from Greece, that found Strongyle eggs in 25.6% of horses (Papazahariadou *et al*., 2009). But this finding is less than the 78% prevalence that was found in the 1986 survey (Tolliver *et al*., 1987). It might be due to routine deworming programs that might were introduced to most of the horse population in this study area. This decline in prevalence was statistically significant ($P < 0.05$), it may suggest a trend. This concurs with another study from Louisiana conducted over similar time scale, which demonstrated a decrease in the infestation of most geohelminth species, (Crane *et al.*, 2008).

However, the reasons why the parasites vary between age and sex groups is require further investigation, base on my knowledge this is the first attempt to investigate the geohelmith parasites in Dutsinma metropolis. Such further studies could encourage more specific needs for owner education that could reduce endo-parasites burdens and also improve horse welfare.

Conclusion

It has been deduced in this research that *Ascaris lumbricoides* and *Strongyloides stercoralis* were identified as important geohelminth parasites in Horses, and are of great public health concern in Dutsinma Local Goverment Area of Katsina State in horses and other animals.

Recommendation

- Based on the results obtained and in order to avoid frequent infection, it is recommended that routine feacal samples go through Parasitological diagnostic techniques to determine cases of geohelminth parasites.
- Communication information and health education be integrated as preventive tool for horse owners.
- Owners of horses should routinely take them to Veterinary Clinics for accurate and appropriate diagnosis.

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