



Short Communication

Gut Parasites of Donkeys and Horses in a Semi-Urban Metropolis, Nigeria

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ABSTRACT

The epidemiological studies of donkey parasites in the world in general and in Nigeria in particular are fragmentary and not readily available. Given this paucity of information, the present work is aimed at investigating gut parasites of donkeys and horses of Udenu Local Government Area (LGA), Enugu state, Nigeria. Standard procedure of parasite search in vertebrates was used. A total of 23 donkeys and 24 horses were examined for gut helminth parasites. In total, out of 47 equines examined, 43 (91.5%) were infected. Out of 24 horses, 20 (83.3%) were infected while all the donkeys were infected (100.0% prevalence). The difference in infection prevalence between horses and donkeys was not significant ($\chi^2 = 4.190$, $df = 1$, $P = 0.060$). This study revealed that helminthiasis is one of the commonest ill-causing factors in donkeys and horses. It is therefore important that strategic treatment of equines be undertaken.

Article Information

Received 21 February 2019

Revised 22 June 2019

Accepted 04 October 2019

Available online 10 June 2021

Authors' Contribution

GCO, CIA, FEC and CDN conceived the study. GCO, CIA, FEC conducted it. GCO, FEC, IOA and GIO wrote the manuscript. IOA, GCO and CDN did statistical analysis. All author edited final draft.

Key words

Gut parasites, Donkeys, Horses, Nigeria

Living things in quest for survival, establish various forms of relationship with other biotic and abiotic forms in their environment. These relationships may among others include reproductive relationships and feeding relationships. These relationships keep a given biome or ecological community in a fairly stable cycle. As interactions continue, living things are exposed to risks capable of threatening their existence. One major risk living things are exposed to is disease, and diseases are conditions in living things that results in pathological symptoms and is not always the direct result of physical injury.

Donkeys (*Equus africanus asinus*) and horses (*Equus ferus caballus*) are domesticated animals of the family Equidae with grey or brown coat. They are examples of animals that make up the living population, and as such are exposed to similar risks of existence as other life forms. Donkeys have a worldwide distribution of about 41.5 and about 40 million found in developing countries (Fielding, 1991). Despite the increase in mechanization throughout the world, donkeys are still well deserving of the name 'beasts of burden' with their inherent ability to thrive in harsh environment. These activities expose them in many occasions to disease-causing organisms. Horses on the other hand, are used for sports,

work, ceremonial purposes and warfare. These activities expose them to diseases most of which are parasitic. Helminth parasite infections have been reported by different authors. *Habronema muscae*, *Habronema majus* and *Trichostrongylus axei* were observed in horses and donkey in Ankara, Turkey (Suleyman and Ayse, 2012). Anteneh and Getachew (2012) recorded the occurrence of gastrointestinal nematodes in horses and donkeys in Gondar town, Ethiopia. Bewketu and Endalkachew (2011) also reported cases of gastrointestinal parasites of donkeys and mules in Bahir dar, Ethiopia.

In Nigeria, the epidemiological studies of the parasites of donkey and horses are fragmentary and not readily available. The present study thus aimed at the study of gut parasites of donkeys and horses of Udenu LGA, Enugu state, Nigeria.

Materials and methods

Udenu is an LGA of Enugu State, Nigeria. Its headquarters are in the town of Obollo-Afor at coordinates 6°55' N 7°31' E and 6.917° N 7.517° E covering a land area of 248km² (96 sq mi). At Obollo-Afor horse depot is situated beside fruit market while donkey depot is at Amutenyi, both along new Makurdi road. This road plays a prominent role in the inter-state trade of donkeys and horses.

A total of 23 donkeys, *Equus africanus* and 24 horses, *Equus ferus* were sampled from the donkey and

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0030-9923/2021/0001-0001 \$ 9.00/0
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horse depots. A visit was made to the abattoir of selected depots and fresh gut samples were collected from any horses or donkey butchered by the abattoir management. These samples were kept in a water proof specimen bag to prevent the fluid from spilling or contacting other surfaces, the bags were labeled. The samples were transported to Department of Zoology and Environmental Biology, University of Nigeria, Nsukka for analysis within one hour of collection. At the abattoir sexes of the horses were determined by glancing at the pelvic area on the horse's underside between the belly and the hind legs as well as under the tail (Jen, 2017). If a male, his penis and testes will be revealed. If female, her udder is revealed. If her tail is lifted, the two openings: the anus and the vulva are seen-the vulva is part of the birth canal (Jen, 2017).

Donkey and horse guts were transferred into sample trays and each gut sample was appropriately sectioned into stomach, small intestine, and large intestine. Each section was carefully cut open to expose the lumen of the tract. The sections were washed in physiological saline and examined for parasites. Parasites noticeable by the eyes were picked and placed into petri dishes and viewed under dissecting microscope. This showed the internal structure of the parasites and pictures were taken. Scrapings from the stomach and intestinal linings were also smeared on slide and examined. The rinse of the gut content was mixed with sodium bicarbonate (NHCO₃) (one spoonful per litre) to remove mucus and enhance helminth parasite search. Parasite search was according to the guideline by Paperna (1996).

Gastrointestinal helminths isolated were stored temporarily in formal saline before identification and counting. After identification and counting, representatives of each parasite species were kept in EDTA-free bottles, with little amount of 70% ethanol.

Parasites recovered were identified by a parasitologist in the Department of Zoology and Environmental Biology, University of Nigeria, Nsukka. They were further cross-examined in text by Soulsby (1982).

Data was analyzed using SPSS version 20.0 (IBM Corporation, Armonk, New York). Parasites prevalence

was obtained by Chi-square analysis. Level of significance was set at $p < 0.05$. Infection prevalence and parasite intensity were calculated using:

$$\text{Prevalence} = \frac{\text{Number of infected hosts}}{\text{Number of examined hosts}} \times \frac{100}{1}$$

$$\text{Mean intensity} = \frac{\text{Number of parasites}}{\text{Number of positive individuals}}$$

Results

A total of 24 horses and 23 donkeys were sampled. Horses comprised of 20 males and 4 females, while the donkeys were all male (Table I). The overall prevalence of infection was 43 (91.5 %). Out of 24 horses sampled, 20 (83.3 %) were infected. All the donkeys sampled were infected with one or more parasite species, giving a 100.0 % prevalence of infection. There was no significant difference in the prevalence of infection between horses and donkeys ($\chi^2 = 4.190$, $df = 1$, $P = 0.060$). The prevalence of infection in horse by sex was 90.0% and 50.0% for male and female respectively. There was no significant difference observed in the prevalence of parasitic infection by sex of horses examined ($p > 0.05$).

The distribution of gut parasites of donkeys and horses at Obollo-Afor is represented in Table II. All the parasites observed from the examined animals were identified to species level. Twelve (12) species of gut parasites were identified, comprising *Gasterophilus intestinalis*, *Strongyles vulgaris*, *Strongyles edentatus*, *Strongylus equinus*, *Strongyloides westeri*, *Oxyuris equi*, *Parascaris equorum*, *Habronema majus*, *Trichostrongylus axei*, *Habronema muscae*, *Gastrodiscus aegypticus* and *Gasterophilus nasalis*. The prevalence of gut parasite infections varied between horse and donkey. But only *S. equinus* and *H. majus* prevalence was significantly different between both ($p < 0.05$). Both were significantly more prevalent in horse (Table II). The mean intensity of parasites in donkeys and horses at Obollo-Afor are also shown in Table II.

Mixed infections of two or three parasites simultaneously were observed; their prevalence is indicated in Table III. Except for the mixed infection involving *G.*

Table I. Prevalence of gut parasites of donkeys and horses at Obollo-Afor, Enugu State.

Animal Taxa	Number Examined	Number Infected	Prevalence (%)	Sex and prevalence n (%)	
				Male	Female
Horse	24	20	83.3	18 (90.0)	2 (50.0)
Donkey	23	23	100.0		
Total	47	43	91.5	20	4
χ^2 ; p-value			4.190; 0.060	3.840; 0.115	

Table II. Prevalence and mean intensity of gut parasites of donkeys and horses at Obollo-Afor, Enugu State.

Parasite species	Number infected (%)			Mean intensity	
	Horse (n = 24)	Donkey (n =23)		Horse (n = 24)	Donkey (n =23)
<i>Gasterophilus intestinalis</i>	9 (37.5)	7 (30.4)	$\chi^2 = 0.261, p = 0.420$	15.50 ± 2.62	12.61 ± 3.41
<i>Strongyles vulgaris</i>	17 (70.8)	20 (87.0)	$\chi^2 = 1.823, p = 0.160$	19.20 ± 4.76	20.83 ± 4.41
<i>Strongyles edentus</i>	9 (37.5)	9 (39.1)	$\chi^2 = 0.013, p = 0.573$	14.15 ± 5.27	15.09 ± 2.59
<i>Strongyles equinus</i>	12 (50.0)	0 (0.0)	$\chi^2 = 15.443, p = 0.0001$	14.10 ± 10.02	-
<i>Strongyloides westeri</i>	12 (50.0)	9 (39.1)	$\chi^2 = 0.561, p = 0.325$	28.15 ± 7.81	14.83 ± 3.14
<i>Oxyuris equi</i>	7 (29.2)	3 (13.0)	$\chi^2 = 1.823, p = 0.286$	11.35 ± 3.49	10.70 ± 8.43
<i>Parascaris equorum</i>	11 (45.8)	12 (52.2)	$\chi^2 = 0.189, p = 0.443$	12.40 ± 4.88	12.91 ± 5.75
<i>Habronema majus</i>	8 (33.3)	0 (0.0)	$\chi^2 = 9.239, p = 0.004$	11.70 ± 5.51	-
<i>Trichostrongylus axei</i>	2 (8.3)	0 (0.0)	$\chi^2 = 2.002, p = 0.225$	10.27 ± 4.33	-
<i>Habronema muscae</i>	2 (8.3)	0 (0.0)	$\chi^2 = 2.002, p = 0.225$	11.18 ± 6.85	-
<i>Gastrodiscus aegypticus</i>	7 (29.2)	3 (13.0)	$\chi^2 = 1.823, p = 0.160$	18.20 ± 9.11	11.30 ± 6.76
<i>Gasterophilus nasalis</i>	2 (8.3)	5 (21.7)	$\chi^2 = 1.665, p = 0.190$	9.20 ± 3.21	10.70 ± 5.33

Table III. Prevalence of mixed infections of gut parasites in donkeys and horses at Obollo-Afor.

Animals	Number examined	No of positive animals	Mixed infection	Prevalence (%)
Horses	24	2	<i>Strongyles vulgaris</i> , <i>Strongyles edentatus</i> and <i>Strongylus equinus</i>	8.3
		3	<i>Gasterophilus intestinalis</i> and <i>Strongyloides westeri</i>	12.5
		2	<i>Gasterophilus nasalis</i> and <i>Strongyloides westeri</i>	8.3
		6	<i>Strongyles vulgaris</i> and <i>Strongyles edentatus</i>	25.0
		10	<i>Strongyles vulgaris</i> and <i>Strongyles equinus</i>	41.7
		4	<i>Strongyles edentatus</i> and <i>Strongyles equinus</i>	16.7
Donkeys	23	6	<i>Strongyles vulgaris</i> and <i>Strongyles edentatus</i>	26.1
Total	47	33		70.21
χ^2				13.156
p-value				0.041

intestinalis and *S. westeri* only, all other cases of mixed infestation involved two or more helminths of the genus *Strongyles*. Out of 47 animals sampled, mixed infection occurred in 33 (70.2%). Mixed infection of *S. vulgaris* and *S. equinus* in donkey was the most prevalent (41.7%); followed by mixed infection of *S. vulgaris* and *S. edentatus* (25.0 %) in horse. The mixed infections of *S. vulgaris*, *S. edentatus* and *S. equinus*, and that of *G. nasalis* and *S. westeri* each had the least prevalence (8.3 %). The difference in the prevalence of mixed infection was statistically significant ($\chi^2 = 13.156, df = 6, P = 0.041$).

Discussion

The results of this research study showed a wide

range of parasitic infections range of parasitic infection of the guts. The overall prevalence of gut parasite observed was 91.5%. The prevalence in donkey and horse was 100% and 83.3% respectively. The results obtained from the study at donkey and horse depot, Obollo-Afor, Udenu LGA of Enugu State, were similar to the report of Anteneh and Getachew (2012). From the results of Anteneh and Getachew (2012), a total prevalence rate of 98.22% and 89.32% was recorded in donkeys and horses respectively with strongyle (98.22% and 84.37%) and *Parascaris equorum* (23.35% and 43.69%) as the two genera of parasites commonly encountered. The results of this work indicate that a total prevalence rate of 100% and 83.3% was recorded in donkeys and horses respectively with *Strongylus vulgaris* (87.0% and 70.8%) and *Parascaris*

equorum (52.2% and 45.8%) as the two most commonly encountered genera. The third genus of parasites commonly encountered common to both was *Strongyloides westeri* (39.1% and 50.0%).

Eight species of parasites occurred, in the donkeys examined, these parasites includes *Gasterophilus intestinalis*, *Strongyles vulgaris*, *Strongyles edentatus*, *Strongyloides westeri*, *Oxyuris equi*, *Parascaris equorum*, *Gastrodiscus aegypticus*, and *Gasterophilus nasalis*. This is similar to report of Zumpt (1965) having only eight parasites occurring, with *G. intestinalis* and *G. nasalis* being the most frequent.

Mixed infection of helminths as was reported here in horses and donkey have been reported by other authors. Mahfooz *et al.* (2008) and Mezgebu *et al.* (2013) have reported mixed infections of helminths in horses and donkeys. Morbidity associated with helminth infection is usually increased by mixed infection (Temesgen *et al.*, 2015). Though the consequences of the mixed infections in the case of the present study was not assessed, it is believed that the consequences is not different.

Conclusion

In conclusion, equines in Enugu and possibly other parts of Nigeria harbor helminth parasites. These parasites are believed to cause morbidity which negatively affect production of horses and donkeys and therefore requires veterinary attention.

Acknowledgements

We gratefully acknowledge the support of the Head, Department of Zoology and Environmental Biology, University of Nigeria, Nsukka and other research colleagues for the support during the course of the research.

Statement of conflict of interest

The authors declare no conflict of interest

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