

Research Article

Prevalence of Gastrointestinal Parasites of Horses Reared in Katsina Metropolis

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ABSTRACT

Equines are animals of strength and might but the effects of Gastro intestinal parasites can greatly limit their activities. Apparently, horses can harbour over half a million gastrointestinal parasites which may include protozoans, trematodes, cestodes and nematodes. This study aimed to identify gastrointestinal parasites affecting horses reared within Katsina metropolis using coprological methods. Between the months of May and August, 2024, fresh faecal samples were collected from 135 horses within Katsina metropolis (Northern Nigeria), and analysed using the floatation techniques to detect faecal parasitic forms (eggs, oocysts) and larvae. *Strongylus vulgaris* was the most prevalent helminth (61.3%), followed by *Oxyris equi* (33.2%), then *Anoplocephala spp* (10.3%). Among the protozoans, *Eimeria spp.* (64.3 %) was more frequent, followed by *Fasciola spp.* (29.9 %). This study demonstrates that horses in Katsina are commonly affected by mixed infections, with *Strongylus vulgaris* being the most prevalent species. From the results obtained, a significant difference (P value = < 0.05) was observed in the prevalence of all the gastrointestinal parasites examined between the body conditions. There was a significant difference in the prevalence of *P. equorum* with the sex of horses (P value = <0.05). From the findings of the present study, proper screening and monitoring of the horses should be carried out regularly, and regular and strategic deworming programmes should be carried out, as some of these parasites can be transmitted to other domestic animals, which could bring about great economic loss to society.

Keywords: Gastrointestinal parasites; Horses; Katsina metropolis; Parasitic protozoans; Prevalence

Citation: Yaradua, Z.A., & Ahmad, M. (2025). Prevalence of Gastrointestinal Parasites of Horses Reared in Katsina Metropolis. *Sahel Journal of Life Sciences FUDMA*, 3(4): 562-568. DOI: <https://doi.org/10.33003/sajols-2025-0304-64>

INTRODUCTION

Horses (*Equus caballus*) are animals of the *equidae* family which also includes donkeys (*Equus asinus*), mules, and zebra (*Equus zebra*). There are an estimated 110 million equines in the developing world (Ali and Yagoob, 2015) and about 59 million horses in the world. In Nigeria, the horse population is estimated to be 200,000 (FAO 2021). Horse (*Equus caballus*) has long been domesticated by man and since then it has been a loyal friend and a trusted partner in man's day to day life (Ola-Fadunsin *et al.* 2019). Horses are associated with royalty and some special traditional festivals in some parts of Nigeria (Ola-Fadunsin *et al.*, 2018). Indigenous horses have been used by institutional and private owners in

Nigeria for several purposes such as for pleasure riding, polo games, ceremonies, crowd control, entertainment and research in Northern and North Central Nigeria (Oladipo *et al.* 2015; Ememe *et al.* 2020).

Parasitic diseases from different literatures are reported to be among the most frequently encountered health problems in horses (Mesafint *et al.* 2023), accounting for a substantial proportion of veterinary consultations and emergency interventions in horses (Tyrnenopoulou *et al.* 2021) and represent a major cause of morbidity and economic loss in equine practice (Ullah *et al.* 2025). Where they are susceptible to more than 60 parasites and are known to harbour and invade different parts

of the horse body especially the gastrointestinal tracts (Dissanayeke *et al.*, 2017). However, the incidence of gastrointestinal parasites varies widely across geographic regions, management systems, and horse populations, reflecting differences in feeding practices, housing, workload, and preventive healthcare (Lu *et al.* 2025).

The gastrointestinal parasites affecting equines includes diverse species of parasites, including protozoa, trematodes, cestodes, and nematodes, among which includes *Strongylus edentatus*, *S. edentatus*, *S. vulgaris*, *Triodontophorus*, *Craterostomum*, *Oxyrus equi*, *Parascaris equorum*, *Eimeria leukarti*, *Giardia doudenalis*, and *Anoplocephala spp* (Ola-Fadunsin *et al.* 2019). Although different researches across the globe have reported over 40 different species of parasites that concurrently parasitizes horses, only a few are infectious. Among these, *S. equinus*, *S. edentatus*, *S. vulgaris*, and *P. equorum* (Halvarsson *et al.* 2024) pose the most severe threats to equine health.

Despite the fact that equines are animals of strength and might but the effects of these Gastro intestinal parasites can greatly limit their activities. Manifestations of gastrointestinal parasitism in horses from different scholars was reported to encompass weakness, emaciation, restlessness, thriftiness, diarrhoea, anemia (Ogbien *et al.* 2022), and, in severe cases, intestinal obstruction or perforation. Apparently, horses can harbour over half a million helminth parasites (Martins *et al.*, 2019). These parasites are a major threat to the health and well-being of horses. The effects of these parasites are greatly evident in young and malnourished horses (Belay *et al.*, 2016), these intestinal parasites could also act as carriers of some micro-organisms such as bacteria, viruses and fungi and these microbes could cause gastrointestinal infections and diseases (Belay *et al.*, 2016). Some of these parasites and gastrointestinal infections have been known to be zoonotic and can be transmitted from these infected horses to humans which could lead to mortalities in humans in the long run.

High parasitic load have been reported by different scholars to be the most prevalent disease of horses in Nigeria, where in northern part of the country area in the derived savannah zone of Northern Nigeria, in Kaduna state a high prevalence of 67% (Collins *et al.* 2026), 82.4% had been reported in Jos (Ogbein *et al.*, 2022) while 93% had been reported in Port Harcourt (Chinwe *et al.*, 2019) Effect of gastrointestinal parasites on horses cannot be over emphasized.

Despite the important role of horses in day-to-day activities in Katsina metropolis, there is a dearth of information on parasitic infection of horses. This study aimed to provide information on the prevalence of gastrointestinal parasites of horses reared within Katsina metropolis. Such data will help to show rise or fall of parasites prevalence, thus the efficacy of control.

MATERIAL AND METHODS

Study Site

The study was conducted within Katsina metropolis of Katsina State. The State is geographically located between at 11°30' 15"N and longitude 007°e and 009°e. It borders Kaduna state to the South, Niger Republic to North, Zamfara state to the East. The very topographical features of state are dominated by gently rolling plane rising from an elevation of about 300m to an average of 450m and peaks at 850m. The state is divided into 2 major geographical zone namely alluvial flood plains (Fadama areas) and sedimentary terrain and crystalline basement (Weatherbase, 2013).

Study Design

A Cross-sectional study was conducted on 135 randomly selected horses of local breed within Katsina metropolis of Katsina state, aimed to determine the prevalence of gastrointestinal parasites in horse and also to assess the relationship of different demographic factors (Age, sex, and body condition) of the horses with the prevalence of the different parasites identified.

Study Population

A total number of 135 horses were randomly selected using purposive sampling methods as the study subjects across the metropolis.

Collection of demographic information

Using an open-ended questionnaire the demographic information of the horses was obtained from the rarer and recorded accordingly. Some of the demographic information's collected includes the age, sex, and their body conditions.

Collection of clinical samples and storage

Fresh faecal samples were aseptically collected from the rectum of the selected horses during the early hours of the day (between 6am – 8am) while owners restrained the animals. Each of the sample were collected into a clean Zip lock bag while wearing gloves, labeled accordingly. The samples were immediately conveyed to the Biology Laboratory of Department of Biology, Umaru Musa Yaradua University, Katsina for proper storage and further examination.

Laboratory analysis

Faecal samples collected were processed using the simple floatation and the formalin-ethyl acetate concentration techniques. The floatation technique was carried out as described by Soulsby (1982). 10 grams of NaCl was dissolved in 500 mL water contained in a beaker. For each of the faecal sample collected, 1 gram was emulsified with 3 to 4 ml of saturated salt solution in a 20ml conical glass test tube. The resultant faecal suspension was poured into another test tube. 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 test tube., ensuring contact with the filtrate. This was allowed to stand for 5 to 10 minutes to allow the parasite eggs to float. The slide was carefully removed and a cover slip was placed on the slide suspended sample and examined for geohelminth parasite under (10x) objective lens of a microscope. Morphological features of the parasites were identified following the guideline provided (WHO 1994; Cheesbrough 1995; Mbong Ngwese *et al.* 2020).

Data Analysis

The data collected from the study animals were recoded and entered in a Microsoft Excel sheet. All statistical analyses were carried out using SPSS version 22 for windows. The association between prevalence of each studied parasite and the study variables (age, sex, and body condition) were analysed using Chi-square test. In all the analyses, confidence level was held at 95%.

RESULTS

From the 135 faecal samples (47%) were positive for different helminthic parasites. These included *Strongylus vulgaris* (61.3 %), *Anoplocephala spp.* (10.3 %), *Parascaris equorum* (24.1 %) and *Oxyris equi* (33.2 %) (Figure 2.0). Infection with species of parasitic protozoans were also observed (Figure 1.0) to be of relevant impotent, of which *Eimeria spp.* (64.3 %) was more frequent followed by *Fasciola spp.* (29.9 %) (Figure 3.0). Mixed infections were detected in (15%) of the examined horses. From the results obtained in Table 1.0 the highest prevalent parasite among the horses with ideal body condition was *Eimeria spp.* (15.1 %) and the least prevalent was *O. equi* (4.0 %).

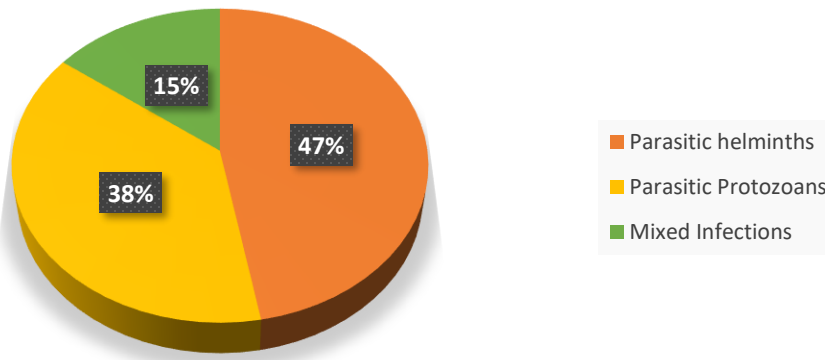


Figure 1. Prevalence of gastrointestinal parasites from horses examined

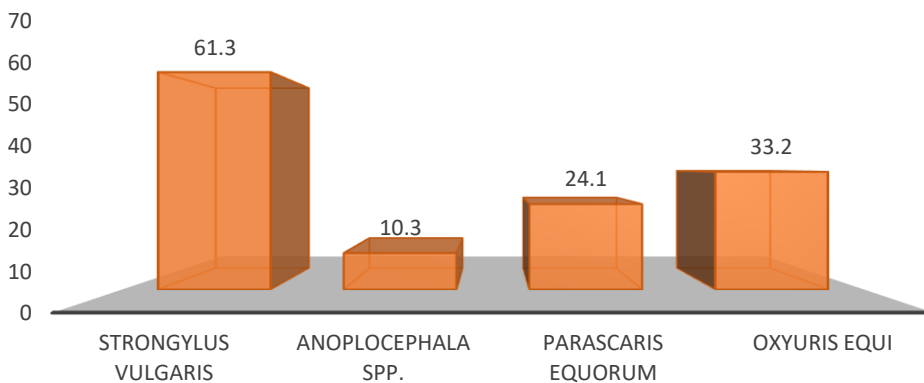


Figure 2. Prevalence of parasitic gastrointestinal helminths from horses examined.

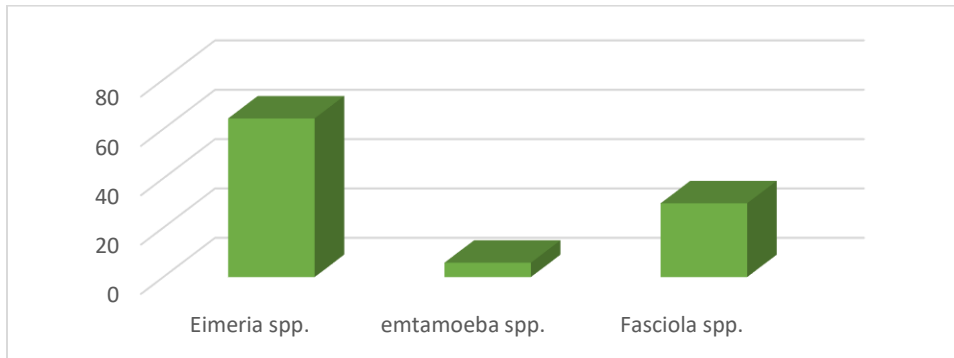


Figure 3. Prevalence of parasitic gastrointestinal protozoans from horses examined

From the results obtained in Table 1.0 the highest prevalent parasite among the horses with ideal body condition was *Eimeria spp.* (15.1%) and the least prevalent was *O. equi* (4.0%). Similarly, in horses with Poor Body Condition the highest Prevalent Parasite was *Strongylus* (37.2 %) and least was *Entamoeba spp.* (7.2 %). Statistical significant difference ($P < 0.05$) was observed in prevalence of all the gastrointestinal parasites examined between the body conditions (Table 1.0). Among the adults (> 2 years) *Strogylus spp.* (33.4 %) and *Entamoeba spp.* (4.1 %) were the highest and lowest respectively, while among the young cults the highest prevalent parasite was *Eimeria spp.* (42.5 %) and the lowest was *Anoplocephala* (0.5 %). There was a statistically significant difference in the prevalence of all the

identified parasites ($P < 0.05$) (Table 2.0), however no statistical difference was observed from the effect of age on the prevalence of *Entamoeba spp.* ($P > 0.05$). The prevalence of all the gastrointestinal parasites (helminthes and protozoans) in both sex groups as determined by the coproscopy technique employed. In females *Strongylus spp.* (52.5%) and *Anoplocephala* (3.2 %) were the highest and lowest respectively, also in males *Strongylus* (54.2 %) and *Anoplocephala* (3.3 %) were the highest and lowest respectively (Table 3.0). There was statistically significant difference in the prevalence of *P.equorum* with sex of horses ($P < 0.05$) However, the effect of sex on the prevalence of other identified parasites was statistically not significant ($P > 0.05$).

Table 1. Prevalence of different parasites recovered from coprological examination in relation to body condition scores of the examined horses

Parasites	Ideal	Poor	χ^2	P - Value
<i>Strongyluss pp.</i>	14.4%	37.2 %	10.31	0.000
<i>P. equorum</i>	7.0 %	16.3 %	12.56	0.001
<i>Anoplocephala</i>	11.2 %	36.4 %	22.43	0.000
<i>O. equi</i>	4.0 %	17.1%	9.21	0.003
<i>Eimeria spp.</i>	15.1 %	22.8 %	8.15	0.002
<i>Fasciola spp.</i>	10.0 %	33.1%	5.93	0.004
<i>Entamoeba spp.</i>	5.6 %	7.2 %	2.94	0.003

Table 2: Prevalence of parasites in relation to age of the examined horses

Parasites	Young < 2 years	Adult > 2 years	χ^2	P - Value
<i>Strongylus spp.</i>	22.6%	33.4 %	21.26	0.004
<i>P. equorum</i>	0.5 %	8.4 %	8.47	0.003
<i>Anoplocephala</i>	71.2%	31.4 %	6.85	0.000
<i>O. equi</i>	6.7 %	24.6 %	4.46	0.001
<i>Eimeria spp.</i>	42.5 %	32.1 %	9.41	0.000
<i>Fasciola spp.</i>	12.2 %	15.6 %	2.91	0.002
<i>Entamoeba spp.</i>	3.4 %	4.1%	0.71	1.023

Table 3: Prevalence of parasites in relation to sex of the examined horses

Parasites	Male	Female	X ²	P - Value
<i>Strongylus pp.</i>	52.5 %	54.2 %	0.344	0.003
<i>P.equorum</i>	3.2 %	3.3 %	0.211	0.005
<i>Anoplocephala</i>	40.8 %	42.5 %	0.143	1.452
<i>O. equi</i>	7.3 %	7.6 %	0.231	0.000
<i>Eimeria spp.</i>	49.7 %	51.6 %	0.473	0.000
<i>Fasciola spp.</i>	13.5 %	14.3 %	0.324	0.000
<i>Entamoeba spp.</i>	4.7 %	4.8 %	0.142	0.000

DISCUSSION

The results of this study further confirms that parasitic helminths and protozoan infections are prevalent among horses reared with in Katsina metropolis. However, the overall prevalence of 47% and 38% reported in this study is lower than that of previous studies conducted in Nigeria, where 70.8% and 76.1% prevalences were reported by Umar *et al.* (2013) and Wosu & Udobi (2014) in their respective studies conducted in Kaduna and Abuja. Lower prevalence of 28.57% has been reported in Romania (Bulgaru & Tudor, 2016). The differences in the prevalence could be attributed to the season of sampling, climatic and environmental differences, management practice, level of stable hygiene, breeding-related conditions, diagnostic technique carried out and nutritional and immune status of the studied horses. Also, differences in the environment-host interaction, environment-parasitic interaction and host-parasite interaction (Belete & Derso, 2015) may have contributed to the varying prevalence rates.

Nematodes were the most numerous and prevalent gastrointestinal parasites detected in our study with *Strongylus spp.* being the most prevalent among all. Nematodes have been reported to be the most numerous, prevalent, common and most diverse group of gastrointestinal helminths of horses (Bulgaru & Tudor, 2016). The fact that *Strongylus spp.* was the most prevalent parasite in our study concurs with reports from previous researchers in Nigeria (Wosu & Udobi, 2014), Pakistan (Khan *et al.*, 2017) and Nepal (Oli & Subedi, 2018). The high prevalence of nematodes (*Strongylus spp.*) recorded may be due to the direct life cycle of this group of helminths where an intermediate host is not required, thereby making infection easier and completion of lifecycle faster (Jürgenschellert *et al.* 2022). *Strongylus edentatus*, *Strongylus vulgaris* and *Strongylus equinus* are the *Strongylus* species known to infect horses and they are worldwide in distribution. *Strongylus equinus* is known to be the relatively least prevalent and least

abundant among the other members of the genus (Taylor *et al.*, 2016).

The prevalence of gastrointestinal parasites was generally higher in female than male horses. This may be due to physiological activities, gestation, and lactation of the females which might lower their immunity. The lower infestation noticed in the male can be due to lack of exposure to sources of contamination. This agrees with the studies of Konigova *et al.* 2021 and Love (2023) whose reported that many intrinsic factors such as sex, age, breed and extrinsic factors like management, climate and parasite control programme influence the prevalence of parasites of domestic animals.

Body condition score is a reliable sign of parasitic burden and can serve as a useful indicator to identify horses that require an immediate attention against gastrointestinal parasitic infections (Samuel *et al.*, 2015). In relation to this, we observed that horses with poor body condition score were having greater faecal egg load than horses with better body condition score. These findings may be attributed to the activities of gastrointestinal parasites in the digestive tracts of horses depriving them of adequate absorption and assimilation of digested nutrients resulting in emaciation and cachexia.

CONCLUSION

Despite the attention given to horse management in Nigeria as compared to domestic livestock, the prevalence of gastrointestinal parasites in horses reared within Katsina metropolis is observed to be of significant concern. The present study provides valuable insights into the prevalence and factors influencing gastrointestinal parasites in horses, contributing to the broader understanding of equine health management.

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