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Full Length Research Article

Prevalence of Gastrointestinal Helminths Species in Cattle Raised at Federal University of Agriculture, Abeokuta, Ogun State, Nigeria

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ABSTRACT
Helminths are worm-like parasites that live in the gut of animals or humans that feed on the host to obtain nourishment and protection, sometimes causing morbidity and mortality if not treated. This study was conducted to determine the prevalence of Gastrointestinal Helminths Species in Cattle at the Federal University of Agriculture, Abeokuta, Ogun State. Faecal sedimentation methods were carried out to detect the presence of parasitic infections. Faecal egg and oocyst counts were carried out using the McMaster technique. A total of 72 (100%) fecal samples consisting of 52 (72.2%) females and 20 (27.80%) males were examined. McMaster has an overall prevalence of 40(55.5%), and 2 (2.8%) Strongyloides and Monienzia sp. while sedimentation techniques show the prevalence of 38(52.8%) and 1(1.4%) Paramphistomium sp. Trichuris and Haemonchus sp. No significant differences ($p < 0.05$) in the occurrence of parasitic helminths in the samples with respect to locations and techniques used. Fecal samples were examined among the sexes, females had 2(10.0%) and age group >18 years with 2(3.2%) co-infected with helminths. Across the breed, white Fulani had 2(3.2%) mixed infections compared to other breeds. The study revealed that GIT parasitic helminths infections prevalence is common among white Fulani cattle probably due to open grazing and scavenging. There is a need to sensitize nomads on deworming to mitigate the GIT infections and improve animal health status.
Keywords: Prevalence, Helminths, Infections, Cattle, Ogun State

INTRODUCTION
Rearing of Cattle represents a treasured in both traditional and modern agriculture; they provide meat, milk, skin, and draught power. In certain parts of Nigeria, cattle owners cogitate wealth and position. Although, the productivity and income-earning from cattle production have persisted to decrease due to various reasons including parasitic infections Marskole *et al*. (2016). Nigeria has a population of 13.9 million cattle, the greater proportion of these animals' population is however greatly concentrated in the northern region of Nigeria (Lawal-Adebowale, 2012). Apart from the cattle as an asset, cattle are infected with gastrointestinal parasites specifically helminths (Anaeto *et al*., 2009). Prevalence studies of GIT have been carried out in different geographical regions of Nigeria (Adedipe *et al.,* 2014; Oluwole *et al.,* 2016; Karaye *et al.,* 2018; Lemy and Egwunyenga (2017). The majority of these parasites is soil-transmitted and cause GIT infections following ingestion of pasture or water infected with their eggs (Inclan-Rico *et al.,* 2018). GIT infections are identified as the greatest limitation to livestock production in both small- and large-scale cattle farmers but their significance is greater, especially in sub-Saharan Africa and Nigeria. This is due to the obtainability of diversified host and parasite species (Morales *et al.,* 2000). The objective of the study was to examine the Prevalence of Gastrointestinal Helminths Species in Cattle Raised in the Directorate of University Farms (DUFARMS) and the College of Veterinary Teaching Hospitals (COLVET) Federal University of Agriculture, Abeokuta, Ogun State, Nigeria.

MATERIALS AND METHODS
Study Area
The study area is located on latitude 70 30' N and longitude 30 54' E. It lies within the humid lowland rainforest region with two distinctive seasons. The wet season extends from March to October while the dry season extends from November to February. The vegetation has the characteristics of a tropical rain forest such as high forest and growth of massive trees and twinning shrubs. The forest is covered with a litter of fallen trees by both anthropogenic and natural activities (Ufoegbune and Fabiyi 2016).

Sample Collection and Sample Size
A cross-sectional study was conducted at the Directorate of University Farms (DUFARMS) and College of Veterinary Teaching Hospitals (COLVET) Federal University of Agriculture, Abeokuta, Ogun State, in August – December 2020. The fresh fecal samples were collected very early in the morning when the cattle were still in their pen, through the rectum, using sterile surgical gloves that were then turned inside out to contain the sample. Samples were labeled with a unique identification number encoding area, age (categorized as young 6–18 months and adult above 18 months) sex, herd identity, and sample number before storing them in ice packed cool box and transported to the Parasitology Laboratory, College of Veterinary Medicine, for microscopic examination. A total of 75 cattle from two study areas were randomly selected in which, 45 and 30 fecal samples were collected at COLVET and DUFARMS respectively.

Parasitological Examination

Faecal sedimentation was carried out according to Foreyt (2001). 5 g of faeces was mixed with 200 ml of water in a beaker and poured the mixture into a new beaker through a sieve. After 10 mins, approximately 70% of the supernatant fluid in the beaker was discarded and refilled the beaker with water. This step was repeated 3-5 times until the supernatant fluid was clear. Approximately, 90% of the supernatant fluid was discarded. Finally, one drop of the sediment was placed on the glass slide, and a coverslip was placed on the glass slide and examined under a microscope. For the McMaster method, 3 g of faeces was mixed in 15 ml of water and filtered through a sieve. The solute was poured into a 15 ml tube and centrifuged at 1500 rpm for 10 mins. The supernatant fluid in the tube was discarded and filled with a saturated sugar solution. The tube was centrifuged at 1500 rpm for 10 mins. Then, the tube was stood with a rank; the sugar solution was filled with a pipette and waited for 30 mins to float the parasite eggs and oocysts. The supernatant fluid was transferred with a pipette into both sides of a McMaster counting chamber. The number of eggs or oocysts in both chambers was counted and multiplied by 50 for the total number of either eggs or oocysts per gram of faeces according to Soulsby (1982).

Statistical Analysis

Data were subjected to descriptive statistical analysis using percentages in determining the prevalence rates in the different sex, breeds, age's group and locations. Prevalence of helminthiasis in relation to sex, breeds, age's group and locations was analyzed using Chi-square statistical test**.**

RESULTS

Prevalence of GIT Helminth infections in Cattle in the Selected Farms

The overall prevalence of GIT helminth infection in cattle in the study area was 41 (56.9%). Of the 41 cattle infected with parasites 29 (55.5%) were males and 12 (60.0%) females, 5 (55.6%) were <18 months old while 36 (57.1) were >18 months. The distribution of the infected cattle by breed shows that 1 (33.3%) Muturu, 6 (100%) Ndama and 34 (54%) White Fulani were infected. A total of 27 (62.8%) cattle at COLVET and 14 (48.3%) cattle at DUFARMS were infected. However, there was no significant difference between sex and infection rate (p = 0.252), age group (p = 0.268) and breed (p = 0.103) (Table 1).

Table 1: Prevalence of helminth infection among breed of cattle in COLVET and DUFARMS

		NE (%)	NI (%)	*p*-value
Sex	M	52 (72.0)	29 (55.5)	
	F	20 (27.8)	12 (60.0)	0.252
	Total	72 (100)	41 (56.9)	
Age	<18	9 (12.5)	5 (55.6)	
	18+	63 (87.5)	36 (57.1)	0.268
	Total	72 (100)	41 (56.9)	
Breed	Muturu C	3 (4.2)	1 (33.3)	
	Ndama C	6 (8.3)	6 (100)	0.103
	White Fulani	63 (87.5)	34 (54)	
	Total	72 (100)	41 (56.9)	
Location	Vet	43 (59.7)	27 (62.8)	
	Du	29 (40.3)	14 (48.3)	0.020
	Total	72 (100)	41 (56.9)	

NE = Number of cattle examined, NI= Number of cattle infected, Muturu C = Muturu cross, Ndama C = Nadama cross; vet = COLVET farm; Du = DUFARMS

The results of McMaster Method of parasite detection as presented in Table 2 indicate that 29 (55.8%) males and 11 (55%) females were infected with *Strongyle sp*, which suggest high prevalence of strongyle sp infection especially among the older cattle (> 18 months). The results also indicate that 34 (54%) white Fulani and 5 out of the 6 Muturu breeds were exposed to strongyle infections. Occurrence of strongyle sp infection was mostly observed in the COLVET farm (62.8%). The frequency of *Moniezia sp* infection or co-infection was generally low across specie or farm location.

The result for sedimentation method as shown in Table 3 also indicate that male cattle (72%) were mostly infected with strongyle spp (53.8%) when compared with females. All 6 Ndama and 49.2% of white Fulani cattle examined were the commonly infected breed respectively while infection occurrence rate was higher in COLVET farms (60.5%) when compared with DUFARMS (41.4%). The sedimentation method detected more helminth species including *Paramphstomim sp*, *Haemonchus* sp, *Trichuris sp* and Fasciola *sp*. The distribution of helminth infection

across ages shows that ages <18 months had 4(44.4 %) of *Strongyle sp.* 1(11.1%) of *Paramphstomim sp* while ages >18 months has 32(50.8%) *Strongyle sp.* 1(1.6%) *Haemonchus sp,* 3(4.8%) *Paramphstomim sp.* 1(1.6%) *Trichuris sp.* has 1(11.1%) and 2(3.2%) co – infections, respectively.

The two parasitological techniques used for the examination of the fecal samples for Helminth identification, McMaster's technique has a higher prevalence of *Strongyle* infection in 40 cattle with 55.5%, 2 (2.8%) are infected with Moniezia sp., while the sedimentation method detected 38 (52.8%) infected with *Strongyle sp*. and 1 (1.4%) of Trichuris sp. 1 (1.4%) of *Fasciola sp*. and 4 (5.6%) of *Paramphistomium sp*. as in Figure 1.

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Table 2: Detection of GIT helminths using McMaster Method

		NE (%)	*Strongyle* (%)	Monienza (%)	Co-infection (%)	*p*-value
Sex	F	20 (27.8)	11 (55)	1 (5.0)	0 (0.0)	
	M	52 (72.2)	29 (55.8)	1 (1.9)	1 (1.9)	0.029
	Total	72 (100)	40 (55.6)	2 (2.8)	1 (1.4)	
Age	<18	9 (12.5)	5 (55.5)	0 (0.0)	0 (0.0)	
	18+	63 (87.5)	35 (55.5)	2 (3.2)	1 (1.6)	0.622
	Total	72 (100)	40 (55.6)	2 (2.8)	1 (1.4)	
Breed	Muturu C	3 (4.2)	1 (33.3)	0 (0.0)	0 (0.0)	
	Ndama C	6 (8.3)	5 (83.3)	1 (16.6)	0 (0.0)	0.022
	White fulani	63 (87.5)	34 (54)	1 (1.6)	1 (1.6)	
	Total	72 (100)	40 (55.6)	2 (2.8)	1 (1.4)	
Location	Vet	43 (59.7)	27 (62.8)	1 (2.3)	1 (2.3)	
	Du	29 (40.3)	13 (44.8)	1 (3.5)	0 (0.0)	0.028
	Total	72 (100)	40 (55.6)	2 (2.8)	1 (1.4)	

NE = Number of cattle examined, NI= Number of cattle infected, Muturu C = Muturu cross, Ndama C = Nadama cross; Vet = COLVET farm; Du = DUFARMS

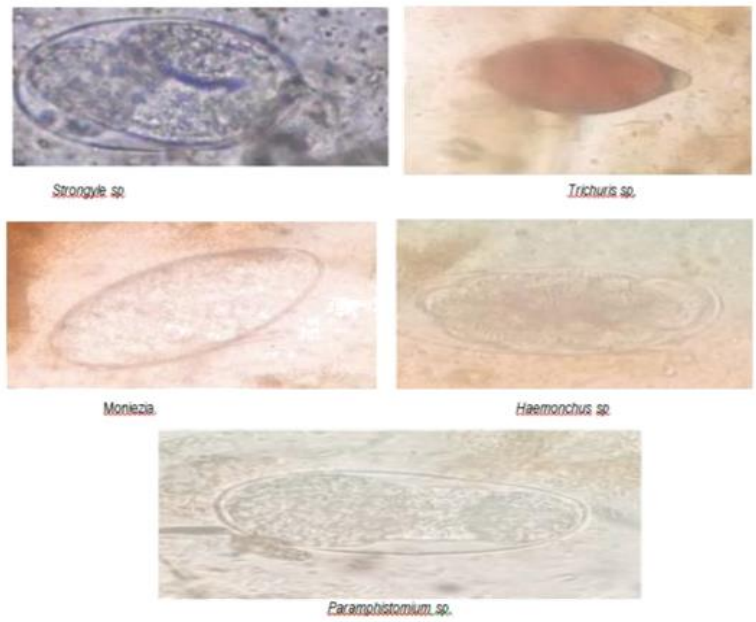

Plate 1: Species of helminths detected among cattle in the selected farms

DISCUSSION

The breed of cattle recorded in our study has been reported to be raised in Southwest Nigeria, with White breeds of cattle been most predominant breeds. While, White Fulani breeds has more prevalence of helminths infections of 54%, Muturu cross 4.2% follow by Ndama cross respectively. Poor educational background, grazing habits and negligence of sign and symptoms of GIT infections among cattle owners in Africa especially in Nigeria, remains a great problem in livestock which predisposing cattle and other ruminants to GI helminths infections. Therefore, its affects feed intake, growth rate, fertility, meat and milk production morbidity and mortality in cattle globally. In the present study, the overall prevalence of GITIs DUFARMs and COLVET was 48.3% and 62.8% indicating that the infections were quite common in the study area. The prevalence of GITIs documented in this study was similar to Adedipe *et al.* (2014) in Ibadan which reveal *Strongyloides* type eggs were most prevalence among the helminthes. Sex of animal is vital index in the epidemiology of parasitic diseases (Yahaya and Tyav, 2014; Paul *et al.,* 2016). This study reveals that both male and female animals have equal possibility of being infected with GITIs (helminths), but male are more infected to female cattle. This prevalence seen in male cattle could be ascribed to continually used of male cattle for agricultural farming work and move in search for food from place to place and in the process get infected or co-infected with helminths parasite. The study documented that *Strogyloides* were more common in young cattle these findings subscribe with Maharana *et al.* (2016) and Khan *et al.* (2017) that young animals are more vulnerable to parasitic infections than the adults. According to Radostits *et al.al.* (1994), reported that young animals are more exposed to parasitic infections as long as adult animals develop some degree of immunity on exposure to GITIs during grazing.

CONCLUSION

The study confirms that most of the cattle especially the white Fulani harbored multiple gastrointestinal helminth parasites in DUFARMs and COLVET farms with a high prevalence of Stronglyes species. There is therefore the need for periodic use of anthelmintics, regular deworming of cattle, quarantine services for newly acquired cattle and hygiene practices for improved health management in cattle husbandry.

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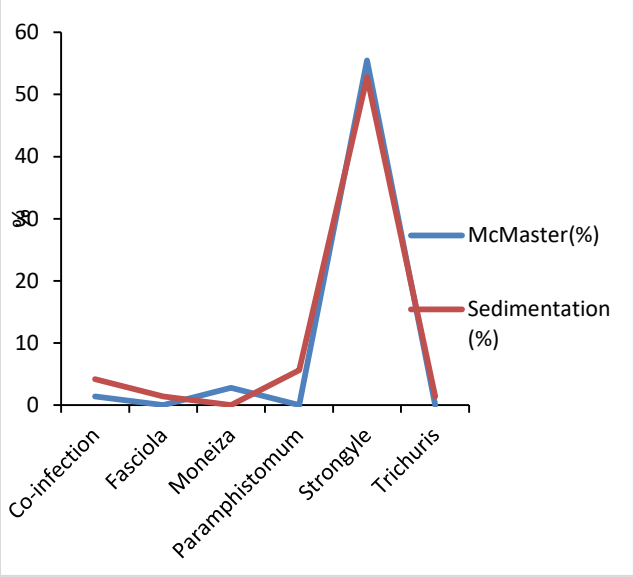

Figure 1: Co-infection parasites species detected among screened cattle in selected farms using the McMaster and sedimentation methods

Table 3: Detection of GIT helminth using sedimentation technique

		NE (%)	*Strongyle* (%)	*Fasciola* (%)	*Paramphstomium* (%)	*Trichuris* (%)	Co-infection	*p*-value
	F	20 (27.8)	10 (50.0)	0 (0.0)	3 (15)	1 (5.0)	2 (10%)	
Sex	M	52 (72.2)	28 (53.8)	1 (1.9)	1 (1.9)	0 (0.0)	1 (1.9)	0.207
	Total	72 (100)	38 (52.8)	1 (1.4)	4 (5.6)	1 (1.4)	3 (4.2)	
	<18	9 (12.5)	4 (44.4)	0 (0.0)	1 (11.1)	0 (0.0)	1 (11.1)	
Age (months)	18+	63 (87.5)	32 (50.8)	1 (1.6)	3 (4.8)	1 (1.6)	2 (3.2)	0.298
	Total	72 (100)	38 (52.8)	1 (1.4)	4 (5.6)	1 (1.4)	3 (4.2)	
	Muturu C	3 (4.2)	1 (33.3)	0 (0.0)	1 (33.3)	0 (0.0)	1 (33.3)	
	Ndama C	6 (8.3)	6 (100)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	
Breed	White Fulani	63 (87.5)	31 (49.2)	1 (1.6)	3 (4.8)	1 (1.6)	2 (3.2)	0.189
	Total	72 (100)	38 (52.8)	1 (1.4)	4 (5.6)	1 (1.4)	3 (4.2)	
	Vet	43	26 (60.5)	1 (2.3)	1 (2.3)	0 (0.0)	1 (2.3)	
Location	Du	29	12 (41.4)	0 (0.0)	3 (10.3)	1 (3.5)	2 (6.9)	0.104
	Total	72 (100)	38 (52.8)	1 (1.4)	4 (5.6)	1 (1.4)	3 (4.2)	

NE = Number of cattle examined, NI= Number of cattle infected, Muturu C = Muturu cross, Ndama C = Nadama cross; vet = COLVET farm; Du = DUFARMS

REFERENCES

Adedipe, O. D., Uwalaka, E. C, Akinseye, V. O., Adediran, O. A. and Cadmus, S. B. (2014). Gastrointestinal Helminths in Slaughtered Cattle in Ibadan, South-Western *Nigeria. Journal of Veterinary Medicine,* 2014:92356.

Anaeto, M. B., Tayo, G. I., Chioma, G. O. and Afolabi, A. A. (2009). Comparative study of Albendazole and C. papaya seed on the control of gastrointestinal nematodes in goats. *Journal of Life and Physical Sciences,* **3**(1): 25-28.

Foreyt, W. J. (2001). Veterinary Parasitology Reference Manual, Wiley-Blackwell, Iowa State, USA, 5th Edition.

Inclan-Rico, M. J. and Siracusa, M. C. (2018). First responders: Innate Immunity to Helminths. *Trends Parasitology,* **34**:861-880.

Karaye, P. G., Ola-Fadunsin, S. D. and Dogo, G. A. (2018). Diversity of gastrointestinal parasites affecting some domestic animals in Plateau State, North Central Nigeria. *Science World Journal*,**13**(1):82–86.

Khan, M. N., Muhammad, S. S., Hafiz, M. R., Abdul, Q., Rao, Z. A., Muhammad, R. and Muhammad K. K. (2017). Comparative Efficacy of Six Anthelmintic Treatments against Natural Infection of Fasciola Species in Sheep. *Pakistan Veterinary Journal,* **37**: 65-68.

Lawal-Adebowale, O. A. (2012). Intech- Dynamics of Ruminant livestock management in the context of the *Nigerian Agricultural System,* **4**: 61-80.

Lemy, E. E. and Egwunyenga, A. O. (2017). Prevalence of parasitic helminthes from feacal samples of cattle at various abattoirs in Abraka, Delta State, Nigeria. *Journal of Animal Health Behavoural Science*; **1**:107.

Maharana, B. R., Binod, K., Sudhakar, N. R. Behera, S. K. and Patbandha, T. K. (2016). Prevalence of gastrointestinal parasites in bovines in and around Junagadh (Gujarat) *Journal of Parasitic Diseases,* **40**:1174–1178.

Morales, M. A., Luenge, J. and Vasquez, J. (2000). Distribution and prevalence of roundworms in male animal in Chile. *Parasitology-aldia,* **24**(3&4):115-118.

Marskole, P., Verma, Y., Dixit, A.K. and Swamy, M. (2016). Prevalence and burden of gastrointestinal parasites in cattle and buffaloes in Jabalpur, *India. Veterinary World*, **9**(11):1214–1217.

Oluwole, A. S., Adeniran, A. A., Mogaji, H. O., Shittu, E. O., Alabi, O. M., Odoemene, S. and Ekpo, U. F. (2016). Survey of gastrointestinal parasites among nomadic cattle herds in Eruwa, Oyo State, Southwestern Nigeria. *Annual Research and Review in Biology,* **2016**;10(6):1–7.

Paul, B. T., Kyari, F., Gadzama , M. A., Zango, M. K. Ejeh, E. F., Ndahi, J. J. and Mana, H. P. (2016). Gastrointestinal helminths and external parasites of domestic rats trapped from residential areas within Maiduguri Municipality, Nigeria. *Sokoto Journal of Veterinary Sciences,* **14**(1): 10-14.

Radostits, O.M., Blood, D.C and Gay, C.C. (1994) Veterinary Medicine. A text book of the disease of cattle, sheep, pigs and horses, 8th Edition.1226-1235.

Soulsby, E. J. W. (1982). Helminths, Arthropods and Protozoa of Domesticated Animals. 7thEdn. Lea and Febiger, Philadelphia: BaillereTindall, London, 212-258.

Ufoegbune, G. C. and Fabiyi, S. (2016). Identification of Land Areas Suitable for Fadama Farming at Federal University of Agriculture, Abeokuta, Nigeria using GIS.*Journal of Applied Science and Environmental Management,* 20 (4): 1027 – 1032.

Yahaya, A. and Tyav, Y. B. (2014). A Survey of Gastrointestinal Parasitic Helminths of Bovine Slaughtered in Abattoir, Wudil Local Government Area, Kano State, Nigeria. *Greener Journal of Biological Sciences,***4**(4):128-134.