



## Prevalence of gastrointestinal nematodes of cattle slaughtered at the lugbe slaughter slab, federal capital territory (FCT), Abuja

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**How to cite this article:** Lilian. O.A. et al. Prevalence of gastrointestinal nematodes of cattle slaughtered at the lugbe slaughter slab, federal capital territory (FCT), Abuja. Veterinary Medicine and Public Health Journal 1(3); 2020: 127-131.

**DOI:** <https://doi.org/10.31559/vmph2020.1.3.11>

**Received Date:** 15/7/2020

**Accepted Date:** 16/8/2020

### Abstract

Gastrointestinal nematodes (GIN) are known to be major constraint to cattle well-being and productive performance worldwide. Their prevalence in Abuja Municipal Area Council (AMAC), Abuja is not well studied. This study was carried out to investigate the prevalence of nematodes of cattle slaughtered at the Lugbe slaughter slab of the Federal Capital Territory, Abuja, Nigeria. Between the months of November 2017 and March 2018, a total of two hundred (200) faecal samples were collected and analysed using direct and floatation methods. Of these, 66 (33%) were infected with gastrointestinal nematode parasites. Five (5) genera of nematodes were identified; *Ascaris* spp, 24 (36.4%); *Strongyles* spp, 20 (30.3%); *Trichostrongylus* spp, 10 (15.2%); *Nematodirus* spp, 8 (12.1%) and *Trichuris* spp, 4 (6.1%). Mixed infection of these parasites involved oocysts which accounted for 27 (13.5%) and was statistically significant ( $p < 0.05$ ). In relation to sex, prevalence in female (55%) were higher than male (28%), while adults had higher prevalence (36.4%) than in the young (29.9%). The prevalence rate of nematode parasite ova was higher in both female and young cattle than the male and adult cattle, respectively. There was no statistical difference ( $P > 0.05$ ) between the age of cattle and prevalence of nematode parasites. Statistical results showed no association ( $P > 0.05$ ) between the nematode parasite ova and the months which the cattle were slaughtered. However, there was an association ( $P < 0.5$ ) between the prevalence of nematode parasites and the sex of the cattle. Our findings revealed that there were GIN in the screened animals. Appropriate nematode parasites control measures using novel and sustainable approaches including sustainable integrated parasite management (SIPM) have been recommended.

**Keywords:** Lugbe; Nematodes; Nigeria; Floatation; Sedimentation.

### 1. Introduction

Cattle production in Nigeria with a population of about 14 million, is the largest in the west African region, and over 90% of this population is concentrated in the northern part of the country (Lawal-Adebowale 2012; Presicce 2020). Cattle is a

major source of protein and served during ceremonies; their dung also serve as manure for agricultural productions and even as survival kit for the nomadic people (Olubukola et al. 2014; Imo 2017). The growth, physical development and well being of cattle in Nigeria is often hampered by



helminthic infections including nematodes (Karshima et al. 2018; Sanda et al. 2019).

Gastrointestinal nematodes (GIN) pose a great burden on the health of animals leading to significant production and economic losses to the animals and farmers, respectively (Charlier et al. 2015). The most common nematodes present in cattle in Nigeria include; *Haemonchus* spp, *Oesophagostomum radiatum*, *Nematodirus* spp, *Ostertagia* spp, *Toxocara* spp, *Ascaris* spp, *Trichuris* spp, *Trichostrongylus* spp and *Strongylodes* spp (Chiejina 1994; Dogo et al. 2017; Singh and Bello 2017). Of these, *Ostertagia* spp and *Haemonchus* spp are considered the most pathogenic and economically important nematode parasites of cattle worldwide (Chiejina 1994). The variation in the transmission patterns of the gastrointestinal nematodes is dependent on the particular climate in the geographic location and environment they exist (Roeber et al. 2013).

Previous studies revealed significant evidence on the impact of nematode infections on the health and productivity of cattle in Nigeria (Jegade et al. 2013; Agbajelola et al. 2015; Sylvia et al. 2015; Afolabi et al. 2017; Lemy and Ekwunye 2017; Dogo et al. 2017 and Yohanna et al. 2019). However, to the best of our knowledge, there are no published studies investigating the prevalence of nematode infections among cattle slaughtered at Lugbe slaughter slab, Abuja Municipal Area Council (AMAC), Nigeria. Providing information on nematode among slaughtered cattle would assist in the design of an effective strategic control measures to improve health conditions and productivity in cattle. This study therefore investigated the prevalence of gastrointestinal nematodes of cattle slaughtered at the Lugbe slaughter slab, Federal Capital Territory (FCT), Abuja.

## 2. Materials and methods

### Study area

This study was carried out in Lugbe, Abuja Municipal Area Council (AMAC) of the Federal Capital Territory, Abuja. Lugbe is located between latitudes 08 55'N to 09 00N and longitudes 07 19'E to 07 26' covering an area of about 50 km of the Greenwich meridian. The relative humidity varies in the area due to seasonal variations. The temperature ranges between 30– 37°C annually with the highest temperature experienced in the month of March/April and with a mean total rainfall approximately 1,650 mm per annum (NPC 2006).

### Study population

Two hundred (200) cattle including males and females were sampled and examined between the months of November 2017 and March 2018. Visual observations of the cattle were made and were categorized into two major body conditions involving poor and good (Nicolson and Butterworth 1986). Poor body conditioned cattle had prominent

dorsal spines pointed to the individual visible transverse processes whereas the good body conditioned cattle had flesh cover easily seen in critical areas and transverse processes were not felt. Sex (whether male or female determined by their genitalia), age of the animals was estimated by their dentition (Abegaz and Awgichew 2009) classifying > 2 years as young while cattle < 2 years of age were classified as adults. There was no proper information on the breeds and history of deworming.

### Sample collection

Faecal samples were collected from the rectum of randomly selected cattle at the point of slaughter. All collected faeces were stored in plastic containers containing about 2 ml of prepared 10% formalin added to avoid hatching of the eggs, labeled appropriately prior to transportation to the Parasitology laboratory, Faculty of Veterinary Medicine, University of Abuja. On each of the animals screened, parameters such as body condition score, breed and sex were recorded.

### Faecal examination

Faecal samples were examined using direct smear and standard floatation techniques using saturated solution of sodium chloride (NaCl), prepared with a specific gravity of 1.20 was used, in recovering the eggs/ova of the parasite. All eggs were identified on the basis of their morphological features as described by (Soulby 1986).

### Data analysis

Data obtained from this study were tabulated accordingly for easy assessment. All analyses were done using Statistical Package for Social Sciences (SPSS) version 16. They were subjected to descriptive statistical analysis using simple percentages in determining the prevalence rates in the different parasites (nematode ova), months, sex, age, and body conditions score was analyzed using Chi-square statistical test, the level of significance was set at  $P < 0.05$ .

## 3. Results

Out of the 200 cattle examined, 66 (33.0%) of them were infected with GIN. The highest prevalence was recorded against *Ascaris* spp 24 (36.4%), followed by *Strongylus* spp, 20 (30.3%), while the least prevalence was recorded against the genus *Trichuris* spp 4 (6.1%) (Table 1).

**Table (1):** Overall prevalence of nematode parasites in cattle slaughtered at the Lugbe slaughter slab in relation to months (n=200)

	Nov. (N = 40)	Dec. (N = 50)	Jan. (N = 40)	Feb. (N = 40)	Mar. (N = 30)	Total (N = 200)
<b>Genera</b>	<b>No. (%) infected</b>					
<i>Trichostrongylus</i> spp	5 (29.4)	2 (15.4)	2 (12.5)	0 (0)	1 (7.7)	10 (15.2)
<i>Strongylus</i> larva	5 (29.4)	5 (76.9)	6 (37.5)	0 (0)	4 (30.8)	20 (30.3)
<i>Nematodirus</i> spp	2 (11.8)	0 (0)	2 (12.5)	3 (42.9)	1 (7.7)	8 (12.1)
<i>Ascaris</i> spp	4 (23.5)	6 (46.2)	5 (31.2)	2 (28.6)	7 (53.8)	24 (36.4)
<i>Trichuris</i> spp	1 (5.9)	0 (0)	1 (6.3)	2 (28.6)	0 (0)	4 (6.1)
<b>Total</b>	<b>17 (25.8)</b>	<b>13 (19.7)</b>	<b>16 (25.4)</b>	<b>7 (10.6)</b>	<b>13 (19.7)</b>	<b>66 (33.0)</b>

The highest prevalence was recorded in the month of November (25.8%), January, (25.4%) and 19.7% for the months of march and December. The least occurrence of nematode infection was in the month of February. However, there was no association between the prevalence of nematode parasites and the months in which cattle were slaughtered ( $P > 0.05$ ) (Table 2).

**Table (2):** Monthly distribution in relation to body condition of cattle slaughtered at the Lugbe slaughter slab

Month	Number sampled	Number with poor Nourishment	Frequency (%)	Number with good nourishment	Frequency (%)
November	40	4	2	36	18
December	50	4	2	46	23
January	40	3	1.5	37	18.5
February	40	7	3.5	33	16.5
March	30	6	3	24	12
<b>Total</b>	<b>200</b>	<b>24</b>	<b>12</b>	<b>176</b>	<b>88</b>

Table 3 revealed that of the 200 faecal samples taken from the cattle, 158 were males while 42 were females. The overall positive male samples were 45 with a prevalence of 28.5% while the overall positive female samples were 23 with a prevalence of 54.8%. Therefore the prevalence of nematode parasite in relation to sex in the study was found to be higher in female than male. The statistical analysis however showed an association between the sex of the cattle and the prevalence of nematode parasites ( $P < 0.05$ ). In relation to age, 36.4% of the infected  $> 2$  years while 29.9% were  $< 2$  years of age. There was no association between the age of the cattle and the prevalence of nematode parasites ( $P > 0.05$ ). Twenty-four (24), 12% had poor body conditions while the ones with good body conditions were (176) 88%.

**Table (3):** Overall prevalence of nematode parasites in cattle slaughtered at the Lugbe slaughter lab in relation to months

Variable	Category	Number examined	Number positive	Number negative	%Prevalence
<b>Sex</b>	Male	158	45	113	28.5
	Female	42	23	19	54.8
	<b>Total</b>	<b>200</b>	<b>68</b>	<b>132</b>	<b>32</b>
<b>Age</b>	$>2$ years	134	40	94	26.9
	$<2$ years	66	24	42	36.4
	<b>Total</b>	<b>200</b>	<b>66</b>	<b>136</b>	<b>34</b>
<b>Body condition score</b>	Good body condition	200	176	24	12
	Poor body condition	200	24	176	88

There was an association between the sex of the cattle and the prevalence of nematode parasites ( $P < 0.05$ ).

#### 4. Discussions

The 5 genera of gastrointestinal nematodes (GIN) obtained from the 200 cattle sampled at the Lugbe slaughter slab include; *Trichostrongyloides* spp, *Strongylus* spp, *Nematodirus* spp, *Ascaris* spp and *Trichostrongyloides* spp. *Ascaris* spp had the highest prevalence rate of infection while *Trichuris* spp had the lowest. The overall results of this study revealed that there is a moderate prevalence 66 (33.0%) of gastrointestinal nematodes.

However, the month of November had the highest nematode prevalence rate of 25.8%, followed by January (25.4%), March and December both had the prevalence rates of (19.7%), respectively. The least prevalence of nematode parasites was recorded against the month of February 7 (10.6%). This is contrary to the findings of Yohanna et al. (2012) who discovered significant difference with nematode parasites ova in the different months of sampling. This result is similar to the works carried out in Ibadan, South Western, Nigeria (Olubukola et al. 2014) and Abraka, Delta State, Nigeria (Lemy and Egwunyenga 2017). The findings in this study have been consistent with Bui et al. (2009). This is very alarming because the period of sampling in this present study which is dry season (November to March) does not support optimal development of eggs and infective larval stages of these parasites.

Furthermore, poor sanitation in the abattoir can also contribute to this prevalence. The correlation therefore between sanitation and prevalence was reported by Anene et al. 1994 and Fakae 1990. It was observed that there is little or no veterinary inspection carried out to ensure the cleanliness of this abattoir. Hence, the cattle owners and butchers can afford to slaughter any type of cattle not minding their health condition and the implication of slaughtering such infected cattle for sale to the populace.

Another reason for nematodes prevalence in these cattle could be that they are supplied by the Fulani herdsmen who subject these cattle to free grazing especially along the river banks which has also been supported by the works of Ajayi et al. 1986 and Fabiyi 1973.

This study also revealed that female cattle (54.8%) had higher prevalence of nematode parasite than the male cattle (28.5%). This could be that the female are being reared basically for reproduction and are only brought in for slaughter at the abattoir in cases of infection or as a result of old age and inability to reproduce further. In other words, the physiological condition of the female animals during reproduction process could be a major contributory factor (Urquhart et al. 1996, Valcarcel and Romero 1990). The results of this study are consistent with previous researchers (Anene 1994 ; Faka 1990; Biu et al. 2009; Jegede et al. 2015).

Another significant finding in this study was that young cattle had higher infection than the adult. Under normal circumstance young cattle cannot be brought into the slaughter slab for slaughter except on diseased conditions. This explains why the young cattle brought into the abattoir for slaughter are more infected than the adult cattle. This concurs with the findings of Yohanna et al. 2012 and Biu et al. (2009) also recorded significant difference with nematode parasites ova across the different age groups revealing infections were higher in the young than the adults groups. This however contrasted the findings of Bashir et al. (2012) who reported no significant difference in the animals in relation to age.

This study also revealed that out of the 200 cattle sampled, 24 had poor body conditions with a prevalence of 12%, while 176 had good body conditions with a prevalence of 88%. This remarkable difference could be attributed to either or non-existence of favorable environmental factors because these cattle were brought in from different locations of the country for slaughter at this abattoir. Furthermore, management system of these animals from different parts of the country could also be accountable for this variation in body conditions. This work therefore provided information on the prevalence rate of infection of nematodes in these cattle and the possible zoonotic significance. In order to mitigate this parasitic infection, comprehensive parasite control program, pasture management, and environmental sanitation in cattle and public health awareness are recommended. New innovative schemes using novel and sustainable approaches referred to as sustainable integrated parasite management (sIPM) are also under consideration.

**Acknowledgements:** The authors thank all those who have been associated with this project especially personnel at the Lugbe Slaughter slab, Abuja Municipal Area Council (AMAC), Abuja for

providing us with the enabling environment to successfully conduct this research.

**Conflict of interest:** Authors declare no conflict of interest.

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