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**Intestinal Parasitic Infection Among Cattle Slaughtered in Some**  
**Abattoirs in Katsina State, Nigeria**

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**ABSTRACT**

Cattle is one of the most domesticated livestock in Nigeria which provides a wide range of products and services to man but may be infected with pathogens that are harmful to itself, other animals and can possibly transfer the pathogens to man. Faecal samples were obtained directly from the rectum of 600 cattle slaughtered in some abattoirs in six Local Government Areas using disposable hand gloves, transferred into universal specimen bottles and preserved in 10% formalin solution for microscopic examination of intestinal parasites. A structured questionnaire was administered to determine some of the factors that enhance the prevalence of infection. Samples were examined using formol-ether concentration technique and stained with Lugol's iodine. The overall prevalence was 173(28.8%). The cestode identified was *Moniezia* sp. 4(0.6%). Nematodes identified were *Strongyle* sp 55(9.2%), *Trichuris trichura* 1(0.2%). The trematodes identified were *Dicrocoelium* sp. 1(0.2%), *Fasciola* sp. 35(5.8%), *Paramphistomum* sp. 14(2.3%) and *Schistosoma* sp. 1(0.2%). The coccidian oocysts had a prevalence of 62(10.3%). Prevalence was higher in females (33.5%) than males (25.9%) ( $P>0.05$ ). Cattle between the ages of 0-1 years had the highest prevalence of infection (39.2%) compared to 2-3 years (24.2%) and 4 years and above age groups (20.4%). The breed of cattle did not influence the prevalence of infection ( $P>0.05$ ). Factors such as vegetation zone and season were found to significantly influence the prevalence of infection ( $P<0.05$ ). Cattle owners should be enlightened relevant agencies on the use of chemotherapy as well as the importance of ranching so as to improve health of these cattle and to also reduce the prevalence of zoonotic infections among human population.

**Key words:** cattle, cestodes, nematodes, coccidian oocysts, trematodes.

### 1.0 INTRODUCTION

Cattle which is the most popular domesticated livestock in Nigeria, represent a valuable asset in both traditional and modern agriculture. They provide meat, milk, skin, fertilizer, fuel and draught power for farming (FAO, 1992; Nwosu *et al.*, 2007). In some traditional settings, they also play an essential role in the socioeconomic system, representing family wealth or they can be regarded as a means of survival by pastoralists (Adedipe *et al.*, 2014). Despite its importance to man, cattle may be infected with pathogens that are dangerous to man and other animals (FAO, 1992; Nnabuife *et al.*, 2013). Factors that can influence the prevalence of gastrointestinal infection in livestock include age, sex, breed of the animal, management practices,

local climatic attributes such as temperature, rainfall, humidity, vegetation nutritional deficiency, pasture

management, immunological status, vector or presence of intermediate host and the number of infective larvae and eggs in the environment and also the parasite species themselves (Radostis *et al.*, 1994; Dappawar *et al.*, 2018). The prevalence and distribution of intestinal parasites among cattle have earlier been reported in Nigeria by several authors (Elele *et al.*, 2013; Adedipe *et al.*, 2014; Umeanaeto *et al.*, 2016; Oyedeji, 2016; Afolabi *et al.*, 2017). To the best of our knowledge, no study has been conducted on the prevalence of gastrointestinal parasites among cattle in Katsina State of Nigeria. The objective of this research is to investigate the gastrointestinal parasites of cattle in six Local

Government Areas within the three vegetation zones of Katsina State so as to provide baseline information which can be used in planning control strategies in the endemic zones of the State.

## 2.0 MATERIALS AND METHODS

### 2.1 Study Area

Katsina State covers an area of 24,192 sq km, located between latitudes 12°15'N and 12°50'N and longitudes 7°30'E and 7°58'E. About 75% of the people are farmers while others are traders and livestock owners. The state is transversed by many rivers, streams, reservoirs and lakes; most of them dry out during the dry season. Water supply in Katsina State is sourced through the damming of rivers, reservoirs and digging of wells and boreholes. The state has a varying climate with a cool dry season (harmattan) from October to February, hot dry season from March to May and a warm wet season from June to September.

### 2.2 Study design

Two Local Government Areas were selected from each of the three vegetation zones giving a total of six Local Governments. 600 faecal samples (200 from each vegetation zones) were collected and examined for presence of gastrointestinal parasites. The study was carried out from November 2017 to October 2018 to cover both the dry and rainy seasons.

### 2.3 Sampling Zones

**2.3.1 Zone A** - This zone is located at the southern part of the state and is characterized by vegetation similar to that of the Northern Guinea Savanna with a mean annual rainfall of about 1000mm. Samples were collected in Funtua (11° 32" N; 7°19" E/11.33°N; 7.317°E) and Kafur (11°39'N, 7°42'E/11.650°N; 7.700° E) Local Government Areas.

**2.3.2 Zone B** - This zone is located at the centre of the state and is characterized by vegetation similar to that of Sudan Savanna with a mean annual rainfall of about 500mm. It was represented by Kankara (11°55'N; 7°24'E /52.10" N; 40.14" E) and Dutsin-Ma Local (12°27'18" N; 7°29'29"E/12.45500°N; 7.49139°E) Government Areas.

**2.3.3 Zone C** - This zone is located at the northern part of the state and is characterized by vegetation similar to that of Sahel Savanna with a mean annual rainfall that is less than 300mm. It was represented by Baure (12°47'N; 8°46'E/12.783°N; 8.767°E) and Maiadua (13°11'26" N; 8°12'42" E/13.19056°N; 8.21167°E) Local Government Areas.

### 2.4 Ethical consideration

Permission was obtained from the Director, Veterinary Services under the Ministry of Agriculture and Natural Resources, Katsina State as well as the managers of the abattoirs before faecal samples were collected.

### 2.5 Faecal Sample Collection

The samples were collected directly from the rectum of the animals immediately after they were slaughtered using disposable hand gloves and transferred into sterile, labelled, wide mouthed specimen bottles with screw caps, preserved in 10% formalin solution and taken to the Parasitology Laboratory, Department of Zoology, Ahmadu Bello University, Zaria for microscopic examination. A structured questionnaire was used to obtain information on sex, age, breed, season and the vegetation zones.

### 2.6 Faecal Sample Processing

The modified Formol-Ether concentration technique was used to concentrate eggs and cysts of the gastrointestinal parasites (Cheesbrough, 2009). Briefly, 1 g of stool sample was emulsified with 4 ml of 10% formol saline in a test tube. The mixture was filtered into a test tube using a cloth gauge and 3-4 ml of diethyl ether was added and shaken vigorously and allowed to stand for two minutes. The mixture was then centrifuged at 1000 revolutions per minutes (1000 rpm) for 3 minutes. Using a glass rod, the faecal debris from the side of the tube was loosened and the tube inverted to pour off the supernatants. The tube was returned to its original upright position and the fluid from the side of the tube allowed draining to the bottom. The bottom of the tube was tapped to resuspend and mix the sediment. The sediment was transferred to a slide, stained with Lugols Iodine and examined for presence of eggs of parasites using the X10 and X40 objectives

respectively. Parasite identification was done using the keys of (Kaufmann, 1996; Foreyt, 2001).

**2.7 Data Analysis**

Percentages were using in determining the prevalence of infection. The relationship between the prevalence of infection to the sex, age breed, season and vegetation zones were determined using chi square ( $\chi^2$ ). *P*-value of <0.05 was considered as statistically significant.

**3.0 RESULTS**

The findings of the study showed that 173(28.8%) of the 600 cattle examined were infected with gastrointestinal parasites. The cestode identified was *Moniezia* sp. 4(0.6%). Nematodes identified were *Strongyle* sp 55(9.2%), *Trichuris trichura* 1(0.2%). The trematodes identified were *Dicrocoelium* sp. 1(0.2%), *Fasciola* sp. 35(5.8%), *Paramphistomum* sp. 14(2.3%) and *Schistosoma* sp. 1(0.2%). The coccidian oocysts had a prevalence of 62(10.3%) (Table 1).

**Table 1: Distribution of gastrointestinal parasites in relation to type of parasites**

Type of Parasite	Number infected	Prevalence (%)
<b>Cestode</b>		
<i>Moniezia</i> sp.	4	0.6
<b>Coccidian oocysts</b>		
	62	10.3
<b>Nematodes</b>		
<i>Strongyle</i> sp.	55	9.2
<i>Trichuris Trichura</i>	1	0.2
<b>Trematodes</b>		
<i>Dicrocoelium</i> sp.	1	0.2
<i>Fasciola</i> sp.	35	5.8
<i>Paramphistomum</i> sp.	14	2.3
<i>Schistosoma masoni</i>	1	0.2
<b>Total</b>	173	28.8

The results of the study also revealed that the prevalence was higher in females (33.5%) than males (25.9%) (*P*>0.05) (Table 2). Cattle between the ages of 0-1 years had the highest prevalence of infection (39.2%) compared to 2-3 years (24.2%)

and 4 years and above age groups (20.4%) (Table 3). It was also revealed that the breed of cattle did not influence the prevalence of infection (*P*>0.05) (Table 4). The findings of the study also showed that factors such as season and vegetation zones were found to significantly influence the prevalence of infection (*P*<0.05) (Table 5) and (Table 6).

**Table 2: Prevalence of gastrointestinal parasites in relation to sex**

Sex	No Examined	No Infected	Prevalence (%)
Female	367	78	33.5
Male	233	95	25.9
<b>Total</b>	<b>600</b>	<b>173</b>	<b>28.8</b>

**Table 3: Prevalence of gastrointestinal parasites in relation to age**

Age (Years)	No Examined	No Infected	Prevalence (%)
0-1	212	83	39.2
2-3	285	69	24.2
4 and above	103	21	20.4
<b>Total</b>	<b>600</b>	<b>173</b>	<b>28.8</b>

**Table 4: Prevalence of gastrointestinal parasites in relation to breed**

Breed of animal	No Examined	No Infected	Prevalence (%)
Bokoloji	137	37	27.0
Bunaji	261	65	24.9
Rahaji	202	71	35.1
<b>Total</b>	<b>600</b>	<b>173</b>	<b>28.8</b>

**Table 5: Prevalence of gastrointestinal parasites in relation to season**

Season	No Examined	No Infected	Prevalence (%)
Rainy	300	110	36.7
Dry	300	63	21.0
<b>Total</b>	<b>600</b>	<b>173</b>	<b>28.8</b>

**Table 6: Prevalence of gastrointestinal parasites in relation to vegetation zones**

Vegetation Zone	No Examined	No Infected	Prevalence (%)
Zone A	200	41	20.5
Zone B	200	60	30.0
Zone C	200	72	36.0
<b>Total</b>	<b>600</b>	<b>173</b>	<b>28.8</b>

#### 4.0 DISCUSSION

The results of the current study demonstrate that there is high prevalence (28.8%) of gastrointestinal parasites among the cattle slaughtered for consumption in some abattoirs in Katsina State. However, the prevalence rates of gastrointestinal parasitic infections obtained in this study is lower than the 34.9% reported in Wudil Local Government Area of Kano State, Nigeria. (Yahaya and Tyav, 2016), 62.2% reported in Port Harcourt, South-south Nigeria (Elele *et al.*, 2013), 44.2% reported in Anambara Southeast Nigeria (Umeanaeto *et al.*, 2016), 77.1% reported in Southwestern Nigeria (Afolabi *et al.*, 2017), 86.4% reported in Plateau State, North-central Nigeria (Karaye *et al.*, 2018). The higher prevalence in these studies may be attributed to the existence of favourable environmental factors which are necessary for the prolonged survival and development of infective larval stage of most parasites (Rossanigo and Gruner, 1995). The differences observed could be due also be attributed to the periods or seasons in which the studies were conducted as well as the sources of cattle sampled in the various regions (Umeanaeto *et al.*, 2016). The results also shows that the coccidian oocysts were more prevalent compared to the other parasites. This findings contradicts the reported prevalence of coccidian oocysts of (Afolabi *et al.*, 2017) who reported a prevalence of 2.55% among 275 bovines slaughtered in Akure abattoirs. Also, a prevalence of 4.6% has been reported among cattle in Jos abattoir (Yohanna *et al.*, 2012). This study also revealed that the cattle were infected with only one cestode (*Moniezia* sp.).

This concurs with the findings of Adedipe *et al.* (2014) and Umeanaeto *et al.* (2016) who also reported *Moniezia* sp. as the only cestode in the studies. This However contradicts the finding of a similar study which did not report the prevalence of cestodes (Oyedeji, 2016). Results of this study also showed that the cattle were infected with only two genera of nematodes namely; *Strongyle* sp. (55%) and *Trichuris* sp. (0.2%). The high prevalence of *Strongyle* sp. among cattle in this study is similar to the findings of Adedipe *et al.* (2014) and Karaye *et al.* (2018) who also reported a high prevalence of this nematode in their studies carried out in Oyo and

Plateau States respectively The high prevalence of *Strongyle* sp. in this study may be as result of their direct lifecycle and cattle become infested by ingesting infective stage with grass (Radostis *et al.*, 1994; Heinz, 2010).

The results of this study also revealed that trematodes (*Dicrocoelium* sp. *Fasciola* sp. *Paramphistomum* sp. and *Schistoma* sp.) were the most abundant gastrointestinal parasites identified. This is in agreement with the findings of Adedipe *et al.* (2014), Umeanaeto *et al.* (2016) and Karaye *et al.* (2018) who also reported some of these trematodes in their studies. This abundance may be attributed to favourable conditions in the grazing lands where the cattle were sourced or reared that favour the proliferation of snails which serve as intermediate hosts for the parasites (Radostis *et al.*, 1994; Heinz, 2010).

In this study, prevalence was higher in females than males but the difference obtained was not statistically significant. This conforms to the report of Adedipe *et al.* (2014) who stated that both the male and female animals have equal likelihood of being infected with gastrointestinal parasites because both cattle are reared under the same local setting in Nigeria and are exposed to poor feeding, veterinary care and management practices.

The higher prevalence of infection encountered in the 0-1 years age group might be attributed to lack of protective immunity, lack of nutritional supplementation and/or lack of use of anthelmintic drugs by resource-poor small cattle farmers there by exposing these cattle in their first grazing season immediately after weaning to grazing areas and water points with a heavy parasitic load (Kemal and Terefe, 2013; Sharma and Busang, 2013).

The breed prevalence rates of 27.0%, 24.9% and 35.1% obtained for Bokoloji, Bunaji and Rahaji breeds of cattle was lower than the 46.00%, 37.42%, and 39.13% recorded for Bunaji, Rahaji, and Sokoto Gudali breeds of cattle obtained by Adedipe *et al.* (2014) among cattle slaughtered in Ibadan, South-Western Nigeria, but higher than the 23.3%, 18.3%, and 13.3% obtained for White Fulani, Red Fulani

and Bokolo breed of cattle by Umeanaeto *et al.* (2016) in Anambara Southeast Nigeria. The statistically non significant association between the breed of cattle and prevalence of infection obtained in this study may be attributed to the equal exposure of these different breeds of cattle to the same sources of contaminants such as water, soil and pasture.

The results of the study also showed that the prevalence of infection was higher during the rainy season compared to the dry season. This is in agreement with the findings of Kemal and Terefe (2013), Marskole *et al.* (2016) and Sulieman *et al.* (2017). This may be due to the warm temperature, moderate humidity and water obtained during the rainy season which may be favourable for the proliferation of these parasites.

The highest prevalence of infection which was recorded in Zone C which has the least amount of annual rainfall is surprising. However, this may be due to the shortage of forage and water in this area thereby leading to a high concentration of these animals in the few places with forage as well as water pools which may eventually become contaminated and become a source of infection for the cattle.

## 5.0 CONCLUSION

The finding of the present study shows that intestinal parasites are prevalent in varying magnitude among cattle slaughtered in some abattoirs in Katsina State. Factors such as vegetation zone and season were found to significantly influence the prevalence of infection. It is therefore suggested that cattle owners should be enlightened by relevant agencies on the use of chemotherapy as well as the importance of ranching so as to improve health of these cattle and to also reduce the prevalence of zoonotic infections among human population.

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