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## Prevalence of Helminth Parasites of Ruminants in Abattoir Market Jos, Jos South Local Government Area, Plateau State, Nigeria

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**ABSTRACT:** Gastrointestinal parasitic infections of animals cause economic losses to farmers and low nutritional value to consumers. This study was carried out to determine the prevalence of gastrointestinal parasite found in Abattoir Market, Jos Plateau State. A total of 205 faecal samples were examined using floatation and sedimentation techniques. Of the 205 samples examined, 193(94.1%) were infected with four groups of parasites of which the nematodes 80(41.40%) were significantly ( $P<0.0001$ ) prevalent. The cattle were significantly ( $P=0.04727$ ) more infected 78(40.40%) while the goats 50(26.00%) were the least infected by helminth parasites. Male ruminants 100(48.80%) were more infected than female ruminants 93(45.40%). There was no significant difference ( $P=0.09278$ ) in the prevalence of helminth parasite in relation to gender. The adult cattle 45(21.95%) were significantly ( $P=0.03797$ ) more infected with helminth parasites, while the young goats 29(9.16%) were the least infected. The most prevalent helminth parasite encountered was *Taenia saginata* 40(20.33%) while *Dicocoeilium dendriticum* 4(2.07%) was the least prevalent parasite. There was a high significant difference ( $P=0.0001061$ ) in the prevalence of helminth parasite species in relation to ruminants. The result of the study revealed a high prevalence of gastrointestinal parasites among animals slaughtered in the study area. Therefore, there is need to educate the farmers on proper animal health care, feeding, sanitary conditions and routine deworming of their animals towards maximum productivity.

**Keywords:** Abattoir, Gastrointestinal, Jos, Parasite.

### Introduction

Ruminants including sheep, goats and cattle constitute the farm animals mostly reared in Nigeria (Lawal-Adebowale, 2012). They are an important source of animal protein, supplying a good percentage of the daily meat and dairy product in urban and rural settlements (Nwosu *et al.*, 2007). Furthermore, their wastes products are of great agricultural significance.

Elele *et al.* (2013) disclosed that helminthic parasites known to infect animals/ruminants are prevalent in Sub-Sahara Africa including Nigeria. Ruminants of all ages are parasitized by a host of helminthic parasites including members of the phyla Nematoda and Platyhelminthes. Species found within these phyla occupy several niches within their mammalian host ranging from intestinal lumen to intravascular or even intracellular sites (Littlewood & Bray, 2001; Afolabi *et al.*, 2017) where they cause diseases, reduced growth rate, substantial loss of productivity, distention, weight loss, abortion, infertility, anorexia, anemia or death in severe cases. The resultant effect of helminthic parasitism is the severe economic loss incurred by the farmer and the nation at large (Junaidu & Adamu, 1997). It also portrays a major challenge to effectual and gainful livestock production in Nigeria.

Environmental conditions such as an encouraging soil and climatic conditions greatly influence the development of helminthic parasites on pastures and their capacity to infect and inflict damage to livestock (Rivera *et al.*, 1983; Gasbarre *et al.*, 2001), while reduced dietary status, compromised immunity and extensive grazing habits on pastures among reared livestock increases the susceptibility of livestock to infective stages of gastrointestinal helminth (Bamaiyi, 2012). To reduce the parasite burden and improve meat protein in Nigeria, the intestinal parasites should be identified and methods of controlling the parasites should be developed to fit individual production situations. This study, therefore, was undertaken to determine the prevalence of helminthic parasites of ruminants at the study site.

## **Materials and Methods**

### **Study area**

The study was conducted in Jos Abattoir Market Plateau State, Nigeria. It is located along Rayfield in Jos South Local Government Area. It is said to be a large market recognized nationwide for meat production.

### **Study animals**

The study animals were ruminants (sheep, goats and cattle) slaughtered at the Jos Abattoir. The animals were composed of different age groups and gender. Age was determined based on dental eruption pattern (Gatenby *et al.*, 1991). Animals up to 6 months of age were considered as young and those greater than 6 months were adult. Sample size was determined using Yamane (1967) formula.

### **Sample collection, examination and Identification**

Fresh faecal samples were randomly collected directly from the rectum of 205 freshly slaughtered animals using gloved fingers, placed into pre-labelled sample bottles containing 10% formalin. The age, gender and species of sampled ruminant was recorded. The faecal samples were finally taken to the Laboratory in the Department of Zoology, University of Jos for parasitological examination.

In the laboratory, preserved faecal samples were examined for detection of helminth eggs using standard procedures of floatation and sedimentation methods (Hansen & Perry, 1994) and were identified based on their colour, shape and contents as described by Soulsby (1982). As *in vivo* identification of infections relies on the microscopic detection of parasite eggs in host faeces (Gareth, 2009), the collected faecal samples were processed and examined under the 10x magnification.

### **Data analysis**

Data obtained were analyzed using R Console software (Version 3.2.2). Pearson's Chi-square test was used to compare the prevalence and distribution of gastrointestinal parasites in relation to age and gender. The P-values < 0.05 were considered statistically significant.

## **Results**

### **Prevalence of Group of gastrointestinal parasites of ruminants studied**

Of the 205 ruminants examined, 193(94.15%) were infected by gastrointestinal parasites. The most prevalent group of helminthic parasite found infecting the 205 ruminants examined was the nematodes 80(41.5%), followed by the cestodes 40(20.7%). The Trematodes 35(18.1%) was least prevalent among the study animals (Table 1). There was a high significant difference ( $\chi^2 = 28.119$ ,  $df = 3$ ,  $P < 0.0001$ ) in the prevalence of group of gastrointestinal parasites infecting ruminants at the study site.

**Table 1: Prevalence of group of Gastrointestinal Parasites of Ruminants Studied**

Parasite Group	No. Infected (%)	Total No. of Ruminants examined
Protozoa	38(19.70)	205
Trematodes	35(18.10)	
Cestodes	40(20.70)	
Nematodes	80(41.50)	
<b>Total</b>	<b>193(94.15)</b>	<b>205</b>

$\chi^2 = 28.119$ , df = 3, P < 0.0001

#### Prevalence of gastrointestinal parasites in relation to ruminant and gender

Cattle 78(40.4%) were most infected by gastrointestinal parasites followed by sheep 65(33.7%) while the goats 50(26.0%) were least parasitized. There was a significant difference ( $\chi^2 = 6.1036$ , df = 2, P = 0.04727) in the prevalence of gastrointestinal parasites in relation to ruminants studied. With respect to gender, the male ruminants 100(48.8%) suffered more infection compared to their female counterparts 93(45.4%)(Table 2). The prevalence of gastrointestinal parasites in relation to gender was not statistically significant ( $\chi^2 = 4.7551$ , df = 2, P = 0.09278).

**Table 2: Prevalence of Gastrointestinal Parasites in Relation to Gender**

Gender	Cattle		Sheep		Goat		
	No. Examined	No. Infected (%)	No. Examined	No. Infected (%)	No. Examined	No. Infected (%)	Total No. Infected (%)
Male	47	47(60.30)	30	27(41.50)	35	26(52.00)	<b>100(48.80)</b>
Female	31	31(39.70)	38	38(58.50)	24	24(48.00)	<b>93(45.40)</b>
<b>Total</b>	<b>78(40.40)</b>	<b>78(40.40)</b>	<b>68(35.20)</b>	<b>65(33.70)</b>	<b>59(30.60)</b>	<b>50(26.00)</b>	<b>193(94.15)</b>

Prevalence of gastrointestinal parasites in relation to ruminants:  $\chi^2 = 6.1036$ , df = 2, P = 0.04727

Prevalence of gastrointestinal parasites in relation to gender:  $\chi^2 = 4.7551$ , df = 2, P = 0.09278

#### Prevalence of gastrointestinal parasites in relation to ruminant age

Of all the ruminants examined, the adult cattle were most infected 45(21.95%). The least infection was observed in the young goats 20(9.76%)(Table 3). There was a significant difference ( $\chi^2 = 11.777$ , df = 5, P = 0.03797) in the prevalence of gastrointestinal parasites in relation to ruminant age.

**Table 3: Prevalence of Gastrointestinal Parasites in Relation to Age**

Ruminant	Age	No. Examined	No. Infected (%)
Cattle	Young	33	33(16.10)
	Adult	45	45(21.95)
Sheep	Young	28	27(13.17)
	Adult	40	38(18.54)
Goat	Young	23	20(9.76)
	Adult	36	30(14.63)
<b>Total</b>		<b>205</b>	<b>193(94.15)</b>

 $\chi^2=11.777$ , df=5, P= 0.03797
**Prevalence of Gastrointestinal Parasites Species in relation to the ruminants**

The most prevalent gastrointestinal helminth parasite observed was *Taenia saginata*40(20.73%) followed by *Eimeria bovis*38(19.69%). *Dicrocoelium dendriticum*4(2.07%) was the least prevalent parasite encountered (Table 4). There was a very high significant difference ( $\chi^2=33.572$ , df=9, P=0.0001061) in the prevalence of gastrointestinal parasites species in relation to the ruminants.

**Table 4: Prevalence of Gastrointestinal Parasites Species in relation to the group of ruminants**

Species of Parasite	Ruminants			Total (%)
	Cattle (N=78)	Sheep (N=68)	Goats (N=59)	
	No. Infected (%)	No. Infected (%)	No. Infected (%)	
<b>Nematodes</b>				
<i>Haemonchus contortus</i>	12(5.85)	5(2.44)	7(3.41)	<b>24(12.43)</b>
<i>Strongyloides papillosus</i>	3(1.46)	6(2.44)	2(0.97)	<b>11(5.70)</b>
<i>Ascaris vitulorum</i>	5(2.44)	4(1.95)	6(2.96)	<b>15(7.77)</b>
<i>Trichostrongylus axei</i>	8(3.90)	7(3.41)	5(2.43)	<b>20(10.36)</b>
<i>Ostertagia ostertagi</i>	6(2.93)	3(1.46)	1(0.48)	<b>10(5.18)</b>
<b>Protozoa</b>				
<i>Eimeria bovis</i>	16(7.80)	9(4.39)	13(6.34)	<b>38(19.69)</b>
<b>Trematodes</b>				
<i>Fasciola gigantica</i>	5(2.44)	9(4.39)	4(1.95)	<b>18(9.33)</b>
<i>Amphistome</i> species	3(1.46)	7(3.41)	3(1.46)	<b>13(6.74)</b>
<i>Dicrocoelium dendriticum</i>	2(0.96)	2(9.76)	0(0.00)	<b>4(2.07)</b>
<b>Cestodes</b>				
<i>Taenia saginata</i>	18(8.78)	13(6.34)	9(4.39)	<b>40(20.73)</b>
<b>Total (%)</b>	<b>78(38.05)</b>	<b>65(31.70)</b>	<b>50(24.35)</b>	<b>193(94.15)</b>

 $\chi^2=33.572$ , df=9, P=0.0001061

## Discussion

### Prevalence of Group of gastrointestinal parasites of ruminants studied

The current study showed that, all the breed of animals in this study area were infected with a widevariety of gastrointestinal parasites including nematodes, cestodes, trematodes and protozoa. The high prevalence (91.15%) of infection recorded in this study reveals that gastrointestinal helminths are a major health challenge of ruminants within the study area. This prevalence is higher than that of Ntonifor *et al.* (2013), Ibukun and Oludunsin (2015) and Dogo *et al.* (2017) who observed a prevalence of 66.90%, 59.20% and 63.8% in Jakiri, Ethiopia, Minna and Vom, North Central Nigeria respectively.

### Prevalence of gastrointestinal parasites in relation to ruminant and gender

The high prevalence of helminth infection in cattle 78(40.40%) could possibly be due to the extensive cattle management system observed by farmers in the study area. The cattle are exposed to gastrointestinal helminthes when they graze freely on available pasture. This result did not agree with that of Ayana and Ifa (2015) who recorded more prevalence in goats (53.30%) in Ambo, Ethiopia. It was also not in line with the findings of Ibukun and Oludunsin (2015) who recorded a higher prevalence of helminth parasites in sheep (98.1%) at Minna, North Central Nigeria.

The lack of variation ( $P= 0.09278$ ) in the prevalence of helminth parasites in relation to ruminant gender possibly suggests that the infection was not gender specific. This coincides with the findings of Kelemework *et al.* (2016) and Ayana and Ifa (2015) who equally observed a lack of variation ( $P>0.05$ ) in the prevalence of helminth infection in relation to gender.

### Prevalence of gastrointestinal parasites in relation to age

The variation ( $P=0.03797$ ) observed in the prevalence of helminth infection in relation to age possibly suggests that the adult cattle were more susceptible to infection. This could be linked to the extensive grazing practices of the nomadic cattle herders before the animal is sold in the abattoir. The low prevalence of helminth parasites recorded in young goats (9.76%) could possibly be because they are usually tended to the homestead thus, reducing the possibility of infection in the field. This result coincides with that of Sylvia *et al.* (2015) who observed a variation in the prevalence of helminth infection in relation to age group in Abeokuta, Nigeria. This result did not agree with that of Ntonifor *et al.* (2013) who observed no variation ( $>0.05$ ) in the prevalence of helminth infection in relation to age in Jakiri, Cameroun.

### Prevalence of Gastrointestinal Parasites Species in relation to the ruminants

The occurrence and prevalence rate of different species of helminth in the ruminant population is quite a complex subject. It is governed by a variety of factors. Most important, however, may be the climatic conditions supportive to the perpetuation of life cycles of these parasites. Naturally, sub-tropical climates in the temperate and humid regions are more conducive for the development and survival of larval forms and also for the vectors/intermediate hosts.

The most prevalent helminth in this study was the cestode *Tania saginata* with a prevalence of 20.73%. This result did not agree with that of Dogo *et al.* (2017) who recorded more *Strongyle* species (43.2%) in the samples examined at Vom, Nigeria. Lemy and Ekwunyenga (2018) recorded more *Ascaris* species (10.5%) in Delta North. The prevalence of *Fasciola gigantica* was considerably low. This may be due to the vegetation cover of Rayfield in Jos South Local Government Area which does not favour the propagation of the snail intermediate host.

## Conclusion and Recommendation

In general, the overall prevalence of gastrointestinal helminth parasites in the study area indicates gastrointestinal helminthosis to be an important health problem. There is an urgent need to educate and encourage livestock farmers in the case study area on the routine use of anthelmintics. Moreover, proper pasture and animal management is required since this is a key component in managing gastrointestinal

helminthes in cattle, sheep and goat operations. Additionally, rotation grazing should be used intermittently; this avoids communal grazing with other animals to avoid cross parasite contamination. The professional input of veterinarians is needed especially in the preventive and control measures against gastrointestinal helminths.

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