

## Original Research Article

# Prevalence of Gastrointestinal Helminths in *Ovis aries* (Sheep) Slaughtered in Kano City Main Abattoir, Kano State Northern Nigeria

Aziza T Zawiyya<sup>1</sup>, Farouk S Nas<sup>1</sup>, Muhammad Ali<sup>2\*</sup>

<sup>1</sup>Department of Biological Science, Bayero University Kano

<sup>2</sup>Department of Microbiology, Federal University Gusau

\*Corresponding Author: Muhammad Ali

Department of Microbiology, Federal University Gusau

Article History: | Received: 22.10.2025 | Accepted: 16.12.2025 | Published: 20.12.2025 |

**Abstract:** *Ovis aries* (Sheep) is one of the earliest animals domesticated by man. They are distributed worldwide with higher concentrations in tropical areas and in dry zones. The study was aimed to determine the prevalence of gastrointestinal parasites of *Ovis aries* (Sheep) in Kano Main Abattoir, Kano State, Northern Nigeria. A total of 230 fecal samples were collected from male and female sheep brought to the Abattoir for slaughter from January through July, 2023. Flotation technique was employed for the detection/isolation of gastrointestinal parasites eggs in the fecal samples using microscope. The result indicated six parasites ova from different genera in the samples examined. These include; *Strongyloides* sp, *Haemonchus* sp, *Trichuris* sp, *Eimeria* sp, *Moniezia* sp and *Entamoeba* sp. *Haemonchus* sp. was the most prevalent parasite encountered 34 (26.8%), followed by *Strongyloides* sp 23 (18.1%), *Eimeria* sp 22 (17.3%), *Trichuris* sp 21 (16.1%) while *Entamoeba* sp 16 (12.6%) and *Moniezia* sp was the least prevalent 11 (8.7%). It was also found that female sheep are more susceptible to gastrointestinal parasite than male counterpart. Similarly, more parasites are found among adult sheep than younger ones. Statistical analysis of the result showed no significant difference in the prevalence of gastrointestinal among different categories of sheep examined at  $p < 0.05$ .

**Keywords:** Abattoir, Gastrointestinal Parasites, Kano, Prevalence, Sheep.

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## INTRODUCTION

Gastrointestinal parasites are usually classified into nematodes, trematodes and cestodes which are the three major types of parasitic helminthes of economic importance in sheep production (Abdu *et al.*, 2013). Nematodes causes the most pathologies and production loss in sheep (Aga *et al.*, 203). Moreover, studies have shown that some of sheep gastrointestinal parasites are of public health importance and they were indicted in zoonotic transmission to human either by direct contact with sheep feces or indirectly through consumption of contaminated water or food (Bhaia *et al.*, 2010). Majority of farmers in Nigeria raise their livestock under extensive or semi-intensive production system as an addition to main agriculture activities (Yeasmin *et al.*, 2014).

Gastrointestinal parasites are considered as the major diseases causing organisms of small ruminants in the Nigeria. Helminths parasite infections in sheep and

goats are of major importance in many agro-ecological zones and a primary factor in the reduction of production and productivity of livestock (Hassan *et al.*, 2013). Gastrointestinal parasites cause mortalities, production loss, and weight loss in small ruminants (goats and sheep), thereby impeding their production system. Sheep constitute a significant portion of livestock in a country (Siddiki *et al.*, 2009). Livestock has greater importance in raising the financial position of a country because livestock is the chief source of protein, and their products like skin, bones, and many goods are made from the fetch of these animals (Cernanska *et al.*, 2005). The effect of infestation by gastrointestinal helminths varies according to the parasite concerned, the degree of infestation and other risk factors such as species, age, season and intensity of worm burden (Opara *et al.*, 2005).

The main source of animal protein is livestock and their products (Hassan *et al.*, 2013). Livestock plays a very important role in the economy of most nations.

**Citation:** Aziza T Zawiyya, Farouk S Nas, Muhammad Ali (2025). Prevalence of Gastrointestinal Helminths in *Ovis aries* (Sheep) Slaughtered in Kano City Main Abattoir, Kano State Northern Nigeria. *SAR J Pathol Microbiol*, 6(6), 262-266.

Sheep are adaptable to several production systems and can be raised with relatively few inputs, but they face huge production challenges (Hassan *et al.*, 2013). Small ruminants are the most essential animals among small-scale farmers in the livestock production industries worldwide. Sufficient production of small ruminants including sheep and goats, support farmers as a means of generating income and important animal derived products (milk, meat, food security, manure, skin, medicine, gifts, hair (Hiwot *et al.*, 2020). Gastrointestinal parasites are one of the major sources of economic loss in small ruminant farming (Win *et al.*, 2020). Most governments in Africa haven't invested in disease control for small ruminants. This coupled with high illiteracy levels among pastoralist impacts negatively on their productivity. The gastrointestinal parasites include helminths and protozoa most of which are known to cause malnutrition to the animals (Dogo *et al.*, 2017). This is a similar situation in Nigeria hence the current study aimed to determine the prevalence of gastrointestinal parasites in sheep slaughtered in Kano main abattoir, Kano State, Nigeria.

## MATERIALS AND METHODS

### Study Area

The fecal samples were collected from Kano main Abattoir, Fagge LGA Kano State. Kano State is located in the North-west Nigeria located at latitude  $11^{\circ} 3'N$  and longitude  $8^{\circ} 3'E$ . It share borders with Kaduna state to the south- west, Bauchi state to the South-East, Jigawa state to the East, Katsina state to the North. It has a total area of 20,131km<sup>2</sup> (7,777sqm) and estimated population of 13.4 million (NPC, 2014).

### Sample Size Determination

The sample size for the study was determined from a standard formula for the calculation of minimum sample size (Nasir *et al.*, 2018). Sample size was given by the formula;  $N = Z^2 (p) (1-p) / d^2$ . Where N = minimum sample size, Z = value of standard normal deviate which at 95% confidence interval has found to be 1.96, P = the best estimate of prevalence obtained from literature review (82%) and d = difference between the true population rate and sample that can be tolerated, this is the absolute precision (in percentage) on either side of the population.  $N = (1.96)^2 \times (0.82) \times (1 - 0.82) / (0.05)^2 = 226.7$  which was rounded up to 230 as the minimum number of samples for the study. Therefore, a total of 230 samples were used in the study.

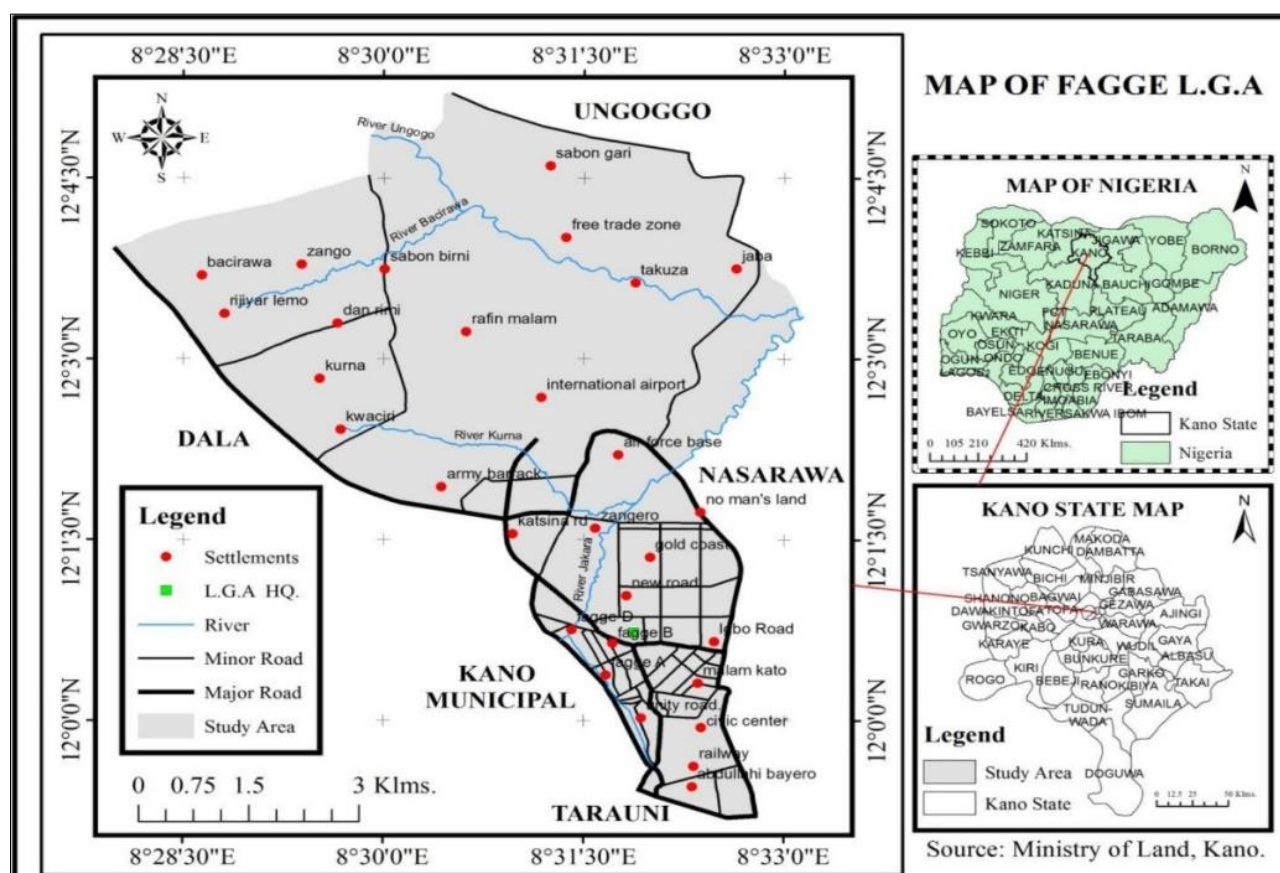


Figure 1: Map of Fagge Local Government Area

### Study population and Sample Collection

A total of 230 fecal samples were collected using hand gloves from sheep brought to the Kano main

Abattoir, Kano for slaughter from January through July, 2023. A simple structured questionnaire was administered to the sheep owners for obtaining sheep's

details such as age and sex. The fecal samples collected after dropping were placed in a sterile sample bottles and transported to the laboratory in the Department of Biological Sciences, Bayero University Kano for further examination.

### Parasitological Examination

Fecal samples were examined by flotation techniques for the presence of gastrointestinal parasites ova as described by Cheesbrough, (2012). The fecal samples were crushed and dissolved in normal saline solution (0.9%) in a beaker. The obtained fecal suspensions were filtered using sieve of 50µm size mesh. This was done so as to trap the large particles or debris. The filtrate was placed into a glass slide covered with cover slip for 15mins. It was then mounted and examined under the microscope using X10 objective to determine the presence of eggs (ova) and X40 objective to determine the morphological features of the ova of the helminthes examined.

### Data Analysis

The data generated were subjected to descriptive statistical analysis using percentages and Chi – square analysis was used in determining the prevalence rates in the gender and age.  $p < 0.05$  was considered indicative of a statistically significant difference.

## RESULTS

### Prevalence of Gastrointestinal Parasites among the Sheep Sampled

The data for the prevalence of gastrointestinal parasite of sheep is presented in Table 1 below. The result indicated that the parasites are distributed into six different genera. They include *Strongyloides* sp, *Haemonchus* sp, *Trichuris* sp, *Eimeria* sp, *Moniezia* sp and *Entamoeba* sp. *Haemonchus* sp. was the most prevalent parasite encountered, about 34 times which accounted for 26.8 %, followed by *Strongyloides* sp 23 (18.1%), *Eimeria* sp 22 (17.3%), *Trichuris* sp 21 (16.1%) while *Entamoeba* sp 16 (12.6%) and *Moniezia* sp was the least prevalent 11 (8.7%).

**Table 1: Prevalence of Gastrointestinal parasites**

S/N	Parasite egg	Number positive	Prevalence (%)
1	<i>Strongyloides</i> sp	23	18.1
2	<i>Haemonchus</i> sp	34	26.8
3	<i>Trichuris</i> sp	21	16.5
4	<i>Eimeria</i> sp	22	17.3
5	<i>Moniezia</i> sp	11	8.7
6	<i>Entamoeba</i> sp	16	12.6
	<b>Total</b>	<b>127</b>	<b>100</b>

### Distribution of Gastrointestinal Parasites in Relation to Sex

The distribution of gastrointestinal parasites in relation to the sex of the sheep examined is presented in Table 2. Out of the 230 fecal samples examined, 103

(45.24%) from male and 127 (54.76%) from female sheep. A total of 127 samples which accounted for 55.2 % of samples were positive for one or more gastrointestinal parasites. Higher incidence was found among female (41%) than male (33%).

**Table 2: Distribution of Gastrointestinal Parasites in Relation to Sex**

Sex	No. examined	No. positive	Prevalence (%)	X <sup>2</sup>
Male	103 (45.24%)	54	23.5	0.1701*
Female	127 (54.76%)	73	31.7	
<b>Total</b>	<b>230</b>	<b>127</b>	<b>55.2</b>	

**Key:** \*The  $p$ -value is .680056, hence there is no significant different on the distribution of gastrointestinal parasites among the sexes.

### Distribution of Gastrointestinal Parasites in Relation to Age

The distribution of gastrointestinal parasites in relation to the age of the goats examined is presented in Table 3. Out total of 230 goats examined, 91 (39.6%) are

below the age of 1 year and are considered as young while 139 (60.4%) are above 1 year. From the result obtained, more parasites were found among adult goats (38.7%) than younger ones (16.5%).

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

Age	No. examined	No. positive	Prevalence (%)	X <sup>2</sup>
Young (< 1 year)	91 (39.6%)	38	16.5	3.2975*
Adult (> 1 year)	139 (60.4%)	89	38.7	
<b>Total</b>	<b>230</b>	<b>127</b>	<b>55.2</b>	

**Key:** \*The  $p$ -value is .069385, hence there is no significant different on the distribution of gastrointestinal parasites among age groups.

## DISCUSSION

In the present study, 55.2% of the samples examined were infected with one or more gastrointestinal parasites. From the findings of this research, *Strongyloides* sp, *Haemonchus* sp, *Trichuris* sp, *Eimeria* sp, *Moniezia* sp and *Entamoeba* sp were the gastro intestinal parasite of sheep observed in this study. The presence of these parasites in this study was in conformity with the findings of Gadahi *et al.*, (2009) and Nwigwe *et al.*, (2013) who noted that the most pathogenic helminths and protozoan parasites in the intestinal tract of small ruminants such as goat include; *Strongyloides* sp, *Trichuris* sp and *Eimeria* species. High prevalence of gastrointestinal parasite of sheep in this study is similar to the findings of Mollah *et al.*, (1996) who examined 250 abomasi of sheep and recorded *Haemonchus* and *Strongyloides* species as the dominant helminth parasites in sheep and are among the successful parasites of animals because of their efficient life cycle ranging from the very simple to the extremely complicated stage. The prevalence in the present study (55.2%), might be due to the system of management that these sheep were subjected to as they were always left to wander about scavenging and feeding indiscriminately on anything they come in contact with and then return to their poorly kept sheds. The sheep also exposed to gastrointestinal parasites when they are maintained in an unhygienic and poorly kept ranches and also when fed with contaminated food and water. The presence of protozoan parasites such as *Eimeria* sp and *Entamoeba* may be due to overcrowding, poor management and hygiene. The presence of helminth parasites in this study support the finding of Adejinmi and Osayomi (2010) who attributed the presence of protozoan parasites in goats as a result of overcrowding and poor hygienic condition. Poor hygienic condition and overcrowding encourage the spread of gastrointestinal parasites, as the animals become carriers of the intestinal parasites and continually contaminate the environment with eggs of the parasites.

Based on the finding of this study in relation to the sex, female sheep are more susceptible to gastrointestinal parasite (31.7%) than rams (23.5%). This result was in conformity with the finding of Shakya *et al.*, (2017) who found higher incidence of gastrointestinal parasites in female goats (46.04%) than male goats (39.5%). Higher incidence among female might be due to genetic predisposition and differential susceptibility owing to hormonal differences (Shakya *et al.*, 2017). Other factors associated with higher incidence of gastrointestinal parasite among female sheep include pregnancy and lactational stress (Shakya *et al.*, 2017). In the present study, more parasites were found among adult goats (38.7%) than younger ones (16.5%). However, there is no significant difference on the prevalence of gastrointestinal parasites in relation to the age of the goats at  $p < 0.05$  (0.694). This agrees with the finding of Chedge *et al.*, (2013) who found 57% and 22% prevalence of gastrointestinal parasites for adult and

young sheep respectively. Higher prevalence of the parasites among adult goats was due to continues grazing on pasture land by the adult in most time and the pasture happens to be infected with infective larvae, as infected adult animals continually shed the eggs gastrointestinal parasites while the young ones which are generally kept at home.

## CONCLUSION

The findings of the present study established a prevalence of gastrointestinal parasites of sheep to be 55.2%. A total of six parasites belonging to six different genera were recorded. They include *Strongyloides* sp, *Haemonchus* sp, *Trichuris* sp, *Eimeria* sp, *Moniezia* sp and *Entamoeba* sp with *Haemonchus* sp. being the most prevalent parasite encountered. It is found that female are more susceptible (31.7%) to gastrointestinal parasite than males one and (23.5%) more parasites are found among adult sheep (38.7%) than younger ones (16.5%). However, these variations were not statistically significant. It is recommended that educating sheep owners on method of transmission and effect of these parasites should be encouraged.

## Acknowledgement

The authors wish to acknowledge the technical staff of Biological Science Department of Bayero University Kano for use of Laboratory facilities. Similarly, the management of Kano main Abattoir was duly acknowledged for their support in the sampling of the fecal matter.

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