

## Prevalence of Gastrointestinal Nematodes of Small Ruminants Slaughtered at Bauchi Central Abattoir, Bauchi, Bauchi State, Nigeria

Inuwa M<sup>1\*</sup>, Atuman YJ<sup>2</sup>, Yuguda A<sup>1</sup> and Aminu YZ<sup>1</sup>

<sup>1</sup>Department of Biological Sciences, Abubakar Tafawa Balewa University, Bauchi, Nigeria

<sup>2</sup>Department of Veterinary, National Veterinary Research Institute Vom Outstation Laboratory Bauchi, Nigeria

\*Corresponding author: Inuwa M, Department of Biological Sciences, Abubakar Tafawa Balewa University, Bauchi, Nigeria, E-mail: muhammadinuwa598@gmail.com; Tel: +2347065768185

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### Abstract

Gastrointestinal helminths have been recognized as a major constraint to both small and large-scale small ruminant production in developing countries. This study was carried out between October and December 2017 with the aim to study the gastrointestinal nematodes of small ruminants slaughtered at central abattoir in Bauchi Local Government Area, Bauchi State, Nigeria. Faecal samples were collected from 200 small ruminants (100 from sheep and 100 from goats) and were processed using simple floatation technique. The result showed that out of the 200 samples examined, 102 (51%) samples were found to be positive, in which six different gastrointestinal nematode parasites were identified with *Haemonchus contortus* having the highest prevalence (16%) while *Moniezia expansa* (1%). Statistical analysis of the data showed a significant difference ( $P < 0.05$ ) in the prevalence of gastrointestinal nematodes among the sex of the small ruminants. Moreover, statistical analysis showed that there is no significant difference ( $P > 0.05$ ) among the species of animals. The age of the small ruminants examined ranges between 1 and 6 years old and the statistical analysis showed that there is no significant difference ( $P > 0.05$ ) among the age of the animals. The study indicated that gastrointestinal nematodes were prevalent among the small ruminants slaughtered at the central abattoir Bauchi. Therefore, it is recommended that veterinary and health officers should inspect the small ruminants slaughtered at the abattoir.

**Keywords:** Nematodes; Prevalence; Gastrointestinal; Helminths

important for resource-poor smallholder systems of rural Nigeria due to their ease management, short generation cycles and high reproductive rates which lead to high production efficiency and significant role in provision of food and generation of cash income [2]. They serve as a living bank for many farmers, closely linked to the social and cultural life of resource-poor farmers and provide security in bad crop years [2].

Gastrointestinal parasites of sheep and goats can compromise animal welfare, reduce productivity and can affect humans [3]. Among these parasites, helminths such as nematodes (roundworms), cestodes (tapeworms) and trematodes (flukes) are the most important as they affect growth as well as the production of the animals. Gastrointestinal nematodes of the Trichostrongylidae family are perhaps the most important parasites of small ruminants worldwide, causing significant morbidity and loss of production [4,5].

Infection usually occurs primarily through contaminated feed and water, enhanced by poor hygiene [6]. Most goats infected have been shown to be asymptomatic or produce only mild symptoms, as a result of which infections are often overlooked till serious complication or chronic clinical signs occur [7]. Gastrointestinal nematodes could be harmful to the infected animals and cause economic loss due mortalities and reduced weight gain [8,9]. The severity of infection depend on the genera of the helminthes involved, animal species, the number of infective stage on pasture, an alteration in host susceptibility, the introduction of susceptible stock into an infected environment, the introduction of infection to an environment, ineffective parasite removal from the host animal due to poor drug administration techniques, and local environmental conditions such as humidity, temperature, rainfall, vegetation and management practice [10,11].

Small ruminants play an important socio-economic role within traditional farming system in many developing countries, including Nigeria, where 80%-90% of the nation's livestock lies in the hand of smallholders or other traditional groups [12]. Therefore, there is a pressing need to increase the production of domestic animals in order to boost the nation's economy and also to overcome the acute shortage of animal's protein in the

### Introduction

Small ruminant, especially sheep and goats, constitute an important source of animal protein to many Nigerians. A lot of socio-economic importance is therefore attached to the ownership of these animals that, in some cases, may be the only realizable wealth of a household [1]. Sheep and goats are very

diet of the average Nigerian [13]. Therefore, this study was carried out to provide credible information that will be used to curtail the menace of gastrointestinal nematodes in small ruminants.

## Materials and Methods

### Study area

The study was carried out at the Bauchi central abattoir. Bauchi (earlier Yakoba) city is the capital of Bauchi state. It is located on the Northern edge of the Jos plateau. Bauchi is located at 10.31° North latitude, 9.84° East longitude and 616 meters above the sea level. However, in terms of climate, according to the Koppen climate classification system, Bauchi has a tropical savannah climate, abbreviated "Aw" on climate maps.

### Sample collection

Faecal samples of approximately 5 gram were collected from the rectum of the animals using clean disposable polyethylene gloves at the early hours of each day. A total number of 20 faecal samples, 10 from goats and 10 from sheep were collected weekly for 10 weeks, which amount to 200 samples, comprising of 100 samples from sheep and 100 samples from the goats of both sexes. The collected samples were put in sample bottles containing 10% formalin and the necessary information including species of the animal, sex, and age were collected and labelled. The samples were transported to zoology laboratory, Biological sciences department, Abubakar Tafawa Balewa University Bauchi for processing and examination.

### Sample examination and processing

Preliminary macroscopic examination of the samples was carried out to determine the consistency or the texture as well as the presence of blood, mucus, pus and or worms in the samples. The faecal samples were examined in the laboratory for the detection of gastrointestinal nematodes using standard procedure of floatation as described by Charles MH., [14]. In this study, the floatation solution used was sodium chloride (NaCl).

### Statistical analysis

The collected data was coded into appropriate variables and entered into Microsoft Excel Worksheet. All analyses were performed using statistical data package for social science (SPSS). The prevalence was calculated by dividing the number of positive samples by the total number of samples examined and times 100. Percentage (%) to measure prevalence and Chi-square ( $\chi^2$ ) was used to test the existence of difference in prevalence between species, age and sex of the animals.

## Results

A total of 200 fecal samples from small ruminants (100 sheep and 100 goats) were examined (Table 1). The overall prevalence of gastrointestinal nematode parasites infestation in sheep and goats was 51% (51/100). The prevalence of gastrointestinal

nematode parasites was 28% and 23% in sheep and goats respectively. The gastrointestinal nematode parasites identified were Haemonchus contortus, Trichostrongylus axei, Oesophagostomum columbianum, Strongyloides papillosus, Trichostrongylus spp., and Moniezia expansa (Table 2). Out of the gastrointestinal nematode parasites identified, Haemonchus contortus had the highest prevalence (16%) while Moniezia expansa (1%). However, out of the 200 small ruminants (100 sheep and 100 goats) that were examined, 56 (28%) sheep and 46 (23%) goats were infected by different gastrointestinal nematode parasites. Sheep had the highest prevalence for Haemonchus contortus 20 (20%), Oesophagostomum columbianum 10 (10%) and Trichostrongylus spp. 6 (6%) while goats had the highest prevalence for Strongyloides papillosus 12 (12%). Both the sheep and goats have the same prevalence for Trichostrongylus axei 12 (12%). However, two sheep were found to be infected by Moniezia expansa 2 (2%) (Table 3). Considering the sex of the animals, females had the highest prevalence for the gastrointestinal nematode parasites 62 (62%) (Table 4). In terms of age, the age of the small ruminants examined ranges between 1 and 6 years old. Out of the 200 small ruminants examined 72 were between 1 and 2 years old, 102 were between 3 and 4 years old and 26 were between 5 and 6 years old. Small ruminants between the age category 3 and 4 had the highest prevalence for almost the parasites identified then followed by those within the 1-2 age category with Moniezia expansa 2 (1%) only identified within the age category (Table 5).

Species	Number examined	Number infected (%)
Sheep	100	56 (56)
Goat	100	46 (46)
Total	200	102 (51)
P-value=0.152		

**Table 1:** Summary of infection based on species.

Parasite	No. examined	No. infected (%)
Haemonchus contortus	200	32 (16)
Trichostrongylus axei	200	24 (12)
Oesophagostomum	200	16 (8)
Columbianum	200	18 (9.0)
Strongyloides papillosus	200	10 (5.0)
Trichostrongylus spp.	200	2 (1.0)
Moniezia expansa		
Total		102 (51.0)

**Table 2:** Prevalence of gastrointestinal parasites among small ruminants.

Parasites	Sheep (%)	Goats (%)
Haemonchus contortus	20(20)	12(12)
Trichostrongylus axei	12(12)	12(12)

Oesophagostomum columbianum	10(10)	6(6.0)
Strongyloides papillosus	6(6.0)	12(12)
Trichostrongylus spp.	6(6.0)	4(4.0)
Moniezia expansa	2(2.0)	0(0.0)
Total	56(56)	46(46)
P-value=0.209		

**Table 3:** Distribution of the parasites based on species.

Parasites	Male (%)	Female (%)
Haemonchus contortus	12(12.8)	20(18.9)
Trichuris globulosa	10(10.6)	14(13.2)
Oesophagostomum columbianum	10(10.6)	6(5.7)
Strongyloides papillosus	4(4.3)	14(13.2)
Trichostrongylus spp.	2(2.1)	8(7.5)
Moniezia expansa	2(2.1)	0(0.0)
Total	40(42.6)	62(58.5)
P-value = 0.019		

**Table 4:** Distribution of the parasites based on sex.

Parasites	Age groups		
	01-Feb	03-Apr	05-Jun
Haemonchus contortus	14(19.4)	16(15.7)	2(7.7)
Trichuris globulosa	8(11.1)	12(11.8)	4(15.4)
Oesophagostomum columbianum	8(11.1)	6(5.9)	2(7.7)
Strongyloides papillosus	6(8.3)	12(11.8)	0(0.0)
Trichostrongylus spp.	6(8.3)	4(3.9)	0(0.0)
Moniezia expansa	2(2.8)	0(0.0)	0(0.0)
Total	44(61.1)	50(49.0)	8(30.8)
P-value=0.146			

**Table 5:** Distribution of the parasites based on age.

## Discussion

In the present study, a higher prevalence of GIT parasites was observed in sheep than in the goats which is in agreement with other works in Ethiopia and elsewhere in the world and this is assumed to be due to the grazing habit of the sheep where they graze closer to the ground fostering opportunity of exposure to parasites [15-17]. Moreover, despite the fact that this study revealed that there is higher prevalence of GIT parasites in sheep than in goats, notwithstanding, statistical analysis of the

result showed that there is no significant difference between the sheep and goats in terms of prevalence of the parasites? This may probably be due to the fact that both sheep and goats graze on the same pasture. However, This finding is contrary to the report of who showed that goats appear to be more susceptible to helminthes than sheep as they appear to develop less immunity but sheep picked more parasites because they predominantly grazed on grass which harbor infective larvae whereas goat are both grazers and browsers [18].

Haemonchus contortus was recorded in higher prevalence in both species of the small ruminants. The high biotic potential and shorter generation interval of Haemonchus allows its greater contamination of pastures and reinfection of animals [19]. This high prevalence rate was in accordance with the findings of in Zaria Nigeria [20]. The prevalence was however higher than the findings of who conducted study on Nematodes of small ruminants in some parts of North Eastern Nigeria [21]. It was observed that the female animals had higher infection of the parasites than males. This finding supports the general understanding of helminth infections that female animals are more susceptible to helminthiasis. Sex difference in helminth infection has been attributed to differences in sex hormones especially during the peri-parturient period due to a decreased immune status [22,23].

Age was considered an important risk factor in Gastrointestinal Tract (GIT) helminthosis [24]. In the present study, the animals were categorized into 1-2, 3-4 and 5-6 year age groups. The animals in the age category 3-4 years recorded the highest prevalence. Several authors have documented that adult and old animals develop acquired immunity [22,25] against helminth infections as they get mature due to repeated exposure and this will help expel the parasite before it establish itself in the GIT [26-28]. On the contrary, there are instances where younger animals were reported to be resistant to parasitic infection [29]. The present study result indicated that gastrointestinal nematodes are the major helminths of sheep and goats in Bauchi town. Predisposing factors such as poor management and concurrent chronic diseases should be avoided.

## Conclusion

Moreover, there should be Strategic anthelmintic treatments of sheep and goats with broad spectrum anthelmintic at the beginning of rain season and at the end of dry season to reduce the worm burden and minimize pasture contamination with larva.

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