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## PREVALENCE OF GASTROINTESTINAL PARASITES AMONG SHEEP AND GOATS SLAUGHTERED IN MODERN ABATTOIR, DAMATURU, YOBE STATE, NIGERIA

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### ABSTRACT

*Gastrointestinal parasites have a devastating effect on the performance of small ruminants. The study was conducted to determine the prevalence of gastrointestinal parasites in sheep and goats in modern abattoir, Damaturu, Yobe state, Nigeria. A total of 34,466 faecal samples of sheep and goats of different breeds and sex consisting of 21,410 goats and 13,056 sheep were examined for the period of 5 years. These samples were processed and screened by direct smear method for the detection of parasitic ova. Ova of parasites were identified through their morphological features using the available keys. The prevalence rate for goat was 9.9% while for sheep was 8.1%. The gastrointestinal parasites observed were *Heamonchus spp* (39.5%), *Oesophagostamum spp* (25.8%), *Moniezia spp* (20.8%), *Fasciola spp* (7.6%) and *Paramphistomum species* (6.3%). Sex wise prevalence of gastrointestinal parasites was higher in female goats, than in their male counterparts. It is therefore recommended that: The animals should be grazed with dried pastures, as the intermediate hosts are not found after drying out the fresh pastures. Regular deworming at least three or four times and improved management practices to mitigate these infections and enhance livestock productivity.*

**Keywords: Prevalence, Gastrointestinal, Parasite, Slaughtered, Abattoir**

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### INTRODUCTION

Gastrointestinal parasites are considered as the major diseases causing organisms of small ruminants (sheep and goats) 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.*, 2013b). Gastrointestinal parasites cause mortalities, production loss, and weight loss in small ruminants (goats and sheep), thereby impeding their production system. Small ruminants (goats and 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 (Gupta *et al.*, 1987). 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 (Cernanska *et al.*, 2005; Opara *et al.*, 2005). The main source of animal protein is livestock and their products (Hassan *et al.*, 2013a). Livestock plays a very important role in the economy of most nations. Small ruminants (sheep and goats) are adaptable to several production systems and can be raised with relatively few inputs, but they face huge production challenges (Hassan *et al.*, 2013a).

Control of internal parasites, especially gastrointestinal nematodes is a primary concern for many livestock farmers and is particularly challenging in humid regions. Intestinal parasites have become more difficult to manage in small ruminants because of the parasite increasing resistance to several anthelmintics (Magona *et al.*, 2011). The level of environmental contamination is influenced by factors including biotic potential of helminths, host immune status and hypobiosis. These parasites are a worldwide problem for both small and large-scale farmers, but there is a greater instance in sub-Saharan Africa in general and Nigeria in particular due to the availability of a wide range of agro-ecological factors suitable for diversified host and parasite species (Onaga *et al.*, 2009). Common abdominal parasites of livestock are coccidia species of phylum protozoa. Trematodes belong to flukes, nematodes commonly called roundworms, cestodes famous on tapeworms, while the most abundant nematodes in small ruminants are *Tricho Strongyloides* which their prevalence are worldwide (Awraaris *et al.*, 2012). Nematodes have a single host life cycle in small or large ruminant's guts to complete their life cycle (Scott and Sutherland, 2009). Nematode's infections are very significant economically that are the leading agents for poor growth and insufficient production. Increasing recognition of the burden

of human fascioliasis has occurred and it is now recognized as an emerging zoonosis by the World Health Organization (Poindexter *et al.*, 2009). The zoonotic disease has a serious impact on both public health and transmission through infected fomites or ingestion of infected milk and meat (Rautureau *et al.*, 2010). Livestock get exposed to these pathogenic parasitic organisms very early under natural grazing conditions and the effects of infections are influenced by the environment, nutrition, climate and management practices (Lüscher *et al.*, 2005; Blackburn *et al.*, 2011).

Outbreaks of parasitic infections are most severe in warm, humid climates; the optimum temperature for larval growth is between 50 and 80°C and the optimal rainfall is at least 5 centimeters (Aboagla *et al.*, 2011). A climate that is too hot or dry can kill most larvae on the pasture. *Haemonchus spp.* has a life cycle lasting approximately four weeks (Mandonnet *et al.*, 2001). When ingested, the larvae travel to the abomasum of the animal, where they burrow into the mucosa and develop into true adults in 21 days (Lah, 2003). While in the abomasum, female adults can lay over 5000 eggs per day. Roughly 10,000 adult *Haemonchus* worms can kill a sheep. The eggs are deposited in faeces. After approximately 24 hours, the eggs hatch on grass in pastures and under optimal conditions, become infective in five to seven days (Meng *et al.*, 2010). Thus, the aim of this study is to evaluate the major types of gastrointestinal parasites that affect ruminants (sheep and goats) slaughtered in Damaturu abattoir, Yobe State, Nigeria.

## MATERIALS AND METHODS

### Study area

The study was carried out in the Damaturu modern abattoir, Damaturu local government area, Yobe state Nigeria. Damaturu which has a total land area of 2,366 km<sup>2</sup>, according to the 2006 census, is estimated to have a population of 88,014 inhabitants. Its location falls between latitude 11°44'40"N and longitude of 11°57'40"E with an average temperature 31.63°C.

### Study design

This study employed a retrospective design to investigate the prevalence of gastrointestinal parasite in sheep and goat slaughtered in Damaturu Modern Abattoir, Yobe state. Data was collected from existing records covering a period from 1st January, 2019 to 31st December, 2023.

### Study population and sample size

The study population consist of animals (sheep and goats) that were slaughtered at the abattoir during the study period (2019 to 2023). Animals of different sexes were included in the analysis. The sample size was determined based on the total number of animals slaughtered at the abattoir during the study period. All available records within the specified time frame were included in the analysis.

### Data collection

The data for this study was obtained from the abattoir's records, which included information on slaughtered animals, such as species (ovine and caprine) sex (male or female) and parasitological findings. The parasitological findings included the presence or absence of gastrointestinal parasites identified during post-mortem examinations. These records were obtained from the abattoir's database and archives

### Data analysis

The data generated were subjected to descriptive statistical analysis using percentages and charts. This analysis aimed to determine if there were significant differences in parasite prevalence between the animal species (sheep and goats) or between sexes. The prevalence of gastrointestinal parasites was calculated in terms of percentages for each species and sex, and the results were graphically represented. The prevalence rate of gastrointestinal parasites in sheep and goats can be calculated using the formula:

$$\text{Prevalence Rate (\%)} = \frac{\text{Number of infected animal}}{\text{Total number of animals slaughtered}} \times 100$$

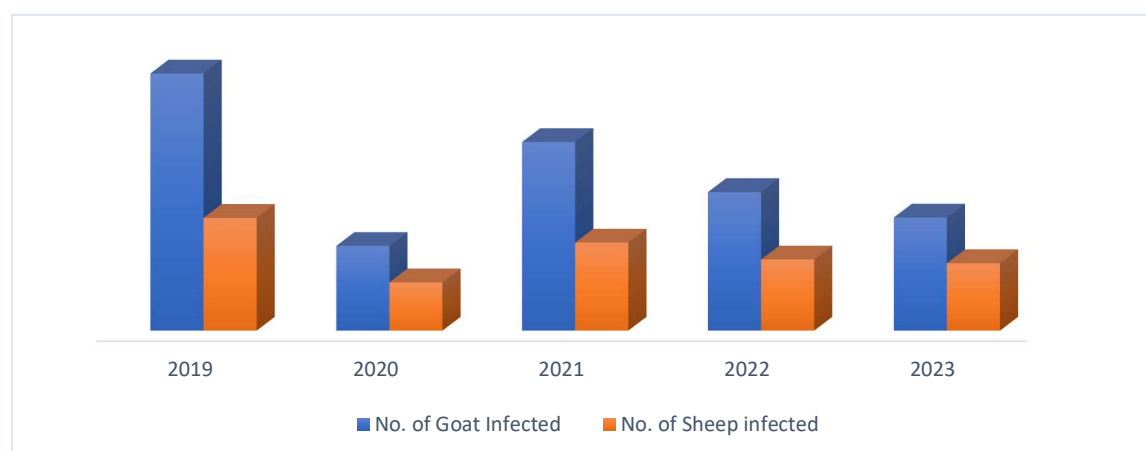
## RESULTS AND DISCUSSION

The results of this study showed that between the year 2019 and 2023 at Damaturu Modern Abattoir, a total number of 21410 goats and 13056 sheep were slaughtered and examined at meat inspection where

2123 goats and 1052 sheep were recorded to have infected with gastrointestinal parasites with a percentage prevalence of 9.9% and 8.1% respectively. This result indicated that goats were highly infected with the gastrointestinal parasites than sheep (Table I). The results of the sex (male or female) and parasitic species distribution indicated that the total of 3175 animals (sheep and goats) infected with the gastrointestinal parasites, 1941 were females and 1234 were males with a percentage prevalence of 61.1% and 38.1%. While, percentage parasitic species were 39.5%, 25.8%, 20.8%, 7.6% and 6.3% respectively. This shows that female animals were highly infected than their male counterparts (Table II).

**Table 1: Prevalence of Gastrointestinal Parasites in Sheep and Goats slaughtered at Damaturu Modern Abattoir between the year 2019 and 2023**

Years	Goats			Sheep		
	No. of animals examined	No. of infected	No. (%) of infection	No. of animals examined	No. of infected	No. (%) of infection
2019	4003	698	17.4%	2112	306	14.5%
2020	2342	230	9.8%	1745	131	7.5%
2021	4147	512	12.3%	2950	239	8.1%
2022	5317	376	7.1%	3073	193	6.3%
2023	5601	307	5.5%	3176	183	5.8%
<b>Total</b>	<b>21410</b>	<b>2123</b>	<b>9.9%</b>	<b>13056</b>	<b>1052</b>	<b>8.1%</b>



**Fig. 1** Prevalence of Gastrointestinal Parasites in Sheep and Goats slaughtered at Damaturu Modern Abattoir between the year 2019 and 2023

In this study, five (5) gastrointestinal parasites of various genera were encountered which include: *Moniezia spp*, *Haemonchus spp*, *Oesophagostomum spp*, *Fasciola spp* and *Paramphistomum spp*. This corroborated the reports by (Shitta and James-Rugu 2013) who observed and reported that nematodes and cestodes constituted the major cause of serious morbidity associated with ruminants in both Northern and Western Nigeria.

The results of this study indicated that goats were highly infected with the gastrointestinal parasites than sheep with a percentage prevalence of 9.9% and 8.1% respectively. The high prevalence of these gastrointestinal parasites observed in goats is in agreement with the findings of Solomon-Wisdom *et al.* (2014) and Nwigwe *et al.* (2013) who in their independent studies reported that gastrointestinal parasites are dominant in goats and are among the successful parasites of animals because of their sufficient life cycle ranging from the very simple to the extremely complicated stage.

The high prevalence in goats might also be due to the system of management that these goats 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. These findings agree with the work of Adejinmi *et al.* (2015) who stated that animals are exposed to massive parasitic infections

when they are kept in poor ranches/conditions and also when they are fed with contaminated food and water.

**Table 2: Prevalence of gastrointestinal parasites in sheep and goats slaughtered at Damaturu Modern Abattoir between the year 2019 and 2023 based on parasitic species and sex.**

Parasites	Female			Male			Total Parasite counts
	Goat	Sheep	Total	Goat	Sheep	Total	
<i>Haemonchus</i> spp	588	144	732	333	189	522	1254(39.5%)
<i>Oesophagostomum</i> spp	431	125	556	102	162	264	820(25.8%)
<i>Moniezia</i> spp	344	96	440	93	127	220	660(20.8%)
<i>Fasciola</i> spp	61	58	119	61	62	123	242(7.6%)
<i>Paramphistomum</i> spp	53	41	94	57	48	105	199(6.3%)
<b>Total</b>	1477	464	1941	646	588	1234	3175 (61.1%) (38.9%)

Females' animals showed were affected higher infection rates than males despite similar husbandry practice. This finding supports with the general understanding of helminth infections that female animals are more susceptible to helminthiasis. It is assumed that sex is a determinant factor influencing prevalence of parasitism (Maqsood *et al.*, 1996; Valcárcel and García, 1999) and females are more prone to parasitism during pregnancy and peri-parturient period due to stress and decreased immune status (Urquhart *et al.*, 1996).

*Haemonchus* spp. was the most prevalent gastrointestinal parasites, 1254(39.5%) encountered followed by *Oesophagostomum* spp. 820(25.8%), and thirdly *Moniezia* spp. 660 (20.8%, then *Fasciola* spp 242(7.6%) while *Paramphistomum* spp 199(6.3%) were the least prevalent parasites encountered. The high prevalence of *Haemonchus* spp. in this study was in agreement with the findings of Osakwe and Angigor (2007).

## CONCLUSION AND RECOMMENDATION

There is a high occurrence of gastrointestinal parasites in sheep goats slaughtered at Damaturu Modern Abattoir, it is therefore concluded that goats were highly infected with the gastrointestinal parasites than sheep with a percentage prevalence of 9.9% and 8.1% respectively. The highest infection rates were observed in 2019 (17.4% in goats and 14.5% in sheep), while 2023 showed lowest rates. The most common nematodes identified were *Haemonchus* spp. (39.5%) and *Oesophagostomum* spp. (25.8%). In sheep and goats, helminthiasis is found to be an important problem in the study area. Therefore, during the control and treatment of small ruminant helminthiasis; species, age and agro-ecology should be considered as potential risk factors for the occurrence of the disease. This finding should be of help to animal scientists, veterinarians and livestock workers as they should certify that only healthy small ruminants examined are slaughtered. It is therefore recommended that: The animals should be grazed with dried pastures, as the intermediate hosts are not found after drying out the fresh pastures. Regular deworming at least three or four times and improved management practices to mitigate these infections and enhance livestock productivity. Extension services should be improved by the government for effective enlightenment in the area of livestock production and further studies on the economic importance of helminthiasis and drug resistance patterns of anthelmintics should be conducted for the holistic implementation of helminthiasis control.

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