

## Prevalence of gastrointestinal parasites of goats slaughtered in Swali, Yenagoa, Bayelsa State, Nigeria

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### Abstract

Gastrointestinal parasites are considered the major disease-causing organisms of small ruminants (sheep and goats) in Nigeria. This study evaluated the prevalence of gastrointestinal parasites of goats slaughtered in Swali Abattoir, Yenagoa, Bayelsa State, Nigeria. Faecal samples collected from 100 goats were analysed for the presences of gastrointestinal parasites using formol-ether concentration technique. An overall prevalence of 34% was recorded during the study. Among the 61 female and 39 male goats examined, 27(44.26%) and 7(17.95%) were infected, respectively. The gastrointestinal parasites identified were *Trichostrongylus* species, *Haemonchus* species and *Eimeria* species; with *Trichostrongylus* spp. being the most prevalent (64.7%). Statistically, the result showed no significant difference with respect to age ( $p=0.06$ ). Although a higher prevalence was recorded among the Kano breed (36.84%) than Red Sokoto breed (32.26%), the difference was not significant ( $p<0.05$ ). Economic losses due to gastrointestinal parasitism are serious constraints affecting small ruminant production worldwide. Therefore, it is recommended that regular effective control measures should be employed and farmers should be educated on the proper use of anthelmintics.

### Introduction

Livestock plays a very important role in the economy of most nations. Goats are primarily raised for meat, leather, milk and hair production (Odeyinka 2000; Adebambo *et al* 2011). In many parts of the world, goats' production is a profitable enterprise because of the high demand for dietary animal protein (Anaeto *et al* 2009). Small ruminants like goats can adapt to several production systems and could be raised with relatively few inputs but they face huge production challenges (Hale and Coffey 2011). Gastrointestinal parasites are considered the main diseases-causing organisms of small ruminants like sheep and goats in Nigeria, leading to reduced production and productivity (Hassan *et al* 2013; Odogu and Okaka 2016). Although these parasites affect both large-and small-scale farmers globally, sub-Saharan Africa, and Nigeria in particular, have a higher incidence due to the availability of a wide range of agro-ecological factors suitable for diversity of species of host and parasite (Onaga *et al* 2009).

Gastrointestinal parasites that infect livestock, particularly goats, include the coccidian parasites, nematodes, cestodes and trematodes (Onaga *et al* 2009; Komaromy 2010). Goats with internal parasites infection exhibit a rough dull-coat, lethargy, diarrhea, tail rubbing, submandibular oedema (bottle jaw), loss of appetite and reduced weight (Risso *et al* 2015). Livestock such as goats get exposed to these pathogenic parasitic organisms very early under natural grazing conditions and the effect of infections are influenced by the environment, nutrition, climate and management practices (Blackburn *et al* 2011).

The consequence of infection with these internal parasites is huge economic losses especially in resource poor regions of the world. Loses can be direct and indirect, and include treatment expenses, decreased performance, and weight loss in animals and even animal death (Blackburn *et al* 2011). The impact of infestation by gastrointestinal helminthes varies depending on the type of parasite involved, the extent of infestation and other risk factors such as species, age, season, and intensity of worm burden.

For many livestock farmers, controlling internal parasites is a major concern, which can be difficult in humid regions. Growing resistance to several anthelmintics has made intestinal parasites more challenging to manage in small ruminants (Magona and Muisis 2002). The impacts of gastrointestinal parasites of goats could be reduced through implementation of appropriate control strategies that require knowledge of epidemiology and ecology of parasites under local conditions.

There is a scarcity of information on gastrointestinal parasites of goats slaughtered in Swali Abattoir in Bayelsa State despite the consequences of infection to animals and human beings. This study provides information on the prevalence of gastrointestinal parasites of goats in Yenagoa, Bayelsa State.

### Materials and methods

#### Study area

The study was carried out in Swali (4°55'29" N 6°15'51" E), Yenagoa Local Government Area, Bayelsa State in the Niger Delta region of Nigeria. It covers an area of 706km<sup>2</sup> and has a population of 352,285.

### Sample size

A total of 100 goats (39 male and 61 female goats slaughtered in the Swali Abattoir) were randomly examined for the prevalence of gastrointestinal parasites. Their ages and breed were also noted.

### Sample collection

Samples were collected between February and June 2021, in the morning from 7:00am. Faecal samples were collected from the intestines of slaughtered goats by hand using gloves and preserved in clean labelled sterile bottles containing 10% formalin. Collected samples were transported to the Department of Biology Laboratory, Federal University Otuoke, Bayelsa State for parasitological examination.

### Parasitological examination

The formol-ether concentration technique was used to analyse the samples (Agyemang *et al* 1997). One gramme (1g) of stool sample was emulsified with 4ml of 10% formol saline in a test tube. The mixture was filtered into a test tube using a hand sieve and 3-4ml of ethyl ether was added and shaken then allowed to stand for two minutes. The mixture was then centrifuged at 1000 revolutions per minute (1000rpm) for 5 minutes. The faecal debris from the tube's side was removed using a glass rod, and the tube was then turned upside down to release the supernatants. The fluid in the tube's side was allowed to drain to the bottom when it was put back into its original upright position. The deposit was mixed by tapping the tube with the finger and using a Pasteur pipette. A drop of the sediment was applied on a microscope slide, covered with a cover slip, and then examined under the microscope using  $\times 10$  and  $\times 40$  objectives. Lugol's iodine was also applied as a stain. Positive samples were identified using standard key.

### Data analysis

The Chi-square test was used to analyze the result for significance at  $p < 0.05$ .

### Results

#### Parasites identified in slaughtered goats

Out of 100 goats sampled in this study, 34 were infected with gastrointestinal parasites, indicating an overall prevalence of 34%. The ova of parasites identified were *Trichostrongylus* species, *Haemonchus* species, and *Eimeria* species. *Trichostrongylus* (64.7%) was the most prevalent while *Eimeria* species (5.9%) was the least prevalent parasite encountered (Table 1).

#### Sex-related prevalence of gastrointestinal parasites in slaughtered goats

Table 2 shows the prevalence of gastrointestinal parasites of goats according to sex. Among the 61 female goats examined, 27(44.26%) were infected; while 7(17.95%) male goats were infected out of 39 male goats examined. The prevalence of infection differed significantly ( $p < 0.05$ ) between the sexes.

#### Prevalence of gastrointestinal parasites in slaughtered goats in relation to age of goats

The comparison of the frequency of infection between goats less than 2 years and those between 2 and 3 years old showed that the younger animals (1-2 years) had a higher prevalence (44.19%) compared to older animals aged 2-3 years (26.32%). However, the difference between the two age groups was not significant ( $p = 0.06$ ; Table 3).

#### Prevalence of gastrointestinal parasites of slaughtered goats in relation to breed

Though a higher prevalence of infection was recorded among the Kano breed (36.84%) than Red Sokoto breed (32.26%), gastrointestinal parasites infection of goats slaughtered in Swali Abattoir was not significantly different between breeds ( $p = 0.64$ ; Table 4).

### Discussion

The study revealed a low prevalence (34%) of gastrointestinal parasites of goats slaughtered in Swali Abattoir in Yenagoa Local Government, Bayelsa State. This result is lower than 75.75% prevalence reported by Olanike *et al* (2015) in Ibadan, South West Nigeria. The low prevalence recorded in this study may be ascribed to the rearing system, period of the study and difference in geographical location.

Three parasites were encountered in this study; *Trichostrongylus* was the most prevalent while *Eimeria* species was the least. High prevalence of *Trichostrongylus* and *Haemonchus* were also recorded by Nwosu *et al* (2007) in North-eastern Nigeria. The result of this study differ from previous studies in Cameroun and South Africa that reported *Haemonchus* as the most important nematode (Tsetetsi and Mbatzi 2003; Bakunzi *et al* 2013; Ntonifor *et al* 2013). Its higher prevalence could be attributed to the capability of adult females to produce thousands of eggs per day, which can lead to rapid contamination of pasture by larvae and consequent outbreaks of haemonchosis (Roeber *et al* 2013).

**Table 1:** Parasites identified in goats slaughtered at Swali Abattoir, Yenagoa, Bayelsa State

Parasites identified	Number sampled	Prevalence (%)
<i>Trichostrongylus</i> species	22	64.70
<i>Haemonchus</i> species	10	29.40
<i>Eimeria</i> species	2	5.90
Total	34	100

**Table 2:** Sex-related prevalence of gastrointestinal parasites in goats slaughtered at Swali Abattoir, Yenagoa, Bayelsa State

Variable	Category	Status		Total number examined (%)	$\chi^2$	p-value
		Positive (%)	Negative (%)			
Sex	Male	7(17.95)	32(82.05)	39(39)	7.34	0.01
	Female	27(44.26)	34(55.74)	61(61)		
	Total	34(34)	66(66)	100(100)		

**Table 3:** Age-related Prevalence of Gastrointestinal Parasites in Goats slaughtered at Swali Abattoir, Yenagoa, Bayelsa State.

Variable	Category	Status		Total number examined (%)	$\chi^2$	p-value
		Positive (%)	Negative (%)			
Age (years)	1-2	19(44.19)	24(55.81)	43(43)	3.49	0.06
	2-3	15(26.32)	42(73.68)	57(57)		
Total		34(34)	66(66)	100(100)		

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

Variable	Category	Status		Total number examined (%)	$\chi^2$	p-value
		Positive (%)	Negative (%)			
Breed	Kano	14(36.84)	24(63.16)	38(38)	0.23	0.64
	Red Sokoto	20(32.26)	42(67.74)	62(62)		
Total		34(34)	66(66)	100(100)		

Goats under intensive and extensive production systems are extremely susceptible to the effects of a wide range of helminth endoparasites (Abebe and Esayas 2001). This suggests that *Trichostrongylus* and *Haemonchus species* may be the major contributors to ruminant endoparasitic infection in the area and cause anemia, oedema, and death of infected goats (Strickland 2000; Burke 2005; Garcia 2007).

The results of this study indicate that infection with gastrointestinal parasites were independent ( $p>0.05$ ) of the breeds of goats. Although the Kano breed had a prevalence of 36.84%, which is higher than the 32.26% recorded among Red Sokoto breed, the difference was not significant ( $p=0.64$ ). The result of this study showed female goats to be more infected than males. This differs from Zvinorova *et al* (2016) that reported higher prevalence of gastrointestinal parasites in males than female goats. This study also revealed that sex of the goats was related ( $p<0.05$ ) to gastrointestinal parasites infection. Significant difference between sexes has also been reported by Zvinorova *et al* (2016). However, the result of this study disagrees with that of Hassan *et al* (2019) on Egypt and Eke *et al* (2019) on Niger State, Nigeria. The higher percentage of infection in females recorded in this work may be due to the physiological condition of the animals during pregnancy and lactation. Urquhart *et al* (1996) assert that hormonal disturbances during these periods can cause stress in females, leading to decreased immunity to infections. The difference in the prevalence of infections between males and females could also be attributed to differences in the number of males and females sampled during the study.

Results from this study show that infection with gastrointestinal parasites were independent ( $p>0.05$ ) of the age of goats sampled. This result agrees with the Eke *et al* (2019) who reported no significant difference ( $p>0.05$ ) in the infection rate in relation to age. Eke *et al* (2019) also stated that gastrointestinal parasites are endemic in small ruminants. This finding also is in consonance with Nwosu *et al* (2007) who stated that adult animals harboured mature worms compared to younger ones.

### Conclusion

Various gastrointestinal parasites have been detected in goats in the study area, namely *Trichostrongylus*, *Haemonchus* and *Eimeria*, which are widely spread across the goats in the abattoir. Therefore, regular check is necessary due to the high prevalence rate of helminthiasis in livestock. Farmers should be trained on the appropriate administration of anthelmintics. Livestock farmers and owners should deworm their sheep and goats at least three or four times annually to decrease the burden of infection and improve productivity. The government should revive the dormant extension services as a top priority to effectively educate farmers on livestock production.

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### Conflict of Interest

Authors declare that no conflicts of interest exist.

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