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Prevalence of gastrointestinal parasites and their association with selected risk factors in slaughtered goats at Akinyele abattoir, Oyo state, Nigeria

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Abstract

Helminthiasis in ruminants is among the major endoparasitic infections responsible for economic losses through reduced productivity and increased mortality. This cross-sectional study was conducted at Akinyele Abattoir, Ibadan, Oyo State, Nigeria, to determine the prevalence of gastrointestinal (GI) parasites and their association with selected risk factors in slaughtered goats. A total of 170 faecal samples were collected from slaughtered goats using a convenience sampling technique over consecutive slaughter days. Samples were transferred into well-labelled sample containers and transported in an ice-packed cooler to the Parasitology Laboratory, Department of Veterinary Parasitology, College of Veterinary Medicine, Federal University of Agriculture Abeokuta for the analysis. Faecal samples were examined microscopically for helminth eggs and coccidian oocysts using the simple flotation technique. Parasite eggs and oocysts were identified based on morphological characteristics using standard parasitological identification keys. Out of the 170 faecal samples examined, 109 (64.10%) were positive for one or more gastrointestinal parasites. The parasites identified included *Haemonchus* spp. (3.00%), other strongyles (27.1%), *Trichuris* spp. (1.20%), *Moniezia* spp. (9.40%), and *Eimeria* spp. (34.10%). *Eimeria* spp. had the highest prevalence, while *Trichuris* spp. recorded the lowest prevalence. No significant association ($P > 0.05$) was observed between gastrointestinal parasite prevalence and the evaluated risk factors, namely breed, age, and body condition score. The findings indicated that gastrointestinal parasitism remains prevalent among slaughtered goats in the study area and may contribute to reduced productivity in small ruminant production systems.

Keywords: Gastrointestinal parasites, goats, prevalence, risk factors, abattoir

Introduction

The livestock sector remains an important component of Nigeria's agricultural economy, contributing significantly to food security, employment, and rural livelihoods. Goats constitute a substantial proportion of Nigeria's livestock population because of their adaptability, low production cost, and ability to thrive under extensive and semi-intensive management systems (FAO, 2019; Alkadir et al., 2024).

In addition to providing meat and milk, goats serve as a source of household income and socio-cultural value in many rural communities.

Despite the importance of goats in Nigeria, productivity is constrained by several factors, including inadequate nutrition, poor management, and parasitic diseases. Among these constraints, gastrointestinal parasitism remains one of the major health challenges affecting small

ruminant production in tropical regions (Taylor et al., 2016). Gastrointestinal parasites reduce feed efficiency, growth rate, reproductive performance, and overall productivity, resulting in substantial economic losses. Helminths belonging to the classes Nematoda and Cestoda, as well as protozoan parasites such as *Eimeria* spp., are commonly encountered in goats reared under extensive production systems where exposure to contaminated pasture and environments is high (Tesfaye et al., 2020). Clinical manifestations of infection include anaemia, diarrhoea, poor weight gain, and mortality in severe cases.

Several studies have reported the prevalence of gastrointestinal parasites in goats and sheep across different parts of Nigeria, including southwestern Nigeria (Adeyemi et al., 2019; Oladipo et al., 2023). However, information on the prevalence of gastrointestinal parasites among slaughtered goats at Akinyele Abattoir and their association with selected animal-related risk factors remains limited. Furthermore, most previous studies focused mainly on farm-level investigations with limited attention to abattoir-based surveillance.

Therefore, this study was designed to determine the prevalence of gastrointestinal parasites, identify the gastrointestinal parasite species present and assess the association between gastrointestinal parasite prevalence and selected risk factors such as breed, age, sex, and body condition score among slaughtered goats at Akinyele Abattoir, Oyo State, Nigeria.

Materials and Methods

Study Area

The study was conducted at Akinyele Abattoir in Akinyele Local Government Area of Oyo State, Nigeria. The area lies between latitudes 7°26'23" N and 7°40'30" N and longitudes 3°47'04" E and

4°05'00" E. The area experiences a bimodal rainfall pattern with peaks in May and August and a dry season between November and February (Nigerian Meteorological Agency [NiMet], 2021).

Study Animals and Sample Size Determination

The study involved West African Dwarf (WAD) and Red Sokoto (RS) goats slaughtered at Akinyele Abattoir. The sample size of 170 goats was determined using the formula described by Thrusfield (2007); $n = Z^2P(1-P) / d^2$

where: n = required sample size, Z = standard normal deviate at 95% confidence interval, P = expected prevalence from previous studies, d = desired precision.

Sampling Technique and Sample Collection

A convenience sampling technique was employed over consecutive slaughter days. Goats presented for slaughter during the study period were sampled. Faecal samples were collected directly from the rectum of goats using disposable gloves and transferred into well-labelled sample containers. The samples were transported in an ice-packed cooler to the Parasitology Laboratory for examination.

Goats were classified into young and adult groups based on dentition. Body condition scores were categorized as poor, moderate, or good according to the method described by Russel (1984).

Laboratory Examination

Faecal samples were examined microscopically for helminth eggs and coccidian oocysts using the simple flotation technique described by Soulsby (1982). Identification of parasite eggs and oocysts was based on their morphological characteristics using standard parasitological identification keys.

Statistical Analysis

Data obtained were analysed using descriptive statistics, including frequencies and percentages. Chi-square analysis was used to determine the association between gastrointestinal parasite prevalence and selected risk factors at a significance level ($P < 0.05$). Statistical analysis was carried out using GenStat Discovery Edition 4 statistical

software.

Results and Discussion

A total of 170 faecal samples obtained from slaughtered goats at Akinyele Abattoir were examined for gastrointestinal parasites. Of these, 109 samples were positive for one or more parasite eggs or oocysts, giving an overall prevalence of 64.10%.

Table 1: Overall prevalence of gastrointestinal parasites identified among slaughtered goats at Akinyele Abattoir

Parasite Species	Number Positive	Prevalence (%)
Haemonchus spp.	5	3.00
Other strongyles	46	27.10
Trichuris spp.	2	1.20
Moniezia spp.	16	9.40
Eimeria spp.	58	34.10

Eimeria spp. recorded the highest prevalence among the identified parasites, while Trichuris spp. had the lowest prevalence. Similar findings have been reported in previous studies conducted in southwestern Nigeria and other tropical regions (Adeyemi et al., 2019; Oladipo et al., 2023). The predominance of Eimeria spp. may be associated with contamination of holding environments and favourable environmental conditions that support survival and

transmission of oocysts.

The occurrence of strongyle eggs observed in this study agreed with reports by Adeyemi et al. (2019), who identified gastrointestinal nematodes as common parasites affecting goats under extensive production systems. Strongyle infections are widely recognized as important constraints to small ruminant productivity due to their effects on feed utilization and growth performance (Taylor et al., 2016).

Table 2: Association between gastrointestinal parasite prevalence and selected risk factors among slaughtered goats at Akinyele Abattoir

Risk Factor	No. Examined	No. Positive	Prevalence (%)	χ^2 (P-value)
Breed				
Red Sokoto	133	83	62.40	0.78 (0.378)
WAD	37	26	70.30	
Age				
Young	56	35	62.50	0.09 (0.758)
Adult	114	74	64.90	
Body condition				
Good	46	27	58.70	1.47 (0.480)
Moderate	105	71	67.60	
Poor	19	11	57.90	

No significant association ($P>0.05$) was observed between gastrointestinal parasite prevalence and the evaluated risk factors. This finding suggests that gastrointestinal parasitism was widely distributed among the sampled goats irrespective of breed, age, or body condition score.

The absence of significant association observed in this study agreed with reports from previous studies which showed that gastrointestinal parasite infections may occur across different animal categories under extensive management systems (Zvinorova et al., 2016; Adeyemi et al., 2019).

The distribution of gastrointestinal nematodes, *Moniezia* spp., and *Eimeria* spp. according to sex, breed, age, and body condition is presented in figures 1, 2 and 3. Breed-wise distribution showed that WAD goats recorded higher incidences of gastrointestinal nematodes (32.40%) and *Moniezia* spp. (13.50%), whereas ~~RS~~ ~~Sokoto~~ Red Sokoto goats had a higher incidence of *Eimeria* spp. (34.6%) infection. These differences may reflect variations in grazing patterns, immunity, and exposure to contaminated environments, as illustrated in Figure 1 and supported by earlier findings in tropical goat populations (Oladipo et al.,

2023).

Age-related distribution showed that young goats recorded prevalence rates of 28.60%, 10.70%, and 37.50% for gastrointestinal nematodes, *Moniezia* spp., and *Eimeria* spp., respectively, while adult goats recorded 32.50%, 8.80%, and 32.50%, respectively (Figure 2). The relatively similar prevalence rates between age groups suggest continuous exposure to infection under free-range and market-oriented production systems, where age-specific management is minimal (Nwosu et al., 2007; Adeyemi et al., 2019).

With respect to body condition, goats with moderate body condition recorded the highest incidence of gastrointestinal nematodes (32.40%) and *Moniezia* spp. (11.40%), whereas goats with good body condition recorded the highest prevalence of *Eimeria* spp. (39.10%). Goats with poor body condition recorded comparatively lower prevalence across all parasite groups. These trends, presented in Figure 3, highlight the complex interaction between nutrition, immunity, and parasite burden, as reported in previous studies (Fadlalla et al., 2018; Kyriazakis and Houdijk, 2020).

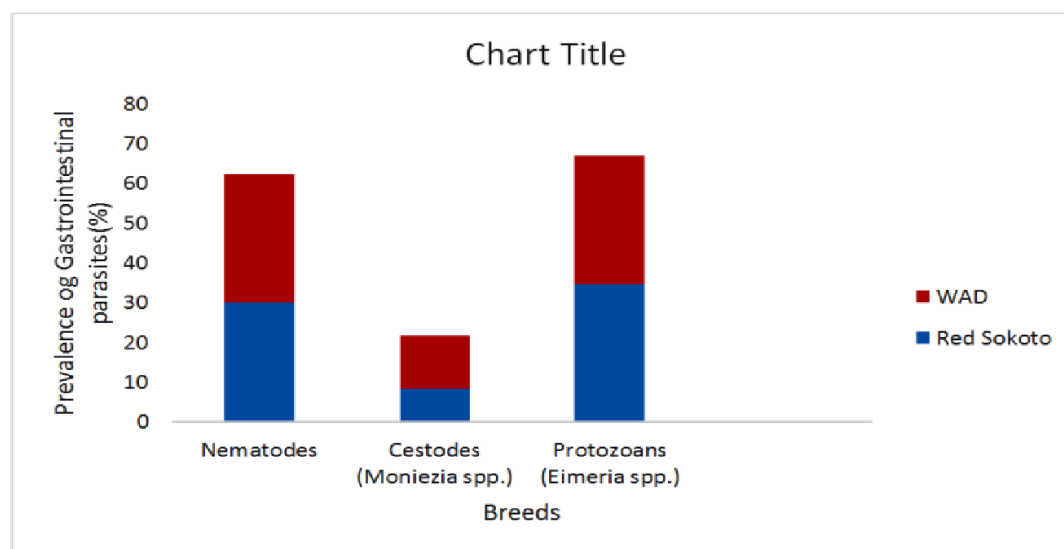


Figure 1: Prevalence of gastrointestinal parasites by breed in slaughtered goats at Akinyele Abattoir, Oyo State, Nigeria.

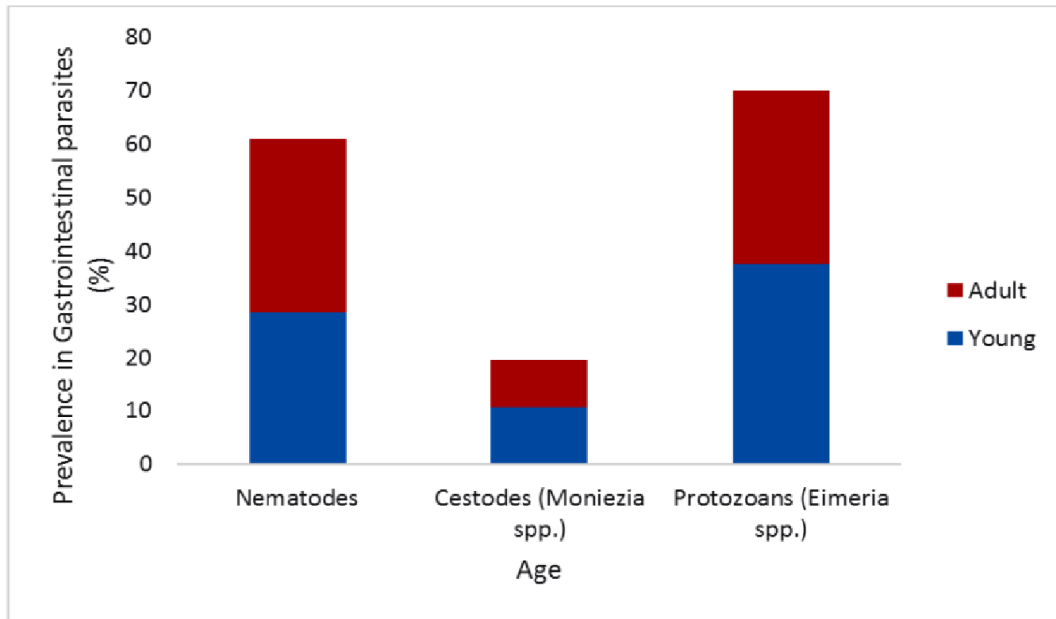


Figure 2: Prevalence of gastrointestinal parasites by age in slaughtered goats at Akinyele Abattoir, Oyo State, Nigeria.

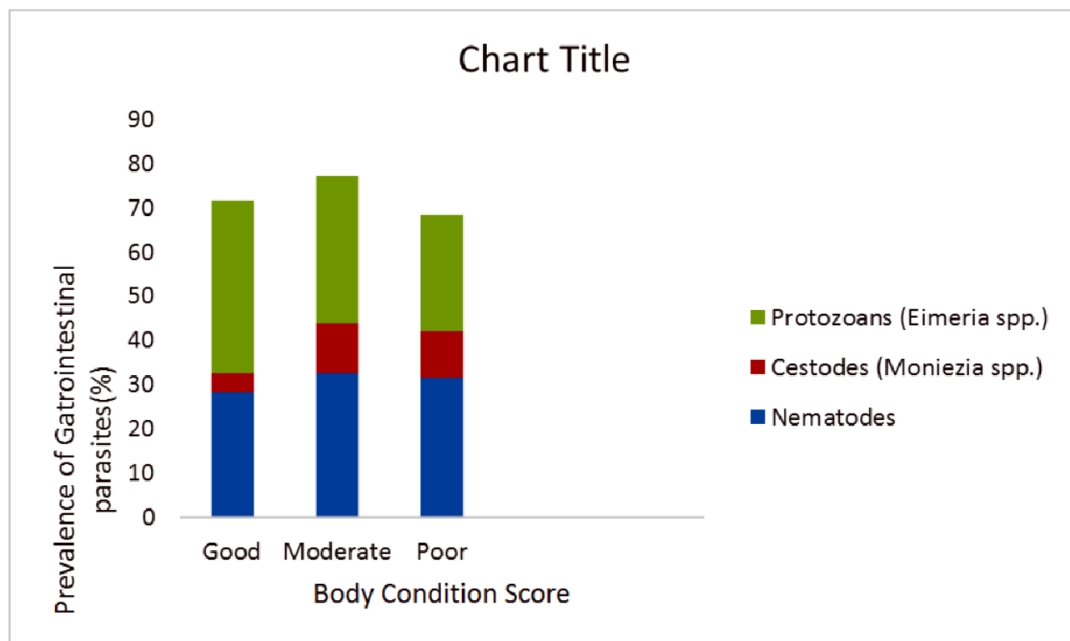


Figure 3: Prevalence of gastrointestinal parasites by body condition score in slaughtered goats at Akinyele Abattoir, Oyo State, Nigeria.

Conclusion

The study demonstrated that gastrointestinal parasites are prevalent among slaughtered goats at Akinyele Abattoir, Oyo State, Nigeria. *Eimeria* spp. and strongyle nematodes were the most frequently encountered parasites. Although numerical differences in prevalence were observed among the evaluated risk factors, no statistically significant association was found between gastrointestinal parasite prevalence and breed, age, sex, or body condition score. The findings indicate that gastrointestinal parasitism remains an important health challenge in goats and may contribute to reduced productivity in small ruminant production systems.

Recommendations

Regular deworming programmes, improved hygiene and sanitation practices, proper housing, and routine veterinary monitoring should be encouraged among goat farmers to reduce gastrointestinal parasite infections and improve small ruminant productivity. In addition, continuous surveillance and further studies involving seasonal variation and molecular identification of parasites are recommended.

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