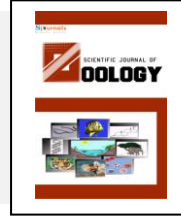


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**Original article**

## Prevalence of gastrointestinal round worms in calves in Sokoto, northwestern, Nigeria

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### ABSTRACT

An investigation to determine the prevalence and distribution of gastrointestinal roundworms in calves in Sokoto metropolis was carried out. A total of 216 faecal samples from calves were examined using Modified McMaster technique for morphological egg differentiation and count of worm-egg per gram of faeces of the sampled calves. Positive samples were cultured to differentiate between morphologically indistinguishable nematode genera. An overall prevalence was found to be 133 (61.57%). Eight different nematode genera were identified with *Cooperia* spp being highest in prevalence (28.78%) followed by *Haemonchus* spp (26.76%) and the least was *Toxocara* spp (0.50%). The prevalence was generally higher in females (56.39%) than in males (43.61%).

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### 1. Introduction

Parasitic nematode infections are one of the major causes of production losses in both tropical and temperate regions of the world (Maclean *et al.*, 1992; Gasbarre *et al.*, 2004, Ballweber, 2006), with the majority of these infections involving the intestinal lumen-dwelling nematodes. Although nematode parasitism is common in animals of all age classes, calves entering the first grazing season are generally the most susceptible age group (Tizard, 1996; Nesru, 1998). In young developing animals, nematode infections may cause retardation of growth

that persists even after elimination of the infection (Morley and Donald, 1980; Hansen and Perry, 1994; Maichomo *et al.*, 2004; Nwosu *et al.*, 2007).

In Nigeria, gastrointestinal nematode infection was predicted as an obstacle to expansion of cattle industry in a study conducted by Lee (1955) in south western states of Nigeria where rainy season is prolonged. Records compiled by Sprent (1946) listed thirteen (13) species of nematodes from the alimentary tract of cattle in Nigeria. A checklist was also compiled by Schillhorn van Veen *et al.* (1975) comprising 16 different species of gastrointestinal nematodes of cattle in northern Nigeria.

The aim of this study is to investigate the prevalence of gastrointestinal roundworms, the average infestation levels and causative nematodes genera and to estimate the parasite population density in calves of different breeds in the study area.

## 2. Materials and methods

### 2.1. Study area

Sokoto is the capital of Sokoto State, located in the North Western part of Nigeria. With a land area of approximately 56,000 square kilometers, it is located between longitudes 11° 30" to 13° 50" East and latitude 4° to 6° North (Anon, 2001). The state is bordered in the North by Niger Republic, Zamfara State to the East and Kebbi State to the South and West (Anon, 2001).

Sokoto is located in the Sudan Savannah vegetation belt with sandy soil and a humidity of below 40% year round except during the rainy season when it rises to 60% (Iloje, 1971).

### 2.2. Sampling technique

Farms within Sokoto metropolis were identified and based on the consent of the proprietors, the total number of calves on each farm were sampled. A total of 216 faecal samples were collected from the calves. Individual rectal or freshly voided faecal samples were collected using labeled polythene bags. Each sample contained the following data: sex, age, and breed, and were transported to the Parasitology and Entomology Laboratory of the Faculty of Veterinary Medicine, Usmanu Danfodiyo University, Sokoto, Nigeria for analysis.

### 2.3. Methods of examinations

#### 2.3.1. Faecal nematode egg counting and morphological differentiation

Following collection of samples, the faeces were examined for eggs of gastrointestinal nematodes. Morphological differentiation was based on microscopic appearance of the eggs encountered, compared to those in standard texts. Microscopic egg-count (eggs per gram of faeces) was carried out using Modified McMaster method (Thienpont *et al.*, 1986; Taylor *et al.*, 2007).

#### 2.3.2. Cultivation and differentiation of infective larvae

Further distinction between genera of the Strongylida-order from the positive samples was made by larval culture of a dung-sterile faeces (burnt and dried bulk faeces) mixture. Faecal cultures were made by the modification of the technique described by Roberts and O'Sullivan (1950) where 5grams of the sample was used instead of 3grams. Identification of the L3 was based on morphological characteristics, which include head shape, number of gut cells and length of sheath tail (Keith, 1953; Gruner and Raynaud, 1980; Taylor *et al.*, 2007).

## 3. Results

The overall prevalence of gastrointestinal nematodes was found to be 133 (61.57%) (Table 1). Gastrointestinal roundworm infections were observed with a prevalence of 51 (57.95%) in calves less than six months and a higher prevalence of 78 (65.00%) in calves six to twelve months (Table 1). Based on breeds, prevalence of gastrointestinal nematodes was low in Sokoto-Gudali 20 (15.04%) breed compared to crossbreed 43 (32.33%) and Friesian breed 70 (52.63%) (Fig. 1). Overall, females 75 (56.39%) were more infected than males 58 (43.61%) (Table 2). Whatever the dominant breed, age or sex, there was worm-egg count of between 200 and 8900epg throughout the study using modified McMaster egg counting technique. Eight different nematode genera

were identified with *Cooperia* spp being highest with 57 (28.78%) followed by *Haemonchus* spp with 53 (26.76%) and the least was *Toxocara* spp with 1 (0.50%) (Table 3).

**Table 1**

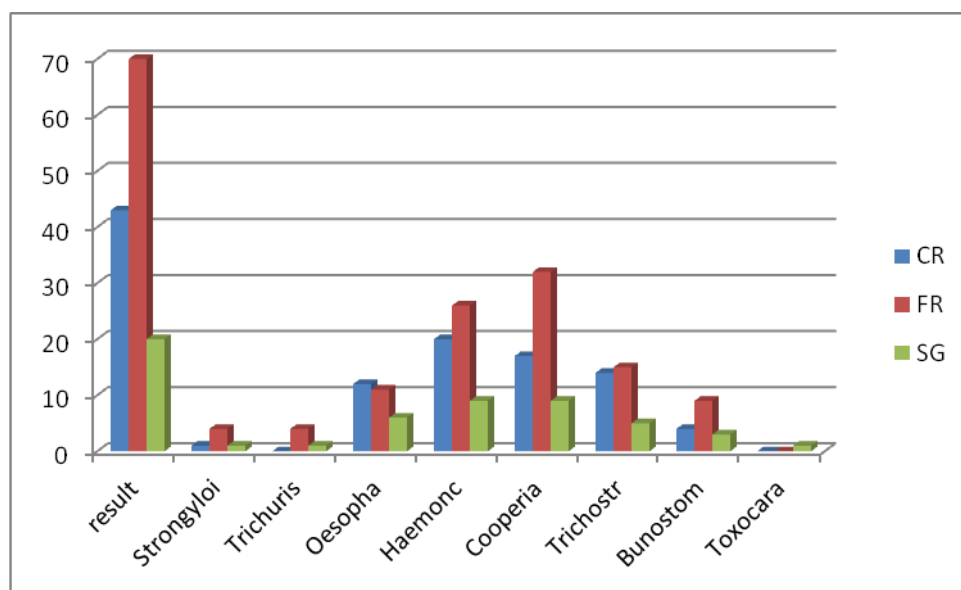
Prevalence of gastrointestinal roundworms of calves by age groups in Sokoto, northwestern, Nigeria.

Age groups (Months)	Sex		Number of samples	Number positive	Prevalence (%)
	Male	Female			
<6	44	44	88	51	57.95
6-12	0	8	120	78	65.00
13-18	52	68	8	4	50.00
Total	96	120	216	133	61.57

**Table 2**

Prevalence of gastrointestinal roundworms of calves by sex in Sokoto, northwestern, Nigeria

Sex	No. of samples	Number positive	Prevalence (%)
Male	96	58	43.61
Female	120	75	56.39
Total	216	133	100



**Fig. 1.** Prevalence of gastrointestinal roundworms in calves in relation to breeds in Sokoto, northwestern, Nigeria.

CR= Crossbreed

FR= Friesian

SG= Sokoto Gudali

Result= number of positive samples per breed

#### 4. Discussion

This study indicated a high prevalence of gastrointestinal nematodes of (61.57%) in calves in selected farms which is in agreement with some studies in other countries with a savannah type of vegetation; Kenya 86.8%

(Waruiri et al., 1998) and 97.2% in the lower plains of southern highlands of Tanzania (Keyyu et al., 2003), but contrary to the findings of Swai et al. (2006) who reported a prevalence of 14.2% in Ngorongoro district, Tanzania.

**Table 3**

Percentage prevalence of gastrointestinal roundworms in calves in Sokoto, northwestern, Nigeria.

Nematode parasites	Number of appearance	Prevalence (%)
<i>Strongyloides</i> spp	6	3.04
<i>Trichuris</i> spp	5	2.53
<i>Oesophagostomum</i> spp	28	14.14
<i>Haemonchus</i> spp	53	26.76
<i>Cooperia</i> spp	57	28.78
<i>Trichostrongylus</i> spp	32	16.16
<i>Bunostomum</i> spp	16	8.09
<i>Toxocara</i> spp	1	0.50
Total	198	100

*Cooperia* spp and *Haemonchus* spp were present in the highest numbers of 28.78% and 26.76% followed by *Trichostrongylus* (16.16%) and *Oesophagostomum* (14.14%) species respectively, as also observed in studies from Kenya, 28.5% and 52.5% followed by 5.6% and 6.9% respectively (Waruiri et al., 1998), in Zimbabwe, 44% and 29% followed by 4% and 13% respectively (Pandey et al., 1993) and in Tanzania, 67.8% and 24.7% followed by 1% and 5.1% respectively (Keyyu et al., 2003).

Prevalence of gastrointestinal nematodes was low in Sokoto-Gudali 20 (15.04%) breeds (*Bos indicus*) which are relatively resistant to helminthosis (Williamson and Payne, 1978) compared to crossbreed 43 (32.33%) and Friesian 70 (52.63%) which is exotic breeds (*Bos taurus*). The findings of higher prevalence rate in females 75 (56.39%) than in males 58 (43.61%) may be due to differences in exposure to infection as a result of the variation in stocking density (sex ratio). The findings of higher prevalence rate found at the age range of six to twelve months 78 (58.65%) suggests a possibility of early introduction of calves to grasses and subsequent increase in larval uptake.

## 5. Conclusion

It is concluded therefore that, susceptibility to gastrointestinal roundworm infections varies among breeds of calves.

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