Epidemiology of Gastrointestinal Nematodes in Dairy Cattle in farms around Gweru, Zimbabwe

Moyo, D.Z.
Department of Biological Sciences,
Midlands State University P. Bag 9055, Gweru,
Zimbabwe
Email: moyodz@msu.ac.zw

Abstract
An epidemiological study of gastrointestinal nematode infections of dairy cows and calves was conducted in two farms in Gweru district from July 2004 to July 2005. Cows had low faecal egg counts during the dry and wet seasons. Calves had significantly higher faecal egg counts during the rainy season than the dry season in both farms (P<0.05). Faecal larval cultures indicated that Haemonchus , Cooperia and Trichostrongylus were the most important nematodes. Pasture larval counts were low during the dry season but increased and peaked in March coinciding with the faecal egg counts peak. Results of the study indicate that next to calves, cows are important contributors to pasture contamination. These categories of cattle would benefit from anthelmintic treatment administered at the end of the dry season and middle of the rainy season.

Key Words:
Dairy cattle, gastrointestinal nematodes, *Haemonchus* and anthelmintic treatment.

Introduction

Gastrointestinal nematodes are a major cause of impaired productivity in ruminants throughout the world (Holmes, 1985). Clinical outbreaks of parasitic gastroenteritis are mainly restricted to young animals, before they acquire immunity against infections. Gastrointestinal nematode infection in calves affects not only growth performance but also the ensuing milk production during the first lactation (Adrichem and Shaw, 1977). However, subclinical production losses in older animals can be more important. Gastrointestinal nematodes may cause production losses due to loss of weight in older animals (Ploeger, 1989; Kloosterman *et al*., 1993), reduced milk production (Bliss and Todd, 1977; Adrichem and Shaw, 1977; Barger, 1981), impaired reproductive efficiency (Holmes, 1985; Zajac *et al*., 1991) and costs of curative and preventive measures. Little is known about the epidemiology of gastrointestinal nematodes in dairy cattle in Zimbabwe. In beef cattle, studies indicated that gastrointestinal nematodes are of economic importance (Pandey *et al*., 1993; Moyo *et al*., 1996; Moyo *et al*., 2003).

The aim of the study was to determine the

seasonal strongyle nematode faecal egg output and genera in dairy calves and their dams as well as the pasture larval counts during the dry and wet season.

Materials and Methods

Climate

The farms are located on the highveld with an altitude of more that 1430 m above sea-level. The climate in Gweru is characterised by two defined seasons, i.e. a rainy season which lasts from November to April and a dry season lasting from May to October. Gweru has an annual rainfall of 643mm occurring during one season (November-April). During the dry season cool conditions occur in winter (end of May-beginning of August) and after that temperatures rise to a maximum of 30^0 C in October (Anonymous, 1978).

Farms

The study was conducted in two farms near the City of Gweru. Farm A is located 15 km North of Gweru and Farm B is located 12 km East of Gweru. Both farms have natural pastures that are dominated by *Cynodon* spp. The stocking rate was 1 L.U/Ha. Rotational grazing occurred fortnightly in two plots.

Animals

Farm A has 80 Jersey cows and Farm B has 30 Holstein and Red Dane crosses. Calves were between 2 and 4 months old at the beginning of the study and the ages of their dams ranged between three and four years. Cows grazed separately from the calves. The basal diet consisted of grazing of natural grass supplemented with 2kg/day per cow of a maize/soybean-based commercial dairy meal (Urelac® 14% CP National Foods, Bulawayo, Zimbabwe). Calves grazed the natural grass only. In Farm A cows were orally treated with albendazole at the end of November. No anthelmintic treatment was given to the animals in Farm B.

Parasitological procedures

Counts of strongyle eggs per gram of faeces (epg) were determined monthly in 10 calves and l0 lactating cows per farm using the salt flotation method. Faecal cultures were also prepared monthly. Pooled faeces from cows and a separate pool from calves were mixed with wood shavings and stored at 27 ^{0}C for 10 days. Up to 100 larvae harvested from cultures were identified to generic level using the standard keys (Ministry of Agriculture Food and Fisheries (MAFF), 1986). Pasture herbage samples were collected monthly for estimation of the number of infective third stage larvae. Herbage samples were collected along a zigzag pattern across the paddock grazed by the animals. About 200 g of herbage was collected. Herbage was collected at 8.00 am. Herbage was soaked overnight in 10 L of water that contained a little amount of liquid washing soap. Herbage was rinsed and oven dried. The water in the bucket was allowed to settle down for 2 hours. About 9 L were siphoned off and the remaining contents of the bucket were put in a 2L measuring cylinder, and were allowed to settle for a further 2 hours. About 1.9L were carefully siphoned and the remaining 100 ml was put in a small beaker. After settling down for 1 hour most of the water was carefully siphoned until about 30 ml remained. This was dispensed into test tubes and was allowed

to settle down for another hour. The supernatant was again carefully siphoned. The infective nematode larvae in the remaining contents were enumerated and identified to generic level using standard keys (MAFF, 1986).

Meteorological data

Meteorological data were obtained from the Department of Meteorology Office, Thornhill Air Base, Gweru.

Statistical analysis

Differences between geometric means of eggs per gram of faeces (epg) of groups was done using the t-test ($P<0.05$ was considered significant).

Results

Faecal egg counts

The geometric mean number of strongylid eggs per gram of faeces (epg) for the calves and cows in the two farms are given in Figure 1. The epg of cows in both farms were low during the dry and wet seasons. The faecal egg counts of cows in Farm A remained below 20 epg whereas in Farm B the epg was below 40. There were no significant differences in the epg of cows during the dry and wet seasons in both farms. The faecal egg counts of calves in Farms A and B were low during the dry season but increased during the rainy season and peaked in March. During the rainy season the epg of calves in both farms were significantly higher than during the dry season ($P<0.05$). Eggs of *Moniezia* were frequently recovered in calves in both farms from November to April. Coccidia oocysts were also frequently recovered in faeces of calves.

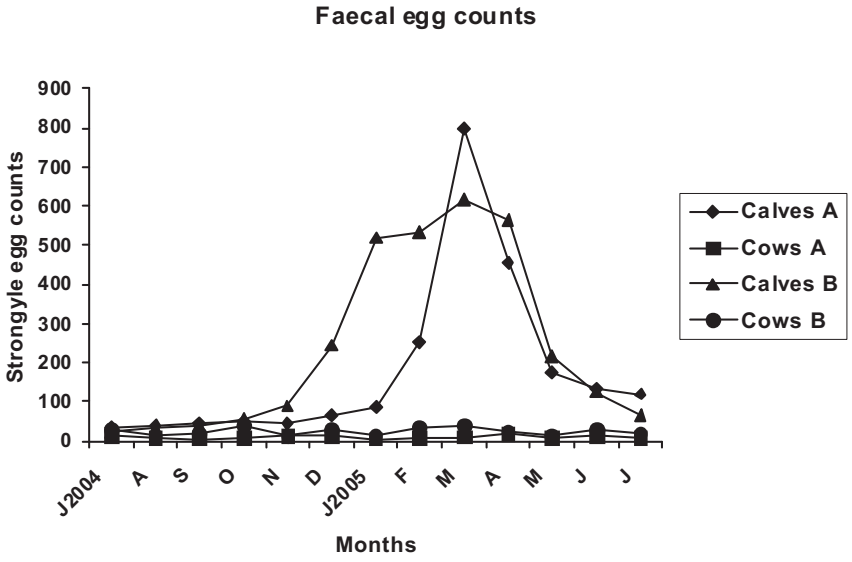
Faecal larval cultures

Table 1 shows the frequency of infective larvae (L3), for the most prevalent genera, *Cooperia*, *Haemonchus* and *Trichostrongylus*, found on faecal culture of pooled samples for the dry and wet seasons in calves and cows. *Cooperia* followed by *Trichostrongylus* were the most prevalent genera in both age categories during the dry season. During the wet season, *Haemonchus* was the most prevalent genus in both age categories and farms. Occasionally *Bunostomum* and *Oesophagostomum* were recovered but in low percentages.

Pasture larval counts

Cooperia, *Haemonchus* and *Trichostongylus* were recovered in herbage mostly during the rainy season. The pasture larval counts peaked in March (Figure 1).

(a)



(b)

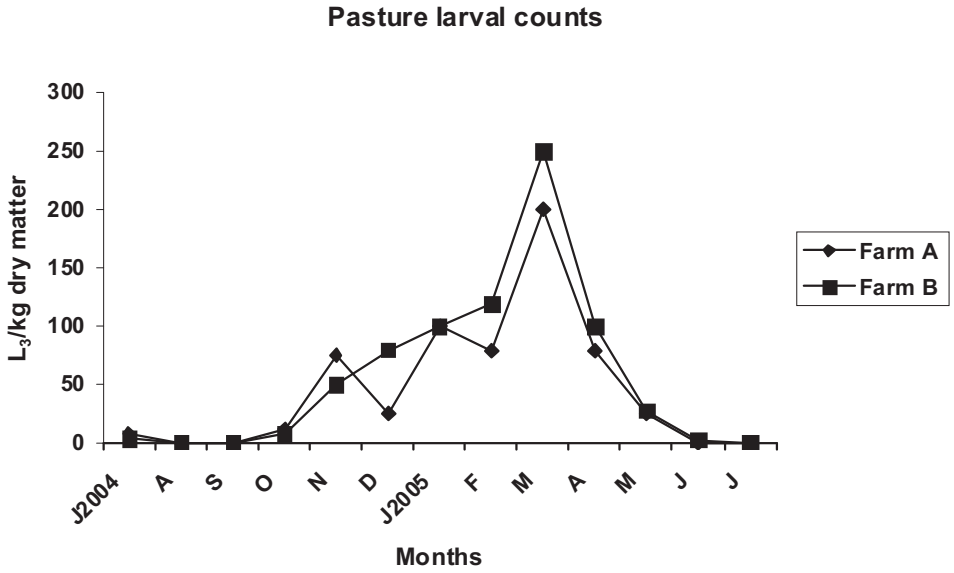


Figure 1. Seasonal changes in (a) strongyle faecal egg count and (b) pasture larval counts at Farms A and B.

Table 1. Frequency of infective larvae (L_3) of the most prevalent nematodes found on faecal culture of pooled samples of calves and cows in two dairy farms in Gweru district (mean and range).

Farm	Parasite	Frequency of L_3			
		Dry season		Wet season	
		Calves	Cows	Calves	Cows
A	*Haemonchus*	21(6-57)	26(3-83)	49(35-90)	42(25-82)
	Cooperia	40(22-49)	33(17-83)	42(11-42)	35(17-61)
	Trichostrongylus	37(13-52)	41(3-61)	3(1-12)	5(0-14)
B	*Haemonchus*	18(3-42)	29(2-70)	53(38-86)	56(19-82)
	Cooperia	43(18-48)	36(10-54)	36(9-44)	29(5-49)
	Trichostrongylus	39(11-60)	33(4-59)	4(2-11)	9(4-15)

Meteorological data

Below average rainfall was recorded during the study period and drought conditions occurred (Figure 2).

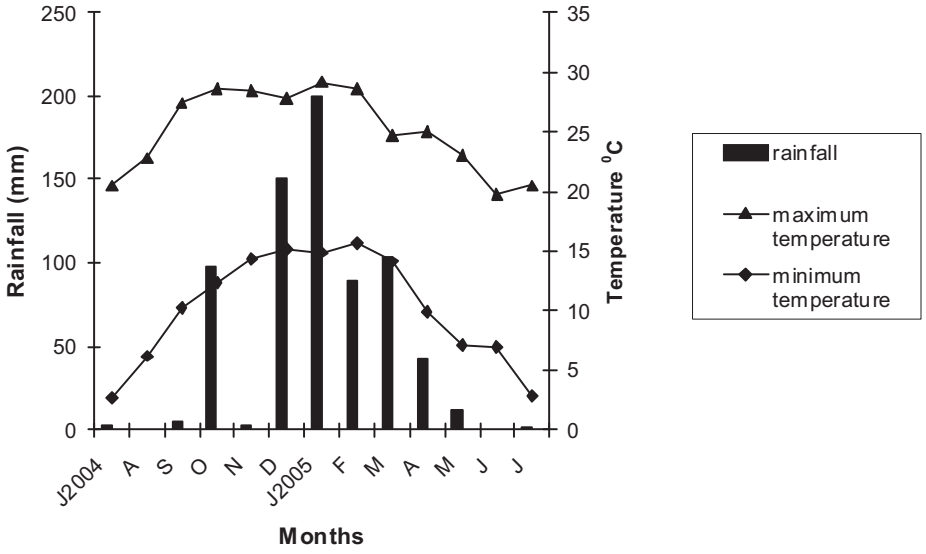


Figure 2. Mean monthly rainfall and maximum and minimum temperatures for Gweru during the study period.