

Seasonal prevalence of gastrointestinal parasites in slaughtered cattle at selected slaughterhouses in Abeokuta and environs, Nigeria

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Abstract

Gastrointestinal parasites are a major factor that interferes in cattle development because of the economic losses they cause in relation to low herd productivity. A study was carried out from October 2014 to June 2015 to assess the seasonal prevalence of gastrointestinal parasites in cattle slaughtered in four cattle slaughterhouses namely Gbonagun, Lafenwa, Owode-egba and Aladesanmi in Abeokuta and environs, Ogun state, southwest Nigeria. A total of 160 faecal samples of cattle were collected across slaughter houses and examined. Of the 160 faecal samples examined, 47 (29.38%) were positive for gastrointestinal parasites. Cattle slaughtered at Aladesanmi had the highest prevalence of 16 while those slaughtered at Lafenwa had the lowest prevalence of 6. Bulls had a higher infection rate of 27 (16.88%) while cows had a prevalence of 20 (12.50%). The gastrointestinal parasites observed were *Strongyle* and *Eimeria* species. *Strongyle* spp. had higher prevalence than *Eimeria* spp. There was no significant association ($P > 0.05$) between the sex of cattle while a significant difference ($P < 0.05$) was observed across different seasons. A higher prevalence was observed in the rainy season as compared with the dry season. The current study suggests that attention should be given to awareness creation among the cattle owners on the proper management and most sustainable way to reduce the risk of contamination and minimise problems that could cause economic losses in cattle production especially during the rainy season when these parasites are more prevalent.

Keywords : Cattle, gastrointestinal parasites, slaughterhouses, faeces, season, Abeokuta, Nigeria

Introduction

Cattle are the most common type of large domesticated animals representing valuable assets in traditional agriculture and have remained an essential component of the agricultural sector of the Nigerian economy producing meat as a major product (Udoh and Akintola, 2003). The historical mobile pastoralism or transhumance is the dominant system of cattle production in Nigeria (Akpa *et al.*, 2012) where these animals are grazed on communal pastures throughout the year with little or no nutrient supplement and fodder shortage being a major problem even in the rainy season. Under this system, they are often exposed to parasites and are thus

constantly being re-infected in a chain reaction mode. The development of variable degrees of resistance among different species of gastrointestinal nematodes to anthelmintic drugs has been reported as a primary factor in the reduction of productivity (Kudi and Kalla, 2001; Kaplan, 2004).

Gastrointestinal parasites are ubiquitous among grazing cattle and they are economically detrimental with significant economic losses worldwide mainly due to condemnation of carcasses and organs at abattoirs (Mummed and Webb, 2015). They are also associated with mortality in infected flocks, depressed growth and feed conversion efficiency, loss

of productivity and enhanced susceptibility to bacterial and viral diseases (Spithill *et al.*, 1999; Ekong *et al.*, 2012).

The epidemiology of gastrointestinal parasites in livestock varies in different localities, depending on the local climate, season and management system (Hansen and Perry, 1994) and its effects are determined by a combination of factors of which the varying susceptibility of the host species, the pathogenicity of the parasite species, the host/parasite interaction and the infective dose are the most important (FAO, 2000). This study therefore was carried out to determine the level of gastrointestinal parasite infections of cattle slaughtered in four selected slaughter houses in Abeokuta and environs, Ogun state, southwest Nigeria.

Materials and Methods

Study area

The study was carried out in four cattle slaughterhouses namely Gbonagun, Lafenwa, Owode-egba and Aladesanmi in Abeokuta and environs, Ogun state, southwest Nigeria. The area lies within longitudes 2° 45''E and 4° 45'' E and latitude 6° 15''N to 7°60''N. The climate is characterised by consistently high temperatures ranging from 22°C to 33°C for most of the year. Annual rainfall is between 1800 and 3000mm. The vegetation of the zone is derived savannah (Onakomaiya *et al.*,2000). The weather pattern shows that the dry season occurs from November/December to March/April and rainy season from April/May to October/November.

Sample collection

A total of 160 cattle were sampled across the four slaughterhouses during the months of October 2014 to June 2015. For sampling

convenience, the year was divided into four seasons: late rainy season (October/November), early dry season (December /January), late dry season (February-March) and early rainy season (May/June). Seasonal visitations were made to the slaughter houses for the collection of faecal samples on specified days during the study period. Sample collection was done as early as 6:00am when animals were usually taken to the slaughterhouses. Faecal samples of about 3 grams were randomly collected with a total number of 40 samples collected monthly throughout the four classified seasons with the aid of latex gloves.

Laboratory techniques

Samples were clearly identified, labelled, kept in an ice box and were screened for helminthic eggs and other protozoan oocysts using simple floatation and sedimentation method (MAFF, 2006) at the Parasitology Laboratory of the College of Veterinary Medicine, Federal University of Agriculture, Abeokuta. The faecal egg and oocyst loads were estimated by the modified McMaster technique. The prevalence of each parasite infection was calculated as the number of cattle diagnosed positive for a given parasite divided by the total number of animals examined at the particular time (Thrusfield, 2005).

Statistical analysis

Data collected were subjected to descriptive analysis and the significance of prevalence proportions were analysed using Chi-square test at $p < 0.05$ level of significance (SPSS, 1999).

Results and Discussion

The overall prevalence of gastrointestinal parasites in cattle (Table 1) within the period

Table 1: Overall prevalence of gastrointestinal parasites in slaughtered cattle in selected slaughterhouses at Abeokuta and environs

Sex	No. of samples	Number of positive	Prevalence (%)
Male	81	27	33.30
Female	79	20	25.32
Total	160	47	100.00

of study was found to be 47 (29.38%) of the 160 animals sampled. This is similar to the report of Shitta (2013) who reported a prevalence rate of 34.9% in cattle slaughtered at Wukari abattoir, Taraba State, Nigeria but lower than 62.1% earlier reported by Nwigwe *et al.* (2013) in south-southern, Nigeria. This outcome might be an indication of the availability of infective stages of these parasites in areas where the cattle were sourced from.

Results further showed that bulls were more infected (33.30%) than cows (25.32%). The higher infection rate observed in bulls in this study corroborates earlier findings by Raza *et al.* (2013) who reported that bulls were more likely to be infected with helminths than the cows which could be attributed to the fact that bulls are more aggressive when feeding and thus likely to pick up more ova of helminths on the pasture. Hillgarth *et al.* (1997) and Apio *et al.* (2006) also reported that male

domestic ungulates are more susceptible to infections with gastrointestinal tract parasites than females due to hormone debilitating immune functions, which favour the growth and spread of parasites in male guts. Though, contrary findings of no significant association with the prevalence of parasite burden across sex were observed in cattle exposed to communal grazing in Ethiopia (Kemal and Terefe, 2013) as well as those slaughtered in Ibadan, Southwest Nigeria (Adedipe *et al.* 2014).

The seasonal effects on the overall prevalence of gastrointestinal parasites in cattle slaughtered in selected slaughterhouses (Table 2) showed a definite seasonal prevalence that corresponded to the rainfall patterns similar to the observations of Nwosu *et al.* (2007). The infestation rates in this study were at peak in the late rainy season (October to November) during which rainfall was probably more favourable for the development and

Table 2: Seasonal effects on the overall prevalence of gastro intestinal parasites in cattle slaughtered in selected slaughterhouses at Abeokuta and environs

Season	N	Slaughter houses				No. positive	Prevalence (%)
		Gbonagun	Aladesanmi	Owode	Egba Lafenwa		
LRS	40	6	6	5	2	19	(47.5)
EDS	40	6	5	1	1	13	(32.5)
LDS	40	2	1	1	3	7	(17.5)
ERS	40	2	4	2	0	8	(20.0)
N	160	15	16	10	6	47	(29.38)

LRS= Late Rainy Season, EDS= Early Dry Season, LDS= Late Dry Season, ERS= Early Rainy Season, n= number of samples

survival of infective larvae on the pasture. The lack of rainfall in the dry season could be responsible for the decline in infestation rate, a condition unfavourable for the development of eggs to infective larvae. It has however been reported that when cattle graze on natural pasture, climate plays an important role in the transmission of parasites (Gatongi *et al.*, 1987), which was evident from the results of this study.

The gastrointestinal parasites (Table 3) observed in this study across seasons were the *Strongyle* and *Eimeria* species. A total of 72.34% of cattle infected with parasites and slaughtered across the seasons were infected with *Strongyle* spp. while 27.66% were infected with *Eimeria* spp. Most of the animals had a combination of the two parasites. However, these two parasites have been reported as the most incriminated gastrointestinal parasites of domestic ruminants (Eysker and Ogunsusi, 1980). Agyei, (1997) and Odoi *et al.* (2007) reported strongyles to be the most common and economically important gastrointestinal nematodes in the tropics.

The high rate of *Strongyle* infection observed during the late rainy /early dry seasons could be as a result of the peak pasture contamination that normally occurs at the end of the rainy season. Moreover the

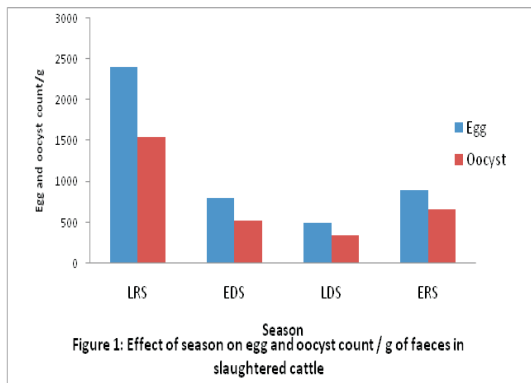
level of infections across seasons could be due to the inefficient methods of control coupled with poor hygiene conditions as well as suitability of the climate for survival and proliferation of the parasites in the slaughtered animals (Biffa *et al.*, 2007). Environmental pollution in addition to poor nutrition resulting from livestock grazing could have contributed to sustained transmission which may be responsible for clinical disease in the slaughtered animals. This could predispose animals to physiological stress which most cattle under the nomadic system are exposed to as they have to walk long distances for food and water which invariably lower their immunity thereby resulting in the high rate of intestinal parasites in these animals. Regassa *et al.*, (2006) attributed the high prevalence of gastrointestinal parasites in cattle to their free-range grazing management which increase their chances of picking up the cysts, ova, larvae or the intermediate host of these parasites that were attached to the pastures.

The effect of season on the egg and oocyst count per gram of faecal samples collected from cattle in the slaughterhouses are depicted in Figure 1. Results on the levels of infestation across season showed a strong presence of egg and oocyst counts in

Table 3: Prevalence (%) of gastrointestinal parasites in slaughtered cattle at different seasons

Parasites	Season				n	(%)
	LRS	EDS	LDS	ERS		
<i>Strongyle</i> spp	16	12	1	5	34	72.34
<i>Eimeria</i> spp	2	0	6	5	13	27.66
Total	18	12	7	10	47	100

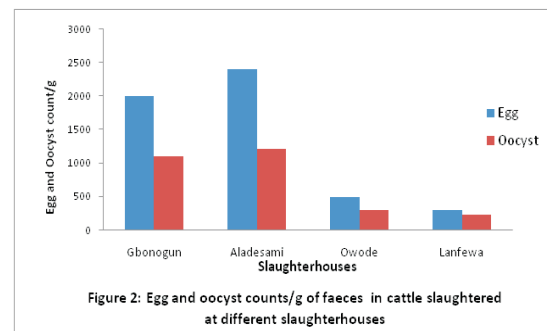
LRS = Late Rainy Season, EDS = Early Dry Season, LDS = Late Dry Season. ERS = Early Rainy Season, n = no of animals



the infected animals, with more eggs of *Strongyle* observed compared to *Eimeria* oocysts. The rainy season presented more counts than the dry season. This could be due to more available intermediate hosts during this season. The number of infective larvae in pasture has been found to be directly related to the pattern of rainfall and also influenced by the number of rainy days (Pfukenyi and Mukaratirwa, 2013).

Figure 2 shows the effect of different slaughterhouses on the egg and oocyst counts in faeces of cattle slaughtered at different slaughterhouses. There were variations across slaughterhouses with higher counts observed in cattle slaughtered at Aladesanmi. The low counts of eggs and oocysts observed in cattle at Lafenwa may be due to the fact that the animals were dewormed periodically. Also, the quarantine programme for newly arrived cattle in the slaughterhouse before introducing them to the lairage could have possibly improved management practices. Nevertheless, the presence of parasitic infections observed in cattle across slaughterhouses supports the fact that grazing cattle from which a larger percentage of cattle in these slaughter

houses were sourced were always exposed to parasites and were thus constantly being re-infected in a chain reaction mode. The high incidence of gastrointestinal parasites in ruminants usually kept under traditional methods of husbandry have insidious effects that undermine host health particularly when compounded by additional stress such as malnutrition (Pal and Qayyum, 1993).



The prevalence of gastrointestinal parasites across sex and season are shown in Table 4. There was a significant association ($p < 0.05$) observed among all the seasons whereas there was no association ($p > 0.05$) between the sex. The absence of significant association with the prevalence of the parasite burden across the sex agrees with the reports of Fikru *et al.* (2006) of non-significant association in the prevalence of gastrointestinal parasites across sex in ruminants. However the season-related differences ($p < 0.05$) in the parasitic prevalence confirmed that the rainy season presented more parasite burden than the dry season because rainfall and temperature were probably more favourable for the development and survival of the pre-parasitic stages (Das *et al.*, 2016) thereby leading to increased availability of infective larvae on the pasture.

Table 4: Prevalence of gastrointestinal parasites in relation to sex and season

	P-Value	degree freedom	of Significance
Sex	11.55	11	0.398
Season	49.94	33	0.030*

*significant at p<0.05

Conclusion

It was evident from the results of this study that gastrointestinal parasites were prevalent in cattle slaughtered in the four slaughterhouses with *Strongyle* and *Eimeria* being the only species and rainfall playing a significant role in the level of infestation. With the role that cattle plays in the economy of individual cattle owners as well as Nigeria as a whole, attention should be given to awareness creation among cattle owners on the proper management and a more sustainable way of reducing the risk of re-infection and pasture contamination so as to minimise major problems that could cause economic loss in cattle production especially during the rainy season when these parasites are most prevalent.

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