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Prevalence and Seasonal Changes in Gastro-Intestinal Helminthes of Nigeria Cattle

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Abstract: Examination of the gastrointestinal tract of 96 cattle slaughtered at the Yola Modern abattoir during the period April 2008 to March 2009 indicated a prevalence of 75% for naturally acquired infections with *Trichostrongylus* sp. (42%; *Cooperia* sp. (31%), *Strongyloides* sp. (24%), *Oesuphagostomum* sp. (44%), *Bunostomum* sp. (11%), *Oestertagia* sp. (3%), *Syngamus* sp. (2%) and *Toxoplasma* sp. (4%), respectively. There were no significant differences ($p>0.05$) in prevalence between sexes and age groups. Out of the 72 infected cattle, 59 or 88% had burdens of <500 worms while burdens of 500-1000 and >1000 were encountered in 6 or 8% and 7 or 10% of the cattle, respectively. A significantly ($p<0.05$) greater number of cattle harbored <500 worms. Although, most of the parasites occurred throughout the study period, higher worm counts were generally encountered during the rainy season than in the dry season.

Key words: Gastrointestinal tract, infections, prevalence, significantly, worms

INTRODUCTION

Nematode infections are a worldwide problem for both large and small-scale farmers. Economic losses are caused by nematodes in a variety of ways. Parasitism causes a reduction in feed intake and lower weight gains. Milk production can also be affected and mortality can occur in heavily parasitized animals. Estimated that in Sub-Saharan African, endoparasites cause annual mortality and production losses in the order of US$2 billion.

Important species of nematodes affecting ruminants in the tropics include the stomach worms *Haemonchus* sp., blood sucking worms that cause anemia and weight loss and *Trichostrongylus axei* which causes gastritis, diarrhea and weight loss; worms of the small intestine such as *Trichostrongylus colubriformis* and *Cooperia* sp., heavy infection of which causes diarrhea, loss of condition and loss of appetite; Bunostomum and Gaigeria hookworms of the small intestine which can cause anemia, diarrhea and loss of condition and *Oesuphagostomum* sp., worms of large intestines which cause diarrhea and loss of condition (Hunter, 1994; Hall, 1985; Kimberling, 1988).

There are >800 species of gastrointestinal parasites in Nigeria (Ogunrinade, 1982; Guobadia, 1991). The prevalence of bovine Helminthiasis have been studied and reported (Alonge and Fasanmi, 1979; Ogunrinade and Bamgboye, 1980; Aliyara and Ayanwale, 1999; Mshelia *et al*., 1999) with *Haemonchus* sp., *Oesuphagostomum* sp. and *Bunostomum* sp. being reported as the most important helminthes of cattle in Nigeria (Schillhorn van Veen, 1974). However, no clear picture of the national prevalence has emerged from these reports which are usually restricted to specific parasites. Gastrointestinal parasites constitute the greatest threat to the health of animals and socio-economic status of the livestock owner (Mitchell, 1997; Ukoli, 1984; Ogunrinade, 1990).

It is evident from the distribution and prevalence of gastrointestinal parasites that the planning of an effective control strategy requires an understanding of the ecology of the parasites and their geographic and seasonal distribution and prevalence. This study was therefore designed with the following objectives:

- To determine the prevalence and seasonal occurrence of naturally acquired gastrointestinal nematode species

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- To determine the sex and age of cattle most commonly infected by gastrointestinal nematodes in Yola, Adamawa State

MATERIALS AND METHODS

The study area: The study area is greater Yola, Adamawa State located on latitude 9.14°N and longitude 12.8°E, the city has a tropical climate, marked with two distinct seasons to wet season (April to October) and dry seasons to wet season (November to March). It has an average annual rainfall of 759 mm with the wettest months of the year are January and February when relative humidity drops to 13% Yola provides a good arable land for agricultural production and animal pasture. The river Benue to the north and Lake Njuwa provide good fishing and irrigation opportunities.

Abattoir survey

Post-mortem worm counts: Following slaughter and evisceration, the entire gastrointestinal tracts of 96 cattle (2 weeks), slaughtered at the abattoir between September 2008 and August 2009 were randomly selected and purchased for examination. The age, sex, breed and health status were recorded. Sections of the tract were separated by ligature and the entire trade placed in a plastic container and transported to the laboratory. The entire tract was processed and examined as described by Hansen and Perry (1994) while parasite identification was conducted as described by Soulsby (1982) and Shah-Fischer and Say (1989).

RESULTS AND DISCUSSION

Prevalence of concurrent parasitic infections: The prevalence of helminthes encountered in cattle slaughtered at the Yola modern abattoir is shown in Table 1 worm burdens for the months of April to September represent averages for 2008 and 2009. Out of a total of 96 cattle examined during the 18 months period (April 2008 to September 2009), 72 or 75% had naturally acquired infections with *Trichostrongylus* sp. (42%), *Cooperia* sp. (31%); *Stongyloides* sp. (24%), *Oesuphagostomum* sp. (45%); *Bunostomum* sp. (11%), *Oestertagia* sp. (3%); *Syngamus* sp. (2%) and *Toxoplasma* sp. (4%). Table 2 and 3 show the prevalence of concurrent parasitic infections according to sex and age of animals examined during the period. There was no significant difference ($p>0.05$) in prevalence between sexes and age groups.

Total worm numbers recovered from infected cattle during each month of the study period varied between 1 and 3,900 (Table 1). The distribution of worm burden according to sex and age of the cattle, 59 or 88% had burdens of <500 worms while burdens of 500-1000 and >1000 were encountered in 6 or 8 and 7 or 10% of the cattle, respectively. A significantly ($p<0.05$) greater number of cattle harbored <500 worms. A similar pattern of worm distribution was countered within age groups and sexes as most cattle in each case harbored <500 worms ($p<0.05$).

Table 4 shows concurrent parasitic burdens in 72 infected cattle encountered during the study period. Among the various parasites (Oestertagia, Syngamus and Toxoplasma) occurred in 31, 24, 42, 11, 3, 2 and 4% of the cattle, respectively.

Seasonal changes in prevalence of gastrointestinal nematodes species: The monthly prevalence rate of concurrent worm species encountered in cattle during the study period is shown in Table 4. In general, the four most common nematode sp. *Trichostrongylus, Strongyloides*, *Oesuphagostomum* and *Cooperia* occurred in high prevalence throughout the study period. However, infection rates with Trichostrongylus and Cooperia occurred in high prevalence throughout the study period. However, infection rates with the rates with *Trichostrongylus* and *Cooperia* sp. were low during the later part of the dry season (March to April) but rose gradually with the rains to reach peak levels (100%) from

Table 1: Monthly prevalence of concurrent parasitic infections in cattle slaughtered at Yola between April 2008 and March 2009

Months	Mean monthly rainfall for Yola (mm)	Number of animals examined	Number of animals infected	Percentage infection (%)	Mean worm burden	Range (mean worm burden)
April	9.2	8	4	50	285	6-1300
May	38.1	8	4	50	200	4-970
June	63.0	8	5	63	276	4-1756
July	13.0	8	5	63	226	14-1216
August	158.0	8	6	75	461	35-1495
September	136.8	8	7	88	407	9-1975
October	70.0	8	8	100	370	10-3900
November	0.0	8	8	100	101	8-800
December	0.0	8	7	88	41	2-142
January	0.0	8	7	88	37	1-112
February	0.0	8	6	75	12	1-67
March	0.0	8	5	63	157	15-100
Total	605.4	96	72	75	214	1-3900

Table 2: Prevalence of concurrent parasitic infections according to sex of cattle

Sex	Number of animals examined	Number of animals positive	Percentage of animals positive
Males	53	41	77
Females	43	31	72
Total	96	72	75

Table 3: Prevalence of concurrent parasitic infections according to age of cattle

Age (year)	Number of animals examined	Number of animals positive	Percentage of animals' positive (%)
25-50	39	33	85
5.0-7.0	33	22	67
OLD>7.0	24	17	71
2.5>7.0	96	72	75

Table 4: Prevalence of concurrent parasitic infections in cattle slaughtered at Yola between April, 2008 and March, 2009

Months	No. examined	*Tricho-strongylus* sp.	*Cooperia* sp.	*Strongy-loides* sp.	*Oesupha-gostomum* sp.	*Bunostomum* sp.	*Ostertagia* sp.	*Syngamus* sp.	*Toxoplasma* sp.
April	8	-(0)	1 (13)	-(0)	2 (25)	1 (13)	0 (0)	0 (0)	0 (90)
May	8	1 (13)	1 (13)	4 (50)	2 (25)	1 (13)	0 (0)	0 (0)	0 (0)
June	8	2 (25)	2 (25)	4 (50)	2 (25)	0 (0)	0 (0)	1 (13)	1 (13)
July	8	1 (13)	2 (25)	5 (63)	2 (25)	0 (0)	0 (0)	0 (0)	1 (13)
August	8	1 (13)	2 (25)	0 (0)	1 (13)	1 (13)	1 (13)	0 (0)	1 (13)
September	8	2 (25)	1 (13)	2 (25)	3 (38)	1 (13)	1 (13)	1 (13)	1 (13)
October	8	8 (100)	8 (100)	2 (25)	8 (100)	1 (13)	1 (13)	0 (0)	0 (0)
November	8	8 (100)	7 (88)	2 (25)	8 (100)	2 (25)	0 (0)	0 (0)	0 (0)
December	8	8 (100)	2 (25)	1 (13)	4 (50)	1 (13)	0 (0)	0 (0)	0 (0)
January	8	8 (100)	2 (25)	1 (13)	4 (50)	1 (13)	0 (0)	0 (0)	0 (0)
February	8	1 (13)	1 (13)	1 (13)	6 (75)	1 (13)	0 (0)	0 (0)	0 (0)
March	8	-(0)	1 (13)	1 (13)	1 (13)	1 (13)	0 (0)	0 (0)	0 (0)
Total	96	0 (42)	30 (31)	23 (24)	43 (45)	11 (11)	3 (3)	2 (2)	4 (4)

later part of the rains to early dry season (August to February) on the other hand Strongyloides infection was at peak level early in the rains and throughout the rainy season (May to October) but became slightly reduced during late dry season. Oesuphagostomum infection were high throughout the rainy season but became gradually reduced from the onset of the dry season remaining low or negligible until the next favorable rainy season. Infection with *Bunostomum* sp. was relatively low (13%) throughout the year except in the months of May and June when no incidence was reported. On the other hand very low levels (13%) of *Oestertagia* sp., *Syngamus* sp. and *Toxoplasma* were reported during the rainy season months (May to September) only.

The mean burdens of concurrent parasite species encountered in cattle are shown in Table 4 while the relationship between parasite worm counts and rainfall in Yola during the study period is shown in Table 4. Although, most of the parasites occurred throughout the study period, higher worm counts were generally encountered during the rainy season than in the dry season. However, the period of peak worm counts varied between worm species. On the other hand, worm counts were relatively very low throughout the dry season from December to April.

High counts of *Strongyloides* sp. were recorded during May to July, September to November with highest counts being encountered in July at the peak of the rains. *Oesuphagostomum* and *Bunostomum* sp. Occurred mainly during the rainy season with peak counts in July to September. However, *Oestertagia*, *Syngamus* and *Toxoplasma* sp. were more predominant during May to September.

The clinical signs and lesions observed in the affected animals were weakness with prostration in some cases, emaciation, watery and pale colored blood pallor or mucus membranes and several Oesuphagostomum nodules (pimply gut) ranging from 1-3,900 in the large intestines and at times small intestine as well. These signs and lesions were more common and severe during the rainy season than in the dry season.

CONCLUSION

Based on the results of this investigation, bovine PGE in Yola area could be effectively controlled by strategic Anthelmintic medication of animals during February, May, July and November. Treatment of the animals at the end of the dry season in February reduces pasture contamination at the beginning of the next rainy season and thus would control the high worm burden recorded in April. Similarly, dosing the animals in May and July ensures control of high worm counts recorded in June and August, respectively.

RECOMMENDATIONS

Treatment of animals at the beginning of the dry season in November reduces the worm population capable of causing clinical disease at this period of

optimal susceptibility. These treatments will also reduction of pasture contamination with nematode eggs and prevent a carryover of infection to the next rainy season. Effective against both adult and developing and inhibited larval stages of the common gastrointestinal nematodes during dosing will ensure adequate control of parasite species encountered during this survey. Similarly, good management practices such as improved general hygiene and supplementary feeding of animals during periods of low grazing will complement the control of PGE by this programme of Anthelmintic medication.

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