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Prevalence and Effect of Parasitic Infections on Cycling in Traditionally Managed Cattle Herds in Bauchi, Nigeria

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ABSTRAK

Kejadian jangkitan dan infestasi oleh parasit (seperti helmint, ektoparasit dan hemoparasit) dan hubungan antara parasit tersebut dengan kitaran pada lembu telah dikaji pada sekumpulan 16 ekor lembu yang diurus secara tradisional di Bauchi, Nigeria. Jangkitan parasitik dan infestasi berlaku secara bermusim dengan kebanyakan jangkitan dan infestasi berlaku dalam musim hujan. Kajian ini juga menunjukkan sesetengan hubungan antara jangkitan parasitik dan infestasi dengan kitaran pada sekawan lembu yang tidak diuruskan dengan baik. Terbukti bahawa amalan pengurusan yang baik sangat penting dalam pengawalan dan pencegahan penyakit.

ABSTRACT

The incidence of infection and infestation by parasites (i.e. helminth, ectoparasites and haemoparasites) and the relationship between them and cycling in cattle was investigated in 16 traditionally managed herds in Bauchi, Nigeria. Parasitic infection and infestation show seasonality with most infections and infestations occurring in the rainy season. This study also shows some relationship between parasitic infection and infestation with cycling in some poorly managed herds. Good management practices were also shown to be important in disease control and prevention.

INTRODUCTION

In many countries of the world, parasitic infection is of major importance in the animal production sector (Blood 1979). In addition to the purely physical injury caused by the parasites, some serve as vectors of many viral, rickettsial, bacterial and protozoan diseases (Fabiyi 1984). They have a marked effect on the production of meat and milk in Africa (Jawara 1990).

Given an appropriate environment, parasitic infection may cause substantial losses in production or even acute clinical symptoms and death (Morley and Donald 1980). The disease causes a rather gradual deterioration of animal performance and does not show dramatic clinical symptoms especially in mature animals (Okaeme and Ogwu 1984).

Most losses in productivity of grazing animals are now associated with clinically in-apparent disease. Therefore the prevention and treatment of parasitic infection involve measures applied to the whole herd. The tropical climate is extremely conducive to the growth and propagation of pathogens and consequently, the environment is rife with disease agents and their vectors (Jawara 1990). Helminthiasis is significant in this case and is a cause of high mortality and decrease production in most farms in Africa (De Haans and Bekure 1991).

Helminthic diseases have been and are still known to be major causes of economic losses in livestock in the tropical world and Nigeria in particular (Maina 1986; Nuru and Dennis 1976; Ogunsusi 1985; Pullan 1979). Most of the losses are due to decreased milk production, poor

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wool quality, inferior carcass grade, sterility, long calving anoestrus and loss of weight (Georgi and Georgi 1990; Istifanus *et al.* 1990; Mohammed *et al.* 1989; Morley and Donald 1980; Ngategize and Kaneene 1985; Ogunsusi 1979).

It is with the above in mind that this study was undertaken to look at the prevalence of parasitic infections and their effect on cycling in a herd health program involving traditionally managed cattle in northern Nigeria.

MATERIALS AND METHODS

Livestock Production System

The selected livestock farms in the study area practice agropastoralism, which is regarded in this part of the country as the traditional managed herds. This involves a management practice whereby the farmers grow cash and food crops in addition to raising livestock. The agropastoralists practice limited transhumance at the end of the crop-growing season to graze predominantly maize and sorghum residues during early December to the end of May. Animal feeds on offer during the rainy season and harvest time decreases so fast that a more critical nutritional stress period occurs during the pre-rainy season (Mid May to Mid June). Watering is done in streams or ponds. There were no deliberate management systems or strategy aimed at controlling the breeding season. Bulls run with the breeding females all the time thus allowing cows to conceive throughout the year, thereby spreading the farmers income from sale of milk.

Selection of Herds

Herds were selected in Bauchi area because Bauchi State has the largest population of livestock in Nigeria and is considered the livestock hub of the country (Ajayi 1995). Only traditionally managed farms were selected. At the beginning of the study, 25 herds were randomly selected but as the study progressed, some herds dropped out. This was because of suspicion that the study was a head count for tax purposes.

Fieldwork/Observation

The fieldwork covered January 1993 to December 1995. Planned periodic monthly visits were made to each herd. At the start of the study through the end, every animal in each herd was examined individually. On each visit to each herd, blood and faecal samples were taken and examined for haemoparasites and helminths (strongyles) using the thin smear method and floatation method respectively. Tick infestation was also noted especially when seen around the legs, mammary gland, dew lap and in-between legs areas. Rectal examination was carried out on each visit to check for pregnancy and /or ovarian activity. Palpation for pregnancy diagnosis was done as described by Eduvie and Dawuda (1986) and Voh JR *et al.* (1994).

Statistical Analysis

Simple percentages, chi square and cow-months methods were used to analyse the data (Remington and Schork 1972). Cow months was used to account for additions and subtractions to and from the herds. The seasonal index (average of the 3 years cow months value) was calculated for each herd by combining the cow month data for the 3 years and plotting it to give a calculated seasonal index.

RESULTS

During the study, 5 herds dropped out after the first year of study and 2 dropping out during the second year of study. This was taken care of statistically using the cow month method of analysis.

The yearly distribution of parasites in the selected herds showed that the prevalence decreased in almost all the herds. The prevalence of haemoparasites infection decreased in all herds for at least the first two years of study except for Kobi, Bula and Tahir herds (Tables 1 and 2). These herds had high prevalence in the third year. Furthermore infection were found to be due to anaplasmosis (Table 1) than babesiosis (Table 2) and both infections showed seasonality in their prevalence (Fig 1). Even though most herds have the prevalence of anaplasmosis reduced with years, Kobi, Bula and Tahir herds have a higher incidence in the third year. For babesiosis, only the Bula herd had higher prevalence in the third year. A similar trend was observed for helminthiasis except that Fawu and Kobi herds have higher incidence in the third year (Tables 3 and 4) (Fig 1). Species of ticks identified were Amblyoma and Hyaloma species. The general picture in this study is that diseases

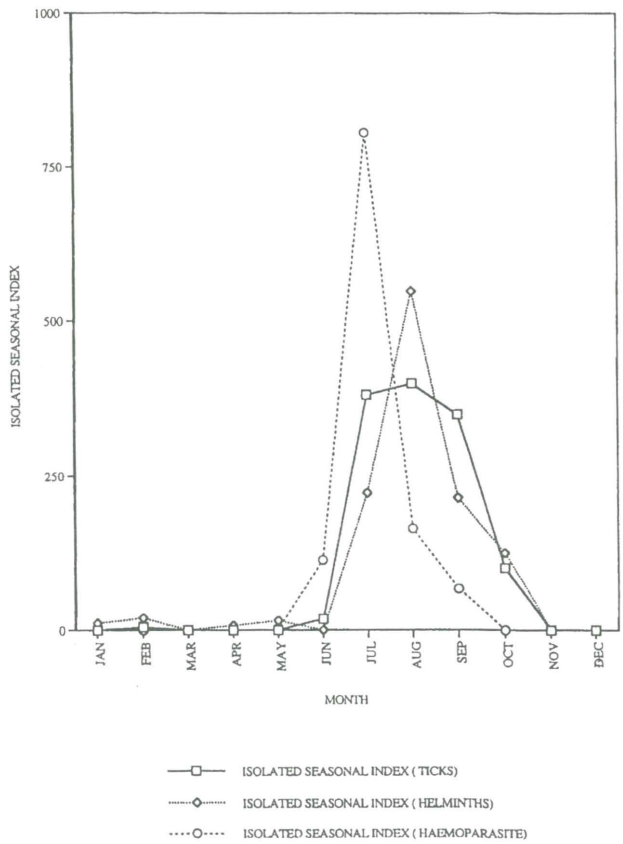

Fig. 1: Seasonal distribution of parasites in 16 herds in Bauchi (1993-1995)

TABLE 1
Yearly incidence of anapalma infection (expressed per hundred cow months)

FARM	1993			1994			1995		
	Cow month	No +ve	%/100 cow months	Cow month	No +ve	%/100 cow months	Cow month	No +ve	%/100 cow months
UNIVERSITY	368	25	6.8	519	25	4.8	501	0	0
FAWU	593	23	3.9	566	17	3.0	634	12	1.9
KOBI	785	45	5.7	715	20	2.8	584	25	4.3
OSKA	772	27	3.5	704	10	1.4	588	0	0
JUMBA	728	42	5.8	678	17	2.5	802	9	1.1
BULA	514	15	2.9	580	4	0.7	530	23	4.3
STATE POLY.	366	13	3.6	419	3	0.7	447	0	0
BUBA	393	40	10.2	407	12	2.9	X	X	X
LIBC	541	42	7.8	436	11	2.5	X	X	X
GIWO	515	10	1.9	480	3	0.6	502	2	0.4
TAHIR	409	26	6.4	279	0	0	458	2	0.4
BARAMI	225	0	0	X	X	X	X	X	X
GALAMBI	206	3	1.5	X	X	X	X	X	X
BISHI	493	7	1.6	X	X	X	X	X	X
MIRI	493	7	1.6	X	X	X	X	X	X
MAIKANO	318	0	0	X	X	X	X	X	X

X - Not done (farms dropped out)

TABLE 2
Yearly incidence of babesia infection (expressed as per hundred cow months)

FARM	1993			1994			1995		
	Cow month	No +ve	%/100 cow months	Cow month	No +ve	%/100 cow months	Cow month	No +ve	%/100 cow months
UNIVERSITY	368	5	1.4	519	1	0.2	501	0	0
FAWU	593	4	0.7	566	0	0	634	0	0
KOBI	785	9	1.2	715	3	0.4	584	2	0.3
OSKA	772	5	0.7	704	1	0.1	588	0	0
JUMBA	728	6	0.8	678	3	0.4	802	0	0
BULA	514	2	0.4	580	0	0	530	2	0.4
STATE POLY.	366	1	0.3	419	0	0	447	0	0
BUBA	393	3	0.8	407	0	0	X	X	X
LIBC	541	5	0.9	436	2	0.5	X	X	X
GIWO	515	0	0	480	0	0	502	0	0
TAHIR	409	2	0.5	279	0	0	458	0	0
BARAMI	225	0	0	X	X	X	X	X	X
GALAMBI	206	0	0	X	X	X	X	X	X
BISHI	493	0	0	X	X	X	X	X	X
MIRI	493	1	1.2	X	X	X	X	X	X
MAIKANO	318	0	0	X	X	X	X	X	X

X - Not done (farms dropped out)

TABLE 3
Yearly incidence of helminths (expressed as per hundred cow months)

FARM	1993			1994			1995		
	Cow month	No +ve	%/100 cow months	Cow month	No +ve	%/100 cow months	Cow month	No +ve	%/100 cow months
UNIVERSITY	368	62	16.8	519	33	6.4	501	32	6.4
FAWU	593	75	12.6	566	30	5.3	634	51	8.0
KOBI	785	132	16.8	715	54	7.6	584	63	10.8
OSKA	772	64	8.3	704	24	3.4	588	17	2.9
JUMBA	728	100	13.7	678	52	7.7	802	28	3.5
BULA	514	37	7.2	580	13	2.2	530	22	4.2
STATE POLY.	366	41	11.2	419	24	5.7	447	26	5.8
BUBA	393	61	15.5	407	45	11.1	X	X	X
LIBC	541	91	16.8	436	69	15.8	X	X	X
GIWO	515	46	8.9	480	34	7.1	502	24	4.8
TAHIR	409	66	16.1	279	19	6.8	458	27	5.9
BARAMI	225	16	7.1	X	X	X	X	X	X
GALAMBI	206	15	7.3	X	X	X	X	X	X
BISHI	493	54	12.8	X	X	X	X	X	X
MIRI	493	46	9.3	X	X	X	X	X	X
MAIKANO	318	32	10.1	X	X	X	X	X	X

X - Not done (farms dropped out)

TABLE 4
Yearly incidence of ectoparasite (expressed as per hundred cow months)

FARM	1993			1994			1995		
	Cow month	No +ve	%/100 cow months	Cow month	No +ve	%/100 cow months	Cow month	No +ve	%/100 cow months
UNIVERSITY	368	149	40.5	519	86	16.6	501	52	10.4
FAWU	593	82	13.8	566	77	13.6	634	53	8.4
KOBI	785	126	16.1	715	73	10.	584	73	12.5
OSKA	772	129	16.7	704	57	8.1	588	22	3.7
JUMBA	728	111	15.2	678	122	18.0	802	26	3.2
BULA	514	32	6.2	580	19	3.3	530	59	11.1
STATE POLY.	366	38	10.4	419	35	8.4	447	29	6.5
BUBA	393	64	16.3	407	61	15.0	X	X	X
LIBC	541	76	14.0	436	83	19.0	X	X	X
GIWO	515	34	6.6	480	50	10.4	502	30	6.0
TAHIR	409	69	16.9	279	23	8.2	458	25	5.5
BARAMI	225	10	4.4	X	X	X	X	X	X
GALAMBI	206	11	5.3	X	X	X	X	X	X
BISHI	493	20	4.8	X	X	X	X	X	X
MIRI	493	0	0	X	X	X	X	X	X
MAIKANO	318	13	4.1	X	X	X	X	X	X

X - Not done (farms dropped out)

cause by these parasites occurred mainly during the rainy season (Fig. 1).

The relationship between parasitic infection and cycling, shown in Tables 5 and 6, showed that only in the University and Buba herds that ectoparasitism was found to affect cycling in the first and second year of study ($P<0.1$), while endoparasites affected cycling ($P<0.l$) in Jumba and Tahir herds in the third year only.

DISCUSSION

The livestock industry in Nigeria, is faced with many problems and one of such problems is parasitic diseases (Jawara 1990). Parasitic infection is known to cause great economic loses in livestock production in Africa in general (Ajayi 1995). In this study, babesiosis and anaplasmosis were the only haemoparasites encountered in all herds and most infections were due to anaplasmosis. High incidences were recorded for the herds in the first year of study, which was seen to reduce greatly in the second and third year of study respectively. This was due to the control measures instituted on a herd basis against tick infestation followed by prophylactic treatment. However, the incidence became high in Kobi, Bula and Tahir herds because of new additions to the herds during the third year.

Infestation due to helminths was found to be mainly by strongyles. The higher incidence in the first year was reduced in the second and third year in all the herds except Fawu and Kobi herds where new animals were added during the third year. Seasonality of infestation was noticed for both haemoparasites and helminths. This agrees with the work of Fabiyi (1984) and Istifanus *et al.* (1990) where outbreaks of helminthiasis occurred in farms, during the rainy season. It also demonstrated negligible peak of infective larvae or eggs during the dry season with a carry over of infective materials in the host from one wet season to the next. The season distribution was used during the course of the study to device control measures by planned deworming of herds during the rainy season. This resulted in the improvements seen in the herds at the second and third year of study. The main problem encountered in most herds was that instead of treating their herds on a herd basis, the farmers treat individual cases. However, this study has demonstrated that treatment on a herd basis takes care of not only clinical cases but subclinical ones too. Subclinical cases are known to be responsible for most decrease in productivity of herds (Blood and Radostits 1995).

A similar trend of distribution as that of haemoparasites and helminthiasis was observed for tick infestation in this study. Infection and infestation for the 3 classes of parasites encountered in our study showed seasonality in distribution. Most of the infection and infestation occurred during the rainy season. This could be because the climate was conducive for their multiplication and development (Ajayi 1995; Jawara 1990).

Statistically, only in a few herds, where management was very poor, that a relationship between parasitic infection/infestation and cycling was found (P<0.0 1). From our study, it was shown that there was seasonality of infection/infestation in herds in Bauchi and this information could be used to plan a control program in herds in these areas. It also showed that good management is essential for disease control and prevention and in increasing productivity by increasing the rate of cycling and hence pregnancy.

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