

The effect of *Babesia bigemina* infections caused by cattle ticks on Nigerian economy

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RÉSUMÉ

AKINBOADE (O. A.), AKINBOADE (C. Y.). — Conséquences sur l'économie du Nigeria des infections à *Babesia bigemina* dues aux tiques du bétail. *Rev. Elev. Méd. vét. Pays trop.*, 1985, 38 (3) : 250-252.

Des études épidémiologiques et des recherches expérimentales ont été conduites sur la babésiose bovine au Nigeria.

Tous les animaux infectés expérimentalement par *Babesia bigemina* ont succombé à cette maladie précédée par une perte de poids et un mauvais état général.

Le sang de 96 bovins, soit 80 p. 100 des 120 animaux de boucherie sélectionnés au hasard, a été reconnu positif à *Babesia* par la méthode de coloration au Giemsa et par le test d'immunofluorescence.

Avec une population de plus de 10 millions de bovins et un coût d'environ 4 nairas (6 dollars U.S. en 1984) par kg de viande de bœuf, les auteurs évaluent la perte économique annuelle du Nigeria due à la babésiose et ses vecteurs à 36 milliards de nairas.

Mots clés : Babésiose - *Babesia bigemina* - Tique - Perte économique - Nigeria.

INTRODUCTION

Babesiosis is a tick-borne protozoan blood disease of domestic and wild animals. It has been found endemic in Nigeria (9, 11, 17). In addition, *Boophilus decoloratus* and *Boophilus geigy* are the main vectors incriminated for the transmission of the disease (10, 16). Elsewhere in Australia, the epizootiological factors in the transmission and control of this disease and the estimation of the infection rates have

SUMMARY

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Experimental and epidemiological studies have been carried out on bovine babesiosis in Nigeria. All the animals that were experimentally infected with *Babesia bigemina* succumbed to this infection with loss in weight and poor condition of health. Blood of 96 (80 p. 100) out of 120 trade cattle randomly selected were found positive for babesiosis using the Giemsa staining technique and the immunofluorescence antibody test. Nigeria, with over 10 million cattle population and with beef meat costing approximately N 4.00 K (N = Naira ; K = Kobo) (US \$ 6.00) per kilogramme, loses about N 0.36 billion annually, due to babesiosis and its vectors.

Key words : Babesiosis - *Babesia bigemina* - Ticks - Economic losses - Nigeria.

been investigated (12, 13, 14). In Europe and America, further works on the importance of various *Babesia* species have been highlighted (8, 18).

In Nigeria, various epidemiological and *in vitro* studies have recently been carried out by AKINBOADE, DIPEOLU and ADETUNJI (1, 2, 3, 5, 6).

In this study, we assess the role of vectors in the transmission of the disease and estimate the possible financial loss incurred as a result of *Babesia* parasitic infection.

MATERIALS AND METHODS

1. Experimental animals

Six Zebu cattle aged between 15-20 months with average weight of 225 kg were treated orally for helminths with 2.5 p. 100 Rintal[®] suspension at a dose rate of 15 ml per 50 kg body weight and for blood parasites with 3.5 mg Berenil[®] per kg body weight intramuscularly. Three weeks after they had been found negative for all parasites, they were allowed to graze on tick infested pastures at the Ministry of Agriculture demonstration farm. The ticks involved — *Boophilus* species — had already been found infected with *Babesia bigemina* according to the method of AKINBOADE and DIPEOLU (4). The ticks were found attached to the animals within 3 days post-exposure to pasture. They were periodically weighed and checked for parasites. The animals were then left on the pasture for 12 weeks but occasionally driven on foot for some distance to drink water at a pool. Their final weights were then recorded. The blood smears made were fixed with methanol, air dried, and stained with Giemsa.

2. Trade cattle

One hundred and twenty randomly selected trade cattle were bled from the jugular vein and blood smears made. The smears were similarly treated as with the experimental animals. All the animals used were indigenous. Sera made from each blood collected were tested using indirect fluorescent technique.

RESULTS

Examination of the Giemsa stained slides showed *Babesia bigemina* parasites in the blood of the 6 experimental animals and in 96 animals (80 p. 100) of the 120 trade animals examined. In conformity with standard abattoir practice (Table I), 20 p. 100 allowance was made for bones, water, blood and faeces

which constitute part of the average weight of the animals and which are part of the beef meat. It can be seen from table n° I that the loss in weight ascribed to babesiosis is the percentage of the difference between average live weight before infection and average weight post-infection over the average weight of lean meat without infection which is 5 p. 100. The 20 p. 100 allowance for bones, blood, water and faeces is averagely constant. Therefore, if 1 kg of meat costs N 4.00, then 180 kg of lean meat will cost N $(180 \times 4) = N 720.00$ per animal. Similarly, 171 kg of lean meat also costs N $(171 \times 4) = N 684.00$. The average cost of the weight lost due to babesiosis is therefore N $(720 - 684) = N 36.00$.

DISCUSSION

Previous workers (9, 11, 16) have established the endemicity of babesiosis in Nigeria. And although the endemic stability is usually maintained as a result of the resistance of the indigenous breeds resulting in few deaths and high morbidity, the mortality with exotic breeds is very high. The endemic stability exhibited by indigenous breeds is maintained by constant exposure of the animals to *Boophilus* ticks — the major vector of *Babesia* organisms in Nigeria.

Based on the fact that less than 1 p. 100 of cattle in Nigeria are intensively managed; virtually all the animals are exposed to ticks which carry the parasitic infection. Our experience also shows that stress due to long distance trekking by cattle, and road or rail transportation from the far north to the southern parts in search of water and food, and for market is a major factor responsible for the high mortality.

Since the estimated cattle population in Nigeria is about 10 million, then average annual loss due to this infection is about N (36×10^6) . This is N 360 million or N 0.36 billion (US \$ 540 million). We feel this loss is considerable in view of the increasing demand

TABLE N° I - Weight differentials of cattle before and after tick infestation

Average live weight before infection	Average weight post-infection	Average weight loss due to babesiosis	Allowance for bones, water, blood, faeces, etc, at slaughter (20 p.100)	Average weight of lean meat without infection	Average net weight of lean meat
225 kg	216 kg	9 kg	45 kg	180 kg	171 kg

for animal protein in developing countries like Nigeria. Although it is difficult to quantify or determine the exact losses caused by this infection (7, 15), it is likely that losses may be greater in financial terms than already estimated. McCOSKER (15) indicated that there are many factors to be considered in determining the importance of babesiosis on the economy. Such factors include mortality, production losses, quarantine cost, and losses due to damage caused by tick vectors to cattle hides and skin which reduce market value, low milk yield and poor carcase quality. Other factors also include lost opportunity and lost markets.

Another factor which makes it difficult to determine the importance of babesiosis in Nigeria is the problem of multiple infections

with some other haemotropic and/or helminth diseases. Because of the extensive system of animal husbandry, polyparasitism becomes a fairly common feature among annual population. This is why experimental transmission with single or some known mixed parasites is considered fairly more reliable.

However, further work is being carried out to characterize these parasites with a view to producing vaccines against these diseases.

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RESUMEN

AKINBOADE (O. A.), AKINBOADE (C. Y.). — Consecuencias sobre la economía del Nigeria de infecciones con *Babesia bigemina* causadas por las garrapatas del ganado. *Rev. Elev. Méd. vét. Pays trop.*, 1985, **38** (3) : 250-252.

Se efectuaron estudios epidemiológicos e investigaciones experimentales sobre la babesiosis bovina en Nigeria.

Todos los animales infectados experimentalmente por *Babesia bigemina* mostraron una disminución de peso y un malo estado general.

La sangre de 96 bovinos, sea 80 p. 100 de los 120

animales de carne elegidos al asar fué demostrada positiva para con *Babesia* mediante el método de coloración con Giemsa y la prueba de inmunofluorescencia.

A partir de una población de más de 10 millones de bovinos y un costo de unos 4 nairas (6 dolares en 1984) por kg de carne de vaca, los autores valúan en 36 mil millones de nairas la pérdida económica anual del Nigeria causada por la babesiosis.

Palabras claves : Babesiosis - *Babesia bigemina* - Garrapata - Pérdida económica - Nigeria.

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