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Original Research

Demonstration of vermicules of Babesia species in haemolymph smears of *Amblyomma variegatum* in Nigeria

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Abstract

The present study was conducted to investigate the presence of developmental stage (s) of Babesia species in *Amblyomma variegatum*. A total of 137 *Amblyomma variegatum* ticks (85 males and 52 females) were examined by haemolymph smears. Out of the examined male ticks, there were 41 nymphs and 44 adults. The female ticks were 23 nymphs and 29 engorged adults. Sixteen adult males and nine nymphs were positive for vermicules of Babesia species but only eight females showed structures similar to Babesia vermicules. The present study recommends conducting molecular and experimental studies to confirm the type of Babesia parasite in *Amblyomma variegatum* tick.

Keywords: Amblyomma variegatum; Babesia vermicule; Haemolymph; Cattle; Nigeria

Introduction

Amblyomma variegatum is known as the tropical bont tick, and it is one of the commonest and most widely distributed ticks on livestock in Africa (Mohammed, 1974, Walker *et al*., 2003). It is a vector of cowdriosis (*Ehrlichia ruminantium*), bovine ehrlichiosis (*Ehrlichia bovis*), *Theileria mutans* and *Theileria velifera*, both causing benign bovine theileriosis (Uilenberg, 1982). It is also associated with severe dermatophilosis, apparently due to a lowered immune response. Due to their long mouth parts, they cause painful bites to animals and damage hides and skin especially around the teats, leading to lowered productivity (FAO, 1984, Walker *et al*., 2003).

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Amblyomma variegatum is not known to transmit Babesia parasites to livestock; however, polymerase chain reaction (PCR) analysis of ticks collected from cattle in Guinea have revealed the presence of Babesia, identified as *Babesia caballi* (Tomassone *et al*., 2005), suggesting that Amblyomma ticks can be infected with Babesia species, although their role in the transmission of this parasite is not clear. In this investigation, haemolymph smears of *Amblyomma variegatum* ticks were examined for developmental stage (s) of Babesia species.

Materials and methods

Ticks were randomly collected from sedentary cattle in the central Plateau State of Nigeria during routine herd health screening. The ticks were transported to the laboratory in conventional plastic tick containers with perforated lids.

In the laboratory, ticks were identified accord-

ing to the keys of Walker *et al*. (2004) and kept separately according to species. Haemolymph smears were made by nipping one leg of the tick just above the first coxa and the resulting haemolymph was smeared on a clean grease-free microscopic glass slide. Not more than four smears were made per slide. The smears were fixed in absolute alcohol for 5 minutes, allowed to be air-dry away from dust, stained with Giemsa stain for 45 minutes and then washed with buffered water. The preparation was examined using an oil immersion lens.

Results

A total of 137 *Amblyomma variegatum* ticks (85 males and 52 females) were examined by haemolymph smears. Out of the examined male ticks, there were 41 nymphs and 44 adults. The examined female ticks were 23 nymphs and 29 engorged adults. Sixteen adult males and nine nymphs were positive for vermicules of Babesia species but only eight females showed structures similar to Babesia vermicules (Fig. 1).

Three females and six males showed *Ehrlichia* (Cowdria) *ruminantium* developmental stage (Fig. 2). *Theileiria kinite* was also demonstrated in the haemolymph of seven adult *Amblyomma variegatum* ticks (Fig.3).

Discussion

Generally, *Amblyomma variegatum* is not associated with Babesia species in livestock (Mohammed, 1974). However, the recent report by Tomassone *et al*. (2005) on the isolation of *Babesia caballi* by PCR from *Amblyomma variegatum* collected from cattle in Guinea has generated interest in the association between babesiosis and Amblyomma ticks. The authors noted that there were no horses in the study area and only very few donkeys. To our surprise, haemolymph smears of *Amblyomma variegatum* ticks from sedentary cattle in Nigeria revealed what appeared to be vermicules of Babesia parasites.

Haemolymph smears do not constitute a very sensitive diagnostic tool. To explore this new finding; advanced diagnostic tools on *Amblyomma variegatum* are requested. Whether this tick plays a role in the epidemiology of bovine babesiosis or any other babesiosis is as yet unknown, but there is a definite evidence of developmental stages of Babesia species in *Amblyomma variegatum*.

It is premature at this stage to speculate on the Babesia species in question, until molecular and genetic sequencing are carried out. In order to prove whether Amblyomma ticks can transmit Babesia parasite, actual transmission experiments will have to be done. Molecular and genetic se-

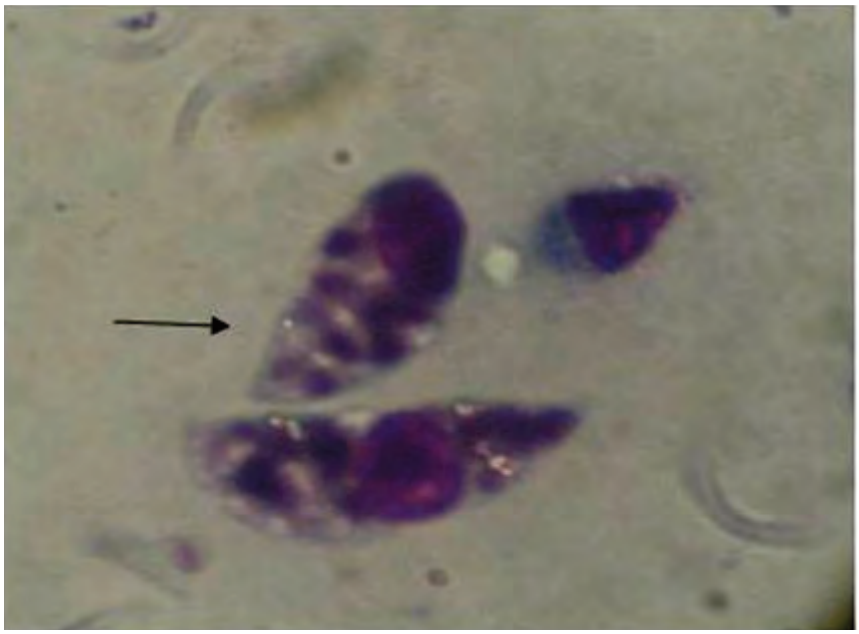

Fig. 1. Haemolymph smear from *Amblyomma variegatum* showing Babesia vermicules.

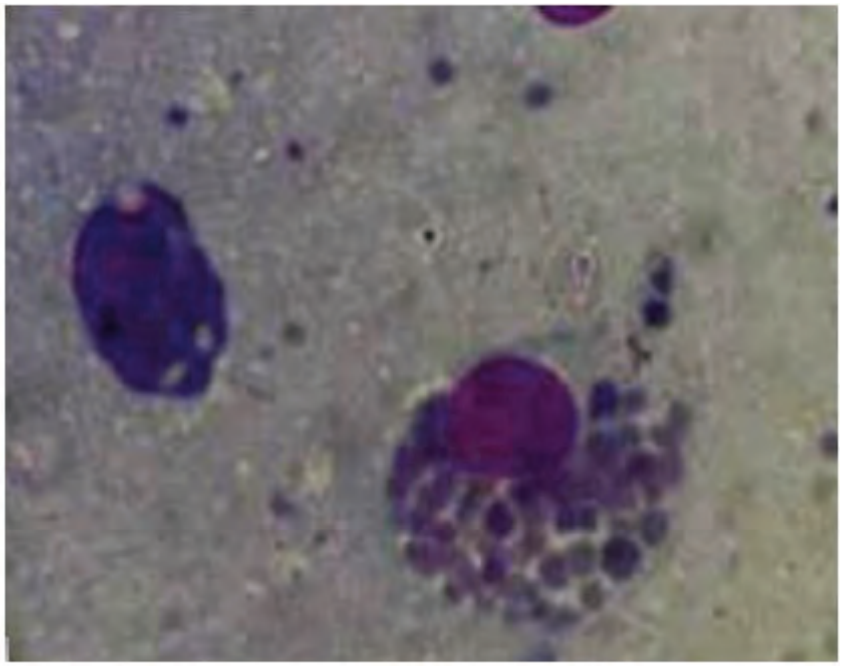

Fig. 2. Dense bodies in haemocyte and particle of *Ehrlichia ruminantium* from disintegrated haemocyte of *Amblyomma variegatum*.

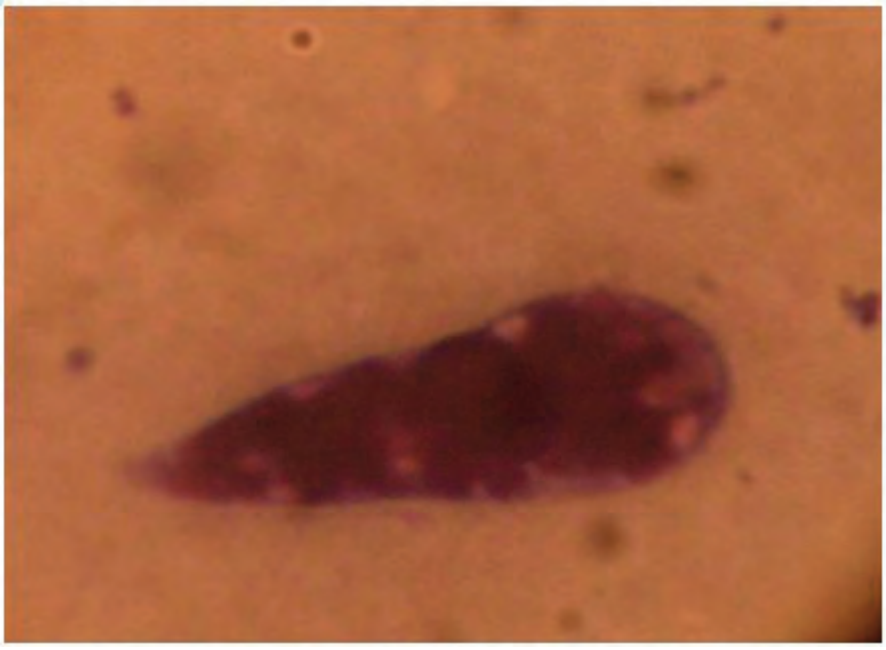

Fig. 3. Haemolymph smear from *Amblyomma variegatum* showing *Theileria kinite.*

quencing work is being planned to identify the parasite.

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