

RESEARCH COMMUNICATION

ANAPLASMOSIS IN UGANDA. III. PARASITOLOGICAL AND SEROLOGICAL EVIDENCE OF ANAPLASMA INFECTION IN UGANDAN GOATS

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ABSTRACT

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Randomly selected goat sera from north-western, central, and south-western regions of Uganda were analyzed parasitologically and serologically for evidence of anaplasmosis. Prevalence rates of 3,2 % by parasitemia, 4,8 % by card-agglutination test, and 12,9 % by DOT-ELISA combined with western blotting were established. Parasitologically positive samples were consistently serologically positive. Positive samples were all from either the north-western or south-western regions of the country. Goats in these regions graze with cattle and are presumable exposed to the same tick species. There was no evidence of clinical caprine anaplasmosis, whereas bovine anaplasmosis cases are very common. *Rhipicephalus evertsi* was frequently observed on goats which cograze with cattle.

INTRODUCTION

Anaplasmosis caused by *Anaplasma marginale* is primarily a disease of cattle, but sheep, goats, and wild ruminants are susceptible to the natural infection (Ristic & Kreier, 1974) and are considered potential reservoirs of *A. marginale* for cattle. In some areas of Uganda, such as the northern, western, and eastern regions where the population of local goats and sheep is high, these animals normally graze together with cattle.

The prevalence and incidence of anaplasmosis infection in goats in Uganda is not known, and the exact role these animals play in the epidemiology of bovine anaplasmosis has not been documented. We report the direct evidence of *Anaplasma* infection without disease in Ugandan indigenous goats based on detection of *Anaplasma* antibodies in the serum samples and the parasites in stained blood smears.

MATERIALS AND METHODS

Serum samples and blood smears were randomly collected from 62 goats in the north-western, central, and south-western regions of Uganda. The serum samples were tested with DOT-enzyme linked immunosorbent assay (DOT-ELISA) (Ssenyonga, Kakoma, Montenegro-James & Hansen, in press), western immunoblotting (WB) by a modification of the method of Tsang Peralta & Simons (1983), rapid card agglutination test (RCAT) (Ame-rault & Roby, 1976), and capillary tube agglutination test (CAT) (Ristic, 1962). The blood smears were stained with Giemsa. For DOT-ELISA and western immunoblotting, the serum was tested at dilutions of both 1:100 and 1:200.

Known *A. marginale* positive and negative sera from the USA (controls) were obtained from infected and noninfected calves at the Research Farm of the University of Illinois. Negative goat sera were obtained from goats born and kept in the University of Illinois' Large Animal clinic under anaplasmosis-free conditions.

RESULTS

The parasitological and serological evidence of anaplasmosis in Ugandan goats are given in Table 1. Two of 62 blood smears (3,2 %) were positive for *Anaplasma* organisms. Eight of the 62 serum samples tested (12,9 %) gave positive reactions in both DOT-ELISA and western immunoblotting, 5 samples (8,0 %) to RCAT, and 3 samples (4,8 %) to CAT. Three samples (4,8 %) were positive in all tests. The 2 parasitologically positive samples tested positive in all serological tests.

The major antigenic profiles of *A. marginale* (Florida strain) reactive with Ugandan goat sera in the western immunoblots (Fig. 1) were practically indistinguishable from those reported for bovine sera

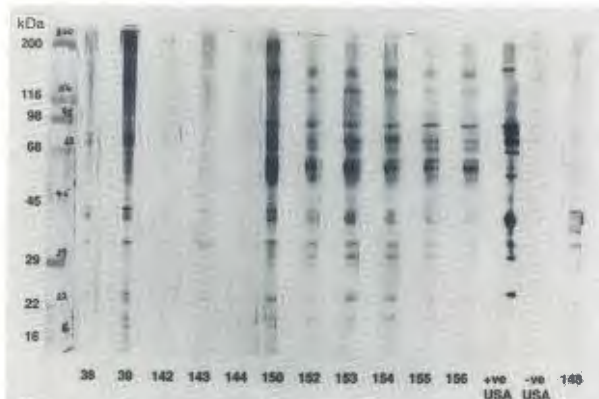


FIG 1 Ugandan goat sera tested against *Anaplasma marginale* antigen (Florida strain). Note very strong reactivity in goat sera 150–156 and sera 39 with prominent bands similar to those in positive control bovine sera (USA+).

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TABLE 1 The parasitological and serological evidence of *Anaplasma* infection in Ugandan Goats

Goat No.	Source	Parasitology	DOT	WB	RCAT	CAT
38	South-western	—	+	+	—	—
39	South-western	+	+	+	+	+
150	North-western	+	+	+	+	+
152	North-western	—	+	+	+	+
153	North-western	—	+	+	+	—
154	North-western	—	+	+	+	—
155	North-western	—	+	+	—	—
156	North-western	—	+	+	—	—

(Ssenyonga, Kakoma, Montenegro-James, Nyeko & Buga, 1991); in particular goat sera distinctly recognized antigenic bands between 100 and 25 kDa.

DISCUSSION

The present data have clearly demonstrated that local Ugandan goats in the regions surveyed have been exposed to *Anaplasma sp.*

All the samples positive to *Anaplasma* infection originated from goats in the north-western and south-western regions and none from the central region. This is possibly due to differences in the husbandry of goats in the 3 regions. In the north-western and south-western regions, goats normally run and graze with cattle. Many of the goats sampled in those 2 regions were infested with *Rhipicephalus evertsi*, the red-legged tick, especially in the perianal region. This tick species is known to transmit *A. marginale* in cattle (Walker, 1962).

In the central region of Uganda, which is predominantly agricultural, there are relatively fewer goats per household compared to the other 2 regions, and in most cases these goats are tethered and grazed around the household and are given supplementary banana peelings.

We are not aware of any reported case of clinical caprine anaplasmosis in Uganda. However, these findings provide direct evidence that goats are

potentially important as reservoirs of *Anaplasma sp.*, thus warranting further investigation to accurately characterize the species of *Anaplasma* afflicting goats in Uganda.

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