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THE CAPYBARA (*Hydrochoerus hydrochaeris*) AS A RESERVOIR HOST FOR *Trypanosoma evansi*

G. A. MORALES, E. A. WELLS and D. ANGEL[□]

Abstract: Discovery of two ill horses and three dogs naturally infected with *Trypanosoma evansi* near an experimental station in the Eastern Plains of Colombia led to a search for reservoir hosts of the parasite. Infection was detected in 8/33 healthy capybaras (*Hydrochoerus hydrochaeris*), none of the remaining 14 horses, and none of 32 Zebu cattle (*Bos indicus*), 18 paca (*Cuniculus paca*) and 20 spiny rats (*Proechimys sp.*). Contrary to common opinion, the results indicated a carrier state in the capybara. Diagnosis was based on morphology, behaviour in albino rats, and pathogenicity and host range in domestic animals.

INTRODUCTION

Hoare⁷ gives a very comprehensive account of the present knowledge of *Trypanosoma evansi*. He describes how the introduction of the infection into previously unaffected areas can be accompanied by enormous losses in livestock. With the decline of this acute phase, domestic bovine species can become asymptomatic hosts and therefore be reservoirs of infection. Further, he summarizes the known natural and experimental infections of wild animals. He concludes that in most cases there is clear evidence of pathogenicity in both circumstances, and wild animals thus cannot be regarded as sources from which domestic animals become infected. However, an hypothesis can be advanced that the introduction of *T. evansi* into a virgin wild animal population could also result in an acute episode, followed by development of a carrier state in one or more species. Acute episodes of disease caused by *T. evansi* in Latin America have been reported from white-tailed deer (*Odocoileus chiriquensis*) and brocket deer (*Mazama sarti*) in Panamá,³ from capybara (*Hydrochoerus hydrochaeris*) in Argentina,⁸ Brasil,^{12,14} Paraguay,^{5,9} Panamá,³ and Venezuela,^{4,10,11,13,15} and from the vampire bat (*Desmodus*

rotundus) in Panamá and Colombia.^{2,8} If a carrier wild animal species shares grazing with domestic livestock, then a potential danger becomes apparent.

This paper describes the isolation of *T. evansi* from healthy capybaras at the Carimagua Experimental Station in the Eastern Plains of Colombia, where spontaneous clinical cases of trypanosomiasis occur in horses and dogs.

MATERIALS AND METHODS

Study area

The Carimagua Experimental Station in the Eastern Plains is located 4½° N latitude, 71½° W longitude, 350 km east of Villavicencio, the State Capital, near the Meta-Vichada border. Annual rainfall in the region is from 1,800 to 2,000 mm, distributed from April through November. There is a marked dry season from mid-December through late March. The mean annual temperature is 26-27 C, with an average minimum of 20 C, an average maximum of 33 C and extremes of 14 C, and 35 C. The elevation is 150-157 m. The topography is characterized by very smooth interfluvial plains with slopes of less than 0.5%. Side slopes seldom exceed 3% as they drop to well

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defined drainageways lined with gallery forests of deciduous hardwood and palm. All the above topographic unit is covered with native savannahs, the gallery forest occurring only along the drainage ways.

Domestic animals on the station are beef cattle, predominantly Zebu (*Bos indicus*), horses and a few dogs. Fifty-eight wild mammalian species have been recorded.¹

History of infection

In 1973, the routine work of the CIAT Animal Health Program on the Carimagua Experimental Station revealed two horses and three domestic dogs clinically infected with *T. evansi*. A concurrent study of the diseases of wildlife in the area had not encountered clinically ill animals of any species.

A decision was made to look for infection in the 14 remaining horses; in the group of adult cattle (32) grazing closest to the gallery forest and swamp area which forms the principle habitat of wildlife; in two wildlife species already being caught for other purposes (pacas and spiny rats), but specifically in capybaras due to their reputation in the literature as a susceptible species.

During December, 1973, through June, 1974, 20 spiny rats were trapped and 18 pacas and 33 capybaras were shot. Trapped animals were taken to the station laboratory where they were bled from the heart. Pacas were shot at night and brought directly to the laboratory where they were necropsied and heart blood drawn into a vacutainer. Capybaras were shot in late afternoon and necropsied in the field; heart blood was taken into a vacutainer. Thick and thin blood smears were prepared from all animals and 1 ml of blood was inoculated intraperitoneally (I/P) into each of two albino rats. Twenty-five of the capybaras were mature adults weighing an average of 48 kg, 6 were subadults weighing an average of 25 kg, and 2 were juveniles averaging 16.5 kg.

Daily, for 16 days, wet blood mounts were prepared from the tail of the albino rats. Positive blood was stored at low temperatures. To assess the infectivity in

a range of hosts, the trypanosome strain isolated was subinoculated into one of five domestic species (horse, dog, rabbit, calf and pig). All animals received intravenously equal aliquots (2 ml) of the same flagellate suspension.

RESULTS

Trypanosomes were isolated from 8 of 33 capybaras (26.6%). Five isolations by subinoculation were made from adult animals, and the other three from young adults. No flagellates were seen in thin or thick blood smears stained by Giemsa. Animals examined were in good condition and none had gross abnormalities compatible with clinical trypanosomiasis. All other animal species sampled were negative.

Experimentally infected albino rats died 12 to 25 days post-inoculation. Smears of all isolates were made and stained by Giemsa. Morphologically, all trypanosomes were characterized by a well defined undulating membrane and free flagellum measuring 4 to 5 μm . The kinetoplast was subterminal. Total length was 19 to 35 μm by 1.2 to 2.6 μm broad.

The isolate was infective for all the domestic animals inoculated. However, there was a difference in pathogenicity observed. It was highly pathogenic for the horse and dog, less so for the rabbit, and produced symptomless infections in the calf and pig. Trypanosomes could be isolated from the last two animals by I/P inoculations of albino rats for up to 3 months, when observations were discontinued.

Based on morphology, behaviour in albino rats, pathogenicity and host range, the trypanosome was diagnosed as *T. evansi*.

DISCUSSION

The present study demonstrated that the capybara can behave as a symptomless carrier of *T. evansi* in the Eastern Plains of Colombia and suggests that this wild animal species could be a reservoir host for infections in domestic animals.

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