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Trypanosoma evansi in capybara from Venezuela

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ABSTRACT: During the slaughtering season of February and March 1991, 559 capybaras (*Hydrochoerus hydrochaeris*) were tested for *Trypanosoma evansi* in two areas in Venezuela: El Frio Ranch and El Cedral Ranch. Blood and serum samples were evaluated for *T. evansi*. Forty-eight (9%) of 559 capybaras had *T. evansi* using the microcentrifugation technique. Further, 279 (50%) of the 559 capybaras had antibodies against *T. evansi* immunofluorescence test in both ranches. Thus, capybaras may be important in the epizootiology of *T. evansi* in this enzootic area.

Key words: *Trypanosome*, capybara, immunofluorescence, *Trypanosoma evansi*, *Hydrochoerus hydrochaeris*.

The capybara (*Hydrochoerus hydrochaeris*), the largest rodent in the world, is widespread in the Venezuelan savanna ecosystem, where it coexists with domestic horses and cattle, and other wild animals. It represents a strong potential source for meat and leather production (Toro et al., 1982).

In Venezuela, *Trypanosoma evansi* may be a limiting factor affecting capybara survival in the western plains; mortality in capybaras during the dry season may be caused by trypanosomiasis (Rangel, 1905; Ojasti, 1973; Azcárate and Bang, 1978). Mortality due to *T. evansi* infections has been reported in Argentina (Gutiérrez, 1958), in Brazil (Stevens et al., 1989), in Paraguay (Elmasian and Migone, 1904; Migone, 1910), and in Panama (Clark and Dunn, 1933).

By inoculating white rats and mice, *T. evansi* has been isolated from capybara blood from animals in apparent perfect health when captured from their natural habitat (Morales, 1978; Stevens et al., 1989; Reverón, 1992); it has also been isolated from capybaras with clinical signs (Ojasti, 1973; Arcay de Peraza et al., 1980). Prevalence of *T. evansi* in capybaras in natural conditions has been reported at about 24% (Wells et al., 1975; Morales et al., 1976), 26% (Toro et al., 1982), 27% (Stevens et al., 1989), and 71% (Reverón, 1992). Some investigators believe that capybaras can act as a reservoir and thus play an important role in the disease epizootiology (Elmasian and Migone, 1904; Migone, 1910; Wells et al., 1975; Morales et al., 1976; Morales, 1978; Toro et al., 1982; Reverón, 1992); individuals of both sexes and any age can be infected (Toro et al., 1982; Reverón, 1992).

Our objetive was to determine the prevalence of active infection, and the seroprevalence of *T. evansi* in capybaras to better understand the importance of capybaras in the epizootiology of *T. evansi* in enzootic areas.

Blood samples were taken from 559 randomly selected capybaras, both males and females older than two years of age and clinically healthy, from El Frío (7°45′N, 68°55′W) and from El Cedral Ranch (7°30′N, 69°26′W), in Apure State, Venezuela, during the slaughter season between February and March 1991. The animals were gathered in groups by people on horseback and of foot, killed by a blow to the head with a club, and butchered in the field; blood samples were taken both with ethylenediamine tetraacetic acid (EDTA) and without anticoagulant from 444 capybaras al Frio Ranch and 115 from El Cedral Ranch. Blood samples were centrifuged in a heparinized capillary tube by the microcentrifugation method of Woo (1969), and evaluated for active infection by *T. evansi*, as observed between the plasma and white blood cells through a binocular microscope at 10×. Serum was

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used to detect antibodies anti *T. evansi* through the indirect inmunofluorescent technique (IIF), using a capybara anti-immunoglobulin G (IgG) produced in goats at the Institute of Veterinary Research in Venezuela, and conjugated with isotiocianato of fluoresceina (Sigma Chemical Company, St. Louis, Missouri, USA); samples were diluted in saline phosphate buffer 1:20 plus Evans blue 1:100 (Garvey et al., 1977). Positive and negative serum controls diluted 1:20 were obtained from experimentally infected capybaras 9 wk after infection and animals raised in captivity, respectively. The test serum used was 1:20 to 1/2,560 and an antigen rat blood highly parasitized with a strain of *T. evansi,* isolated from capybaras from El Frío Ranch. Data were analyzed through linear regression using (PROC GLM) and Duncan's Multiple Range Test for mean separation (SAS Institute Inc., 1992).

Active infection of *T. evansi* was observed in 38 (9%) of 444 capybaras from El Frio Ranch, and in 10 (9%) of 115 capybaras from El Cedral Ranch. This difference was not significant ($P > 0.05$). Based on the IIF, antibodies against *T. evansi* were detected in 207 (47%) of 444 capybaras from El Frio and 72 (63%) of 115 capybaras from El Cedral Ranch; this was a highly significant difference ($P < 0.01$). Further, we observed 67 (32%) of the 207 antibody positive animals at El Frio had titers $\geq$1:320, whereas 33 (46%) of 72 antibody positive animals at El Cedral had titers $\geq$1:320.

There was no significant difference ($P < 0.05$) in the prevalence of *T. evansi* active infection by the microcentrifuge test and these values were lower than reported in trials made on capybaras from the Llanos Orientales of Colombia (Well et al., 1975; Morales, 1978). The authors inoculated white rats with blood from suspect capybaras, and obtained a prevalence of 24% (Well et al., 1975; Morales, 1978) or 23% (Morales and Carreño, 1976). The high percentage of active infection observed in that trial may be evidence that a more sensitive method than the microcentrifugation test (MTC) was used. The MTC can detect chronic infection with low levels of parasites. A method like the MTC was not used in this study due to the high costs associated with it.

The IIF technique used in this research is valuable for diagnosis of trypanosomiasis under natural conditions. The results were highly significant in the Frio and Cedral population. The lower values (25%) reported by Toro et al. (1982) on capybaras from Guasdualito, Apure state, Venezuela probabaly resulted from their using the capillary agglutination method, which is less sensitive than the IIF. Reverón (1992) found a 71% prevalence in capybaras at El Frio Ranch using the enzyme linked immunoassay (ELISA); differences in results from animals of the same habitat could be due to the high sensitivity and specificity of the ELISA method. The high prevalences observed in absence of clinic pathological signs might be evidence the capybara is a natural reservoir for trypanosomes; this is supported by the trypanotolerance described by Murray et al. (1982) and Mulla and Rickman (1988). Some workers have reported infections of *T. evansi* on capybaras that resulted in clinical symptoms of trypanosomiasis (Arcay de Peraza et al., 1980). This occurred in the critical dry season when the reduction of water and grass sources might have caused a concentration of animals and hematophagous insects, further weakening of the capybaras; the infection processes may have led to their death (Ojasti, 1973).

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