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Short Communication

# Outbreaks of trypanosomosis due to *Trypanosoma vivax* in cattle in Bolivia

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## Abstract

This paper reports the first occurrence of bovine trypanosomosis due to *Trypanosoma vivax* in Bolivia. *T. vivax* was identified in thin blood smears of 159 cattle from the Provinces of Velaco (57), Nuflo de Chavez (20), Guayaros (30) and Chiquitos (52), and in 86.20% of 29 cattle from Laguna Concepción examined by microhematocrit test. The clinical signs observed were fever, anemia, abortion, progressive weakness, loss of appetite, lethargy, substantial weight loss in a relatively short time, and progressive emaciation. © 1998 Elsevier Science B.V.

*Keywords:* *Trypanosoma vivax*; Cattle—Protozoa; Epidemiology—Protozoa; Bolivia

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## 1. Introduction

Bolivia is a sub-tropical country located in the center of South America. It has nine departments. The Santa Cruz Department is the largest and economically the most important, producing petroleum, natural gas, sugar cane, cotton, timber, soya bean, rice, wheat, corn and cattle (Hall et al., 1993). This department is considered one of the most important livestock regions, maintaining a population of 1 598 957 bovines. The greatest

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Table 1

Measurements of *Trypanosoma vivax* in cattle from Santa Cruz, Bolivia, means  $\pm$  SE ( $\mu\text{m}$ ) ( $n = 80$ )

	P-K	K-N	P-N	N-A	F	L	PN/KN	PN/NA
Minimum	0.81	3.24	4.05	4.86	2.43	12.15	1	0.62
Maximum	1.62	7.29	8.91	8.1	7.29	21.06	1.25	1.42
Mean	0.54	5.05	5.59	5.9	4.35	15.86	1.11	0.96
SE	0.51	1.07	1.15	0.76	1.26	2.23	2.11	0.24

P-K, distance from posterior end to kinetoplast; K-N, distance from kinetoplast to middle of nucleus; P-N, distance from posterior end to middle of nucleus; N-A, distance from nucleus to anterior; F, free flagellum length; L, total length including free flagellum.

numbers of cattle are found in extensive lowland provinces of Nuflo de Chavez, Guayros, Velasco, Chiquitos, Angel Sandoval and Cordillera (Hall et al., 1993).

*Trypanosoma vivax* is found throughout the tsetse belt in Africa. It has, however, spread to other parts of Africa, Central America, South America, the West Indies and Mauritius (Levine, 1973). *T. vivax* was reported in the New World for the first time in French Guyana (Lerger and Vienne, 1919) and later in other parts of South America, Central America, and some Caribbean islands (Meléndez et al., 1995). In Brazil, Shaw and Lainson (1972) reported the first occurrence of *T. vivax* in a water buffalo (*Bubalis bubalis*) in the vicinity of the city of Belém, Pará State. Silva et al. (1996) reported the first occurrence of *T. vivax* in the Pantanal region of Brazil on the border with Bolivia. This is the first report of *T. vivax* in Bolivia.

## 2. Materials and methods

Between January and May of 1996, thin blood smears stained with May-Gruenwald-Giemsa were submitted by veterinarians to the Laboratorio de Diagnostico e Investigaciones Veterinárias (LIDIVET) in Santa Cruz de la Sierra, Bolivia. In September, blood samples were collected from the caudal vein of 29 bovines in the Laguna Concepción (Province of Chiquitos). Samples were taken using a vacuum system (Vacuum II, Labnew, Campinas, Brazil). The sampled animals, all Bolivian criollo-zebu crossbreeds, were between 1 and 10 years old (mean 4 years old). The diagnosis was made using the microhematocrit centrifuge test (Woo, 1970). Blood from each sample and the concentrated parasites in the buffy coat of microhematocrit tubes were also used to prepare thin smears. The trypanosomes were identified based on morphological and biometrical data (Table 1).

## 3. Results and discussion

In early 1996, several cases of intense anemia, abortion and death were reported in cattle in the lowland provinces of Santa Cruz Department. *T. vivax* was diagnosed in thin blood smears of 159 cases from the Provinces of Velaco (57), Nuflo de Chavez



Fig. 1. Cattle with trypanosomosis due to *Trypanosoma vivax* presenting weakness and loss of condition.

(20), Guayaros (30) and Chiquitos (52) and in 86.20% of 29 cattle from Laguna Concepcion examined in September. The clinical signs observed by veterinarians were fever, anemia, abortion, progressive weakness, loss of condition and loss of appetite. In September we observed lethargy, weakness, substantial weight loss in a relatively short time, anemia and progressive emaciation and death of six cattle (Fig. 1). Some animals presented packed cell volumes (PCV) as low as 17%. The mean PCV was 26%.

Bovine trypanosomosis due to *T. vivax* affects the health and productivity of cattle in Colombia and Venezuela (Wells et al., 1982; Meléndez et al., 1995). According to Otte et al. (1994), the parasite was recorded in Colombia in 1931, when an epidemic with high associated mortality occurred on the Atlantic coast, allegedly following the importation of infected cattle from Apure, Venezuela. At present, overt clinical trypanosomosis is rare in herds in which *T. vivax* is endemic. However, in these herds, primary *T. vivax* infections have been shown to cause subclinical alterations in calves (Otte et al., 1994). In French Guyana, Desquesnes and Gardiner (1993) reported a prevalence of 31%, 35%, 25%, 26%, and 59% in Saint-Laurent, Sinnamary, Kourou, Cayenne, and Saint-Georges zones, respectively. All zones border the Atlantic Ocean border.

Silva et al. (1996) reported for the first time trypanosomosis due to *T. vivax* in the north of the Pantanal, Brazil. The north of Pantanal is located on the border with Velasco Province (Bolivia). According to information provided by local veterinarians, 180 000 head of cattle, principally from the Pantanal, were exported from Brazil to Bolivia.

According to Gardiner (1989), a temporal association between the rainy season when biting flies, particularly Tabanidae, are abundant and an increased prevalence of *T. vivax* infections in cattle has been noted. In Santa Cruz, studies on zoning of the province into three regions of estimated tabanid fly challenge by Hall et al. (1993) showed that the provinces of Velaco, Nuflo de Chavez, Guayaros and Chiquitos are in an area of high fly challenge. In the Pantanal, studies showed that the season occurs in the first half of the rainy season, from September/October to December/January. However, the tabanids remain in high numbers until the end of the rainy season. This season represents the period of major risk of trypanosome transmission by these insects due to their abundance and population peak, most notably *Tabanus importunus* (Silva et al., 1996). Similar to the Pantanal, in the lowlands of the department of Santa Cruz, the rainy season could represent the period of major risk of trypanosome transmission by these insects. According to Gardiner (1989), *T. vivax* also infects various species of antelope, for which it is non-pathogenic. In the lowlands of Bolivia the ungulate fauna is very rich and co-exists with domestic livestock. These animals could serve as an important reservoir of infection. Current and recent historical evidence indicates that bovine trypanosomiasis in the lowland provinces of Santa Cruz has had a devastating effect. *T. vivax* has the potential to become an important bovine disease in Bolivia. However, more studies are necessary to determine the epizootiology of *T. vivax* and the impact of the disease on the economy of the region.

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