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Biometry of *Trypanosoma vivax* found in a calf in the state of Maranhão, Brazil

Biometria de *Trypanosoma vivax* em bezerro do Estado do Maranhão, Brasil

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- NOTE -

ABSTRACT

Blood samples from cattle presenting signs of anemia, lethargy, weakness and general weight loss were collected. *Trypanosoma vivax* was detected in the blood smears of a calf. This paper reports the first recorded occurrence of *T. vivax* in the state of Maranhão, northeastern region of Brazil, and provides the biometrical data of the parasite.

Key words: *Trypanosoma vivax*, Maranhão, bovine, biometry.

RESUMO

Amostras de sangue foram coletadas de bovinos que apresentaram sinais de anemia, letargia, fraqueza e perda de peso. *Trypanosoma vivax* foi detectado em esfregaços sanguíneos de um bezerro. Este trabalho registra, pela primeira vez, a ocorrência de *T. vivax* no Estado do Maranhão, Região nordeste do Brasil, e fornece os dados biométricos do parasito.

Palavras-chave: *Trypanosoma vivax*, Maranhão, bovino, biometria.

Trypanosomiasis is one of the world's most important human and livestock disease. The species of animal trypanosome, with particular economical importance in South America include *Trypanosoma vivax* and *Trypanosoma evansi*. *T. vivax* is a blood parasite of ruminants, originating in Africa (LEVINE, 1973). In South America it was first described in oxen suffering from an emaciating disease in French Guyana (LEGER & VIENNE, 1919) and subsequently in Central

America and some Caribbean Islands. The first report in Brazil was in the early 1970s in a water buffalo (*Bubalis bubalis*) from the vicinity of the city of Belém and in cattle and sheep elsewhere in the state of Pará (SHAW & LAINSON, 1972). New records were reported in the states of Amapá (SERRA-FREIRE, 1981, 1983), Mato Grosso (SILVA et al., 1996) and Mato Grosso do Sul (PAIVA et al., 1997).

SILVA et al. (1996) reported an outbreak of trypanosomiasis in bovines of the Brazilian Pantanal due to *T. vivax*, characterized by ematiation, abortion and death. More recently, LINHARES et al. (2006) confirmed the occurrence of an outbreak in a bovine herd in Tocantins, and BATISTA et al. (2007) confirmed an outbreak in cattle from the semi-arid region of Paraíba.

The present study reports for the first time the presence of *T. vivax* in blood smears from a naturally infected calf in the state of Maranhão, Brazil, and gives the biometrical data of the parasite.

In August of 2003 in a dairy farm located in the village of Colombo, municipality of Itapecuru-Mirim, in the state of Maranhão, animals, especially calves, showed clinical signs of anemia, such as paleness of the oral and conjunctiva mucous membranes, lethargy and weakness. Because hemoparasite infection was suspected, blood samples were obtained from 20 cows and 11 calves. Thin blood smears were done and stained with Giemsa.

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The examination revealed trypomastigotes of *Trypanosoma* in the blood smear of one calf that died in a few days. For the biometrics characterization, 50 trypanosomes were measured using an optic microscope (Olympus BX 15) connected to a specific software (Image-PrpPlus). The biometrics data was compiled as described by HOARE (1972).

The trypomastigotes forms were monomorphic, the posterior end typically rounded, a free flagellum present, the kinetoplast large and terminal and an undulating inconspicuous membrane. The description is compatible with the one made by several authors for *T. vivax* (Figure 1).

This is the first recorded occurrence of *T. vivax* in the state of Maranhão. This result suggests that *T. vivax* is spreading throughout Brazilian territory. Also in the northeastern region of Brazil, BATISTA et al. (2007) reported an outbreak of trypanosomiasis by *T. vivax* in Paraíba. According to these authors, data obtained suggested that the semiarid region is non-endemic for trypanosomiasis and the disease occurred due to introduction of the parasite in a susceptible herd after an apparent rise in the *Tabanus* spp. population. LINHARES et al. (2006) reported for the

first time the occurrence of *T. vivax* in Tocantins, in a herd which had come from São Paulo. The authors emphasize the potential risk of introducing animals from free areas to enzootic ones, where the parasite probably circulates among wild mammals.

According to JONES & DÁVILA (2001), *T. vivax* in the New World is an example of a pathogen that has spread beyond its original distribution range through human intervention, both in spanning the thousands of miles between Africa and South America and in propagating itself after introduction in new areas; hence, the need to identify this pathogen across South America.

In 100% of the measured trypanosomes, kinetoplast (K) was located near the posterior end. In 41 (82%) the nucleus was near the anterior end. The range of lengths were 15.38µm to 24.26µm (including free flagellum 3.06µm to 8.63µm and means of 6.01µm) (Table I).

Morphologic studies performed by HOARE (1972) state that the range of lengths of *T. vivax* were from 18µm to 31µm (including free flagellum 3-6µm long), with means from 21µm to 25.4µm, over 90% of

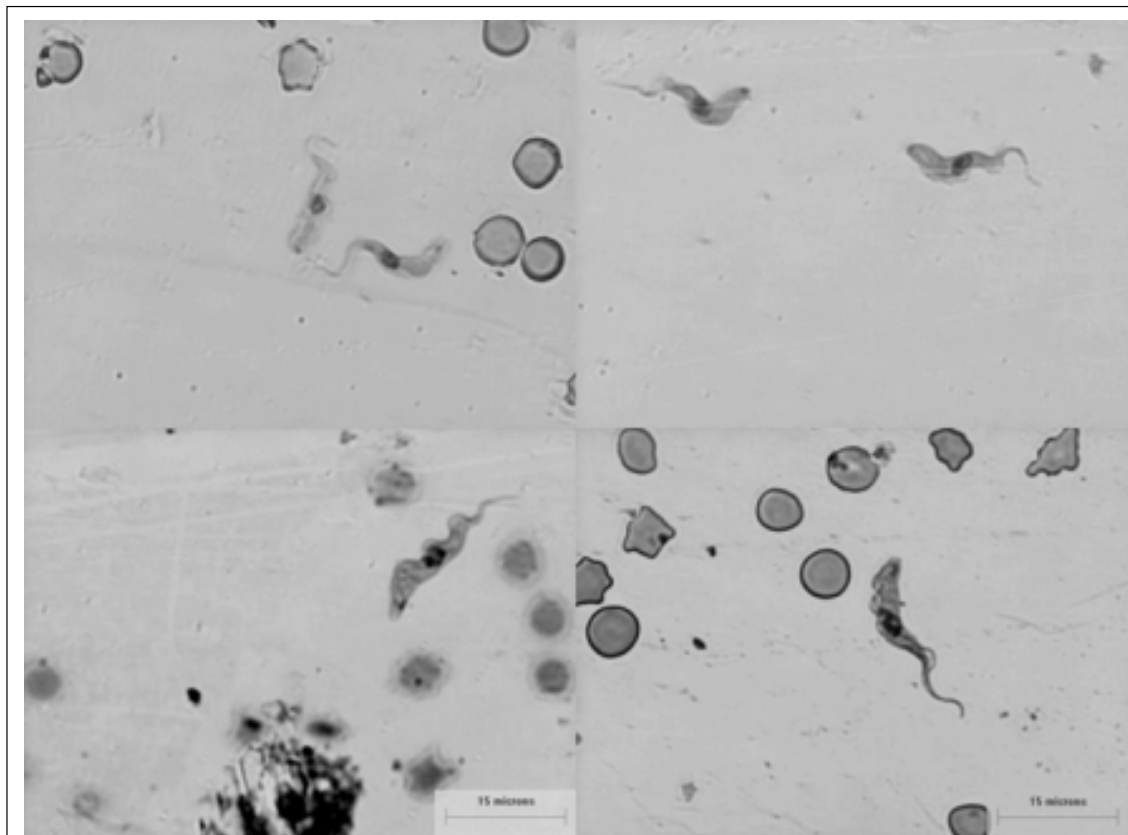


Figure1-Photomicrographs of *Trypanosoma vivax* from bovine of Itapecuru-Mirim, Maranhão state, Brazil.

Table 1 - Measurements of *Trypanosoma vivax* of bovine from Maranhão, means \pm SD (μ m) (n=50).

	PK	KN	PN	NA	F	L	PN/KN	PN/NA
minimum	0.65	4.88	2.28	4.21	3.06	15.38	0.34	0.37
maximum	2.0	8.30	10.03	8.78	8.63	24.26	1.53	1.71
mean	1.35	6.40	7.64	6.75	6.01	19.94	1.20	1.15
SD	0.37	0.79	1.16	1.08	1.31	1.93	0.14	0.23
SE	0.05	0.11	0.16	0.15	0.18	0.27		

PK: distance from posterior end to kinetoplast; KN: from kinetoplast to middle of nucleus; PN: from posterior end to middle of nucleus; NA: from nucleus to anterior extremity; F: free flagellum length; L: total length, including free flagellum.

the measurements were between 20 μ m and 26 μ m. The dimensions of *T. vivax* firstly reported in Brazil (SHAW & LAINSON, 1972) were 22.77 μ m (ranging from 19.2 μ m to 25.0 μ m). SILVA et al. (1996) found in the Pantanal forms with means of 18.73 μ m (ranging from 11.34 μ m to 21.87 μ m). LINHARES et al. (2006) obtained a mean of 19.42 μ m. We found a dimension of 19.9 μ m. (ranging from 15.38 μ m to 24.26 μ m).

Maybe the differences observed in biometrical data could be related to the phase of the disease (acute or chronic). FAIRBAIRN (1953) showed that short forms were characteristic of the strains causing acute disease in cattle in West Africa, while long forms are associated chiefly with strains causing chronic infection in East Africa. DÁVILA et al. (1997) compared measurements of *T. vivax* in blood films from naturally infected bovines from Brazil and Bolivia. They believe that shorter forms reported in their work could be related to the acute disease observed by them. In water buffalos, SHAW & LAINSON (1972) reached the same conclusion with regard to the Belém parasite. However, LINHARES et al. (2006) stated that further studies will be necessary in order to elucidate the differences in size of the Brazilian *T. vivax* samples and its possible association with virulence.

The presence of *T. vivax*, or antibodies against it, was demonstrated in Latin American countries in cattle, including Brazil (SHAW & LAINSON, 1972, SERRA-FREIRE, 1981, SILVA et al., 1996, PAIVA et al., 1997, LINHARES et al., 2006, BATISTA et al., 2007); according to the literature, few outbreaks were described in South America. In Brazil, all reported outbreaks are currently restricted to the Pantanal region (SILVA et al., 1996), Tocantins (LINHARES et al., 2006) and Paraíba (BATISTA et al., 2007). Further studies will be necessary in order to understand the possible impact of *T. vivax* infection in cattle in the state of Maranhão.

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