

# The Seroprevalence of Equine Trypanosomosis in the Pantanal

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*Since little information is available on the epizootiological status of Trypanosoma evansi in South America and particularly Brazil, we evaluated equine serum samples collected in 1993, 1994, 1995 and 1997 for the presence of antibodies against this trypanosome species. Our study shows corroborative evidence about the correlation among high T. evansi seroprevalence and the rainy season in the Pantanal, Brazil. The higher seroprevalence was 79.2% in horses from a ranch located in the Nhecolândia sub-region in 1994 and the lower 5.8% in animals from the same ranch in 1997. No seroprevalence was found in 1993. The possible re-introduction of T. evansi in the region as well as the relationship among our results with the outbreaks reported in 1994, are briefly discussed.*

Key words: *Trypanosoma evansi* - seroprevalence - Pantanal - Brazil

*Trypanosoma evansi* causes the equine trypanosomosis also called "Mal de Caderas", and is one of the most important protozoan diseases in the Pantanal region of Brazil. *T. evansi* infects a wide variety of mammals and in the Pantanal has been found in horses, coatis (*Nasua nasua*), dogs, capybaras (*Hydrochaeris hydrochaeris*) (Nunes & Oshiro 1990, Silva et al. 1995b) and small wild rodents (*Oryzomys* sp.) (Nunes et al. 1995).

In South America, *T. evansi* affects principally horses which are very important for cattle management, however, it is important to emphasize that cattle raising is the most important economic activity in the Pantanal. Extensive cattle ranches varying from 10,000 to 200,000 hectares occupy most of the Pantanal. It is populated by 3,013,218 cattle, 4,966 buffaloes and 49,000 horses (Cadavid Garcia 1986, Silva et al. 1998, Seidl et al. 1998). According to Seidl et al. (1998) the estimated total cost of *T. evansi* to the Pantanal region's cattle ranchers is about US\$2.4 million and 6,462 horses per year.

Preliminary studies on the prevalence of *T. evansi* in the northern region of the Pantanal have been developed by Franke et al. (1994). They recorded the presence of *T. evansi* in horses, bovines, dogs and capybaras in the sub-region of Pantanal of Poconé with prevalences of 9.6%, 4.2%, 18.6% and 14%, respectively. These results were obtained using the Ab-Elisa (enzyme-linked immunosorbent assay) for detection of antibodies against *T. evansi*.

This paper shows data on the seroprevalence of *T. evansi* in horses from the Pantanal region of Brazil.

## MATERIALS AND METHODS

Using an immunofluorescent antibody test we evaluated 20 equine serum samples from ranch 1 (R1-Nhecolândia sub-region) collected in January 1993 and other 65 serum samples collected from the ranch 2 (R2-Nabileque sub-region) in February 1994 (manuscript in preparation). Twenty-two sera samples from ranch 3 (R3-Nhecolândia sub-region) collected in 1993 (August), 1994 (March) and 1995 (December), as well as other 102 samples collected in July 1997 were analyzed. Twenty samples of ranch 4 (R4-Nabileque sub-region) obtained from the outbreak of 1994 (Silva et al. 1995b) were also tested.

## RESULTS

From the R3 located in the Nhecolândia sub-region of the Pantanal we obtained the following

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prevalences: 0, 79.2% and 68% in the years 1993, 1994 and 1995, respectively. The prevalence of R1-Nhecolândia (January 1993) was zero. On the other hand in R2 and R4 from Nabileque sub-region (February 1994) were 21.5% and 100%, respectively (Table).

The incidence recorded in R3 was 0, 79.2, 68 and 5.8% in 1993, 1994, 1995 and 1997, respectively.

## DISCUSSION

Prevalences in R2 and R3 from 1994-1995 (Table) are higher than those recorded in the literature. Franke et al. (1994) found a *T. evansi* prevalence of 9.6% in horses from the Pantanal of Poconé sub-region State of Mato Grosso, using an ab-Elisa (Elisa for antibody detection). In Santa Cruz, Bolivia a *T. evansi* prevalence of 4.41% using Elisa was recorded in horses (Klarmann-Osuna 1996). On the other hand, in the Formosa province, Argentina the prevalence found was 19.3 % in horses among the years of 1983-1987 (Monzon & Colman 1988). The low prevalence in this study was 5.8% in R3 located in the Nhecolândia sub-region. Nevertheless, it is similar to the 4.41% prevalence found in horses from Santa Cruz, Bolivia, considered by the author as a high one (Klarmann-Osuna 1996).

In the present study we have not found indication of *T. evansi* prevalence in horses from R1 and R3 (Nhecolândia sub-region) in 1993. This trypanosome was probably introduced in South America during the XVI century by Spanish settlers (Hoare 1972, Santos et al. 1992) and arrived to the Pantanal by 1850. No effective drug treatment was available until 1930, however, ranchers usually imported horses from other regions because of the high mortality rate caused by this trypanosome. Furthermore, outbreaks of equine trypanosomosis have been informally reported in the Nhecolândia sub-region since 1894 (Barros 1959). However, considering that (a) the first official records of *T. evansi* outbreaks in horses were made in 1994 (Silva et al. 1995b); (b) other researchers did not find *T. evansi* in horses from the Nhecolândia sub-region before 1994 (Stevens et al. 1989), and (c)

lack of *T. evansi* prevalence in 1993 (present study); we believe that this parasite could have been re-introduced in the southern Pantanal in 1994. Factors like increase of cattle movement during the last years, climatic conditions like flooding of the region (Dávila et al. 1997), stress of animals and contact with new *T. evansi* strains could have contributed for the outbreaks of 1994.

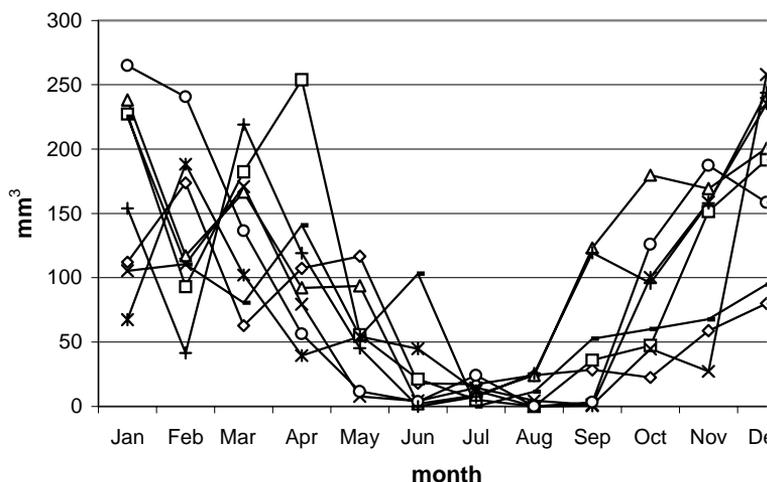
There is a temporal association among the raining season and the abundance of tabanids in the Pantanal, but these insects remain in a high number until the end of the rainy season (Silva et al. 1995a). A similar observation has been made in Kenya (Gardiner 1989), Thailand (Lohr et al. 1985), Chad (Gravel & Balis 1965) and Bolivia (Bejarano 1996). The latter author concluded that the peak of tabanids coincide with the highest temperature and rainy season in a province of the Santa Cruz department, Bolivia. Since in the Pantanal the dry season is from June-August (Figure), we could think that the lack of prevalence in R3 in August 1993 is due the low number of mechanical inoculators like tabanids. It would be true when parasitological test are used, and we were looking for parasites in the blood of animals. However, in the present study we used a serological test which can detect IgG levels against *T. evansi*. According to Monzón (1986, 1987), serological titers down gradually after treatment and remain circulating for approximately one year. Thus, we should have detected some prevalence in R3 (August 1993), if any, such as done in the same ranch in July 1997, which is also a month belonging to the dry season.

Our study provide corroborative data about the correlation among high prevalences and the rainy season in the Pantanal (Table). The higher prevalence recorded in R3 (Nhecolândia sub-region) in 1994 (79.2%) could correspond to an outbreak. In the same year, from February to July, nine *T. evansi* outbreaks occurred in the same sub-region as well as neighbors sub-regions as Pantanal of Paraguay, where the first outbreaks of equine trypanosomosis were reported with mortality as high as 51% (Silva et al. 1995a,b). There probably is a relationship among the outbreaks reported in Nhecolândia and Paraguay sub-regions (Silva et al 1995a) with the

TABLE

Seroprevalence of *Trypanosoma evansi* in the Nhecolândia and Nabileque sub-regions of the Pantanal, Brazil (%)

	1993		1994		1995	1997
	Jan	Aug	Feb	Mar	Dec	Jul
R1 - Nhecolândia	0	-	-	-	-	-
R2 - Nabileque	-	-	21.5	-	-	-
R3 - Nhecolândia	-	0	-	79.2	68	5.8
R4 - Nabileque	-	-	100	-	-	-



Monthly precipitation means from years 1990-1997 in the Pantanal of Nhecolândia sub-region, State of Mato Grosso do Sul (Balbina Soriano, Embrapa-Cpap, pers. commun.).

high prevalence found in the present study in the Nabileque sub-region (R2). This is possible because of the Pantanal of Paraguay sub-region is close to the Pantanal of Nabileque, and R3 is one of the nine places where outbreaks occurred in 1994 (Silva et al. 1995a).

*T. evansi* is in fact enzootic in the Pantanal and the present study showed an indication of enzootic instability in 1994 when outbreaks in horses from the Nhecolândia sub-region were reported. Studies on serodemes and VAT (variable antigenic type) populations of circulating strains, as well as seroprevalence in animals from neighbors sub-regions to Nhecolândia before 1994 should be made for a better understanding of the dynamics of this parasite in the region.

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