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COMMUNICATION

Sylvatic focus of American Trypanosomiasis in the State of Morelos, Mexico

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Abstract: Wild vectors and reservoir hosts of *Trypanosoma cruzi* were surveyed from February 1993 to June 1994 in Ticumán (18°46'N, 99°07'W), Mexico (Deciduous Tropical Forest). Direct faeces examination showed that 87% of *Triatoma pallidipennis* hosted the parasite; *T. cruzi* forms were present in cultures inoculated with faeces of fifty 67% triatomine bugs and thirty CD-1 strain mice (10 d old) inoculated (peritoneum) with faeces of positive insects *T. cruzi* amastigotes were found in heart 67%, kidneys 47%, liver 80%, lungs 50%, oesophagus 60%, skin 23%, spleen 73% and stomach 60%. *T. cruzi* was isolated by direct blood examination from seven 21% chiropterans and five 38% rodents and *T. cruzi* forms were present in cultures inoculated with blood of twenty-three 68% chiropterans and seven 54% rodents and *T. cruzi* amastigotes were seen in the kidneys of one 3% chiropterans and four 31% rodents and only in one *Pteronotus parnellii mexicanus*, organisms were seen in skin 2%. There was no association between organs and *T. cruzi* infection ($p > 0.05$).

Key words: *Trypanosoma cruzi*, wild mammals, *Triatoma pallidipennis*, Mexico.

Epidemiology of American Trypanosomiasis (Chagas' disease) includes the vector, triatomine bugs ***TB*** infected with *Trypanosoma cruzi*, and susceptible mammals (sources of infection for the humans). In rural areas, contact between *T. cruzi* and humans is easy because of the persistence of intra-domiciliary vectors and domestic mammals that may acquire the infection from sylvatic foci (Botero and Restrepo 1994). We determined the infection rate ***IR*** of wild vectors and reservoir hosts ***RH*** of *T. cruzi* from Ticumán, Mexico.

In the study area (Ticumán 18°46'N, 99°07'W), Tlaltizapán, Morelos, Mexico, 965 m above sea level, climate is warm and sub-humid Aw_o(w)(e)gw" in Köeppen's classification modified by García (1988) and the surrounding vegetation is characterized by Deciduous Tropical Forest. Three sylvatic sites were selected as trapping stations and from February 1993 to June 1994, specimens of ***TB*** according to Carcavallo (1985) were collected and transported to the laboratory where the Lent and Wygodzinsky (1979) identification keys were followed. To determine *T. cruzi* infection ***TCI*** the captured ***TB*** faeces extracted through abdominal compression were placed on slides, diluted in PBS (pH 7.2) and observed by light microscopy ***LM*** according to Rosario (1989). Trypanosomes from faeces (0.2 ml) were cultured in NNN medium and inoculated (0.2 ml) into the

peritoneum of thirty CD-1 strain mice (10 d old). Wild mammals ***WM*** were caught with "Mist" nets, 200 x 600 cm, for chiropterans ***CHT*** and "Sherman" traps for rodents ***ROD***; all nets and traps were arranged 10 m from each other. In the laboratory the ***WM*** were identified according to Ramírez-Pulido *et al*. (1989) and Wilson and Reeder (1993). Mammals were killed by aseptic cardiac puncture and 1 ml of heparinized blood was immediately added to sterile culture tubes with NNN medium and incubated at 26 ºC for 30 d according to Rosario (1989); once a week a drop was observed under a coverslip by ***LM***. Internal organs such as heart ***H***, kidneys ***K***, liver ***LI***, lungs ***L***, oesophagus ***O***, skin ***SK***, spleen ***S*** and stomach ***ST*** were removed and fixed in 10% neutral formalin solution and histologically examined to determine the presence of *T. cruzi* amastigotes ***TCA*** according to Wisnivesky-Colli *et al*. (1992). Giemsa and Wright-stained blood smears ***BS*** from each mammal were prepared, and the ***IR*** was determined by prevalence according to Bush *et al*. (1997). Dependence between different organs of ***WM*** and the ***TCI*** was determined through chi-square goodness of fit.

Most of the ***TB*** collected were the third, fourth and fifth instar nymphs and some adult males and females belonging to *Triatoma pallidipennis* species. Direct faeces examination showed that *T. cruzi* trypomastigotes ***TCT*** were present in 87% of 75 captured ***TB*** and *T. cruzi* forms ***TCF*** were present in cultures of 67% ***TB***. Mice inoculated were found already infected at 7-15 d post-inoculation and parasitaemia peaks oscillated among (mean 2.3 x 10^5 trypomastigotes/ml) observed on day 10 and (mean 4.6 x 103 trypomastigotes/ml) recorded on day 19 post-inoculation and ***TCA*** were found in ***H*** 67%, ***K*** 47%, ***LI*** 80%, ***L*** 50%, O 60%, ***SK*** 23%, ***S*** 73% and ***ST*** 60%. Most of the ***WM*** trapped were ***CHT*** and also some ***ROD*** were caught and ***TCT*** were found in ***BS*** of 21% ***CHT*** and 38% ***ROD***. Only specimens of *Balantiopteryx plicata plicata* were negative and in culture medium one specimen of *Peromyscus melanophrys melanophrys* was positive showing recent and low parasitaemia. ***TCF*** were present in cultures of 68% ***CHT*** and 54% ***ROD*** while ***TCA*** were found in the ***K*** of 3% ***CHT*** and 31% ***ROD*** and only in one *Pteronotus parnellii mexicanus*, organisms were seen in ***SK*** 2% and for additional results, see Table 1. There was no association ($p > 0.05$) between the whole group of ***WM***; or for ***CHT*** and for ***ROD***.

TABLE 1

Results of direct blood examination and culture, and histopathological examination of wild mammals caught from February 1993 to June 1994, for Trypanosoma cruzi *infection.*

Species	Mammals captured and examined	Positive mammals		Examined organs							
		BS	Culture†	***H***ab	***K***ab	***Li***ab	***L***ab	***O***ab	***Sk***ab	***S***ab	***St***ab
*Artibeus jamaicensis triomylus**	7	2	4	4	0	2	0	0	0	5	6
*Balantiopteryx plicata plicata**	2	0	0	0	0	0	0	0	0	0	0
Choeronycteris mexicana*	1	1	1	1	0	1	1	1	0	0	1
*Glossophaga soricina leachii**	1	1	0	1	1	1	0	0	0	1	0
*Pteronotus parnellii mexicanus**	6	0	5	5	0	3	0	2	1	2	0
*Sturnira lilium parvidens**	17	3	13	5	0	9	0	3	0	0	7
*Baiomys musculus pallidus***	7	3	5	0	0	5	2	5	0	4	3
*Liomys irroratus torridus***	3	1	0	3	2	3	0	1	0	3	0
*Neotoma mexicana torquata***	2	1	1	2	2	0	2	1	0	0	2
*Peromyscus melanophrys melanophrys***	1	0	1	0	0	0	0	0	0	0	0

* Chiroptera; ** Rodentia; ***BS*** blood smears; † NNN medium; [a] Histopathology; [b] Amastigote nests; Columns 4-11: number of positive specimens

H Heart; ***K*** Kidneys; ***Li*** Liver; ***L*** Lungs; ***O*** Oesophagus; ***Sk*** Skin; ***S*** Spleen; ***St*** Stomach

Our finding of specimens of *T. pallidipennis* infected with *T. cruzi* from caves where ***CHT*** and other mammals live, and the 87% infection frequency was not unusual. The data were not significantly different from that of 81% obtained by Arriola (1989), but did differ clearly from Magdaleno *et al.* (1990), Bautista *et al.* (1992) and Herlindo-Jaimes (1998) who found 15%, 29% and 54% infected respectively. In Mexico, studies on ***CHT*** reservoirs of *T. cruzi* one few. The ***IR*** did differ significantly from that of 59% for *P. parnellii* obtained by Parra *et al*. (1992) and from that of 29% for *Artibeus jamaicensis triomylus* and 60% for *Sturnira lilium parvidens* obtained by Herlindo-Jaimes (1998), so as from that of 50% for *A. jamaicensis* obtained by D'Alessandro *et al*. (1984). Our finding of ***TCI*** in bats agrees with previous researches characterizing various ***CHT*** species as ***RH*** of the parasite in America (reviewed by Pereira-Barretto 1985). Concerning ***ROD*** reservoirs in Mexico, there is insufficient epidemiological research, that is why more synantropic that wild rodents have been studied. The ***IR*** were not significantly different from that of 91% for *P. melanophrys* and 97% for *Neotoma mexicana* obtained by Parra *et al*. (1992), but did differ significantly from that of 43% for *P. m. melanophrys* and 40% for *Baiomys musculus pallidus* obtained by Herlindo-Jaimes (1998). The fact that some infected reservoirs were culture-negative indicates possible contamination and that they lacked a circulating parasitaemia.

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RESUMEN

Se determinó la infección por *Trypanosoma cruzi* en chinches triatóminas y mamíferos silvestres capturados de febrero de 1993 a junio de 1994 en Ticumán (18°46'N, 99°07'W), Tlaltizapán, Morelos, México. El 87% de los ejemplares de *Triatoma pallidipennis* tenía el parásito; *T. cruzi* fue aislado de la sangre de siete quirópteros y cinco roedores. No hubo dependencia significativa entre los órganos examinados de los mamíferos y la infección por *T. cruzi.*

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