

## RESEARCH NOTE

## Wild Reservoirs Infected by *Trypanosoma cruzi* in the Ecological Park "El Zapotal", Tuxtla Gutiérrez, Chiapas, México

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The transmission cycles of Chagas' disease involves a wide range of hosts. Dogs and rodents are probably the most important reservoir host involved in the intra and peridomestic infection cycle while opossums (*Didelphis* species) and armadillos maintain the disease in the sylvatic cycle. Wild and domestic cycles are often physically close to one another, so *Trypanosoma cruzi* strains show continual movements from human dwellings to wild environments and *vice versa* (WHO 1991, Technical Report Series, No. 811, p. 23-25, L Diotaiuti et al. 1995 *Mem Inst Oswaldo Cruz* 90: 443-448).

In México, only a few studies on *T. cruzi* reservoirs have been conducted, most of them involving the role of domestic and peridomestic animals. Limited studies conducted in northwest and central México have indicated rats, mice and opossums to be the most important species for persistence of the disease in wild animal populations (C Correa et al. 1990, Mem II Reun Nal de Chagas, Tepic, Nayarit, México p. 60, L Zárate & R Zárate 1984 *Intern J Entomol* 27: 102-107, PM Salazar 1988 *Parasitol Today* 12: 348-352, ME Espinoza 1988, Mem Wildlife Soc p. 25, J Ricardez unpublished data).

In Chiapas, very little is known about the sylvatic cycle of Chagas' disease. "El Zapotal" is an ecological park in the city of Tuxtla Gutiérrez, Chiapas. The park is large in area (ca. 100 ha) and covered mostly by low tropical forest where *Achras zapota* (Chicozapote), *Delonix regia* (Flamboyan) and *Mangifera indica* (Mango) are the dominant tree species. The climate is usually hot-subhumid with an average annual temperature of 24.7°C and a mean annual precipitation of 948.2 mm. This ecological park is home to about 38 mammal species, notably *Dasyprocta punctata* (Guaqueque), *Tayassu tajacu* (Jabali), *Odocoileus virginianus* (Venado cola blanca), and *Felis pardalis* (Ocelote). Due to the proximity of a human settlement (about 1500 m) we decided to search for possible reservoir species for Chagas' disease at "El Zapotal" and to determine their possible role in the natural persistence of the disease, as well as the potential risk posed to the local human population.

From May 1989 to September 1990 mammals were collected using Sherman, Tomahawk and conventional rat-traps (17 of each type) distributed along 17 transects in zones where mammal activity had been detected, e.g. close to shelters, caves, vegetation and watering places. Bats were trapped using bird nets. The presence of *T. cruzi* infection was determined by direct microscopic observation of blood samples, xenodiagnosis (using 20 *Rhodnius prolixus* bugs for each animal), and blood culture. In addition, histological examinations were performed on the organs from positive animals to confirm infection by *T. cruzi*.

A total of 141 animals were collected, of which 118 were rodents (83.7% of total sample) of 5 different species: 80 *Peromyscus mexicanus*, 34 *Heteromys desmarestianus*, 2 *Rattus rattus*, 1 *Syngmodon hispidus* and 1 *Mus musculus*. A total of 19 opossums (13.5%) were trapped comprising 3 species: 12 *Didelphis virginiana*, 1 *D. marsupialis* and 6 *Metachirops opossum* and 4 bats (2.8%) of 2 species: 2 *Desmodus rotundus* and 2 *Artibeus jamaicensis*. Infection by *T. cruzi*, corroborated by all four methods, was detected in a total of 13 animals representing just three species. Two of these were rat species: *P. mexicanus* (5/80, 6.3%) and *H. desmarestianus* (6/34, 17.6%) and one opossum *D. virginiana* (2/12, 16.6%). In spite of the fact of human inhabitants from the park report the presence of some triatomids whose description is relate to *Triatoma dimidiata* no triatomid bug was found in the area. The low infection rate of collected reservoir hosts may be a reflection of the low density of triatomids in the area or may suggest that the infection is transmitted principally through cannibalism and necrophagy.

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These results confirm that rodents and opossums play a key role in the persistence of *T. cruzi* and may be also important agents for the transmission of the disease to humans because of their abundance, the ability to harbour infection and their proximity with peridomestic and intradomestic triatomine bugs when rodents and opossums go to houses searching for food. They may also play an important role in the movement of *T. cruzi* strains

to and from human dwellings due to their habits of foraging between wild and domestic habitats in the rural areas. We conclude that in this area of Chiapas, the presence of *T. cruzi* reservoirs permits the persistence of wild strains and will influence their introduction to human dwellings. Given an increase in triatomid population densities we predict a greater risk to the human population from exposure to strains with high pathogenicity.