

**Lecture 11. Fernando Abad Franch** (Fiocruz, Amazônia, Brazil):

**“Detecting triatomines: challenges to field research and eco-epidemiological data analysis”**

**Keynote Lecture 3: Ricardo Gürtler** (CONICET, Argentina)

**The process of house reinfestation after residual spraying with pyrethroids in the Gran Chaco**

*Ricardo E. Gürtler<sup>1</sup>, François Noireau<sup>2</sup> and Antonieta Rojas de Arias<sup>3</sup>.*

*<sup>1</sup>Laboratorio de Eco-Epidemiología, Universidad de Buenos Aires/CONICET, Argentina; <sup>2</sup>Institut de Recherche pour le Développement (IRD), Francia; <sup>3</sup>Centro para el Desarrollo de la Investigación Científica, Díaz Gill Medicina Laboratorial/Fundación Moisés Bertoni, Asunción, Paraguay.*

The Gran Chaco is the last frontier in the elimination of *Triatoma infestans*. In cooperation with local vector control programs, a multi-site prospective study was conducted from 2007 to 2010 to investigate the process of house reinfestation with the major vector *T. infestans* after community-wide residual spraying with pyrethroid insecticides in three rural areas (250-364 houses each) located in the Argentinean, Bolivian, and Paraguayan Chaco. High levels of house infestation and infection prevalence in (peri)domestic *T. infestans* bugs indicated intense transmission of *Trypanosoma cruzi* before interventions in all study sites. The pre-intervention house distribution of bug infection with *T. cruzi* indicated that transmission was widespread though heterogeneous; in Argentina and Paraguay transmission was detected only in 20-30% of households. In the Argentinean Chaco, the distribution of bug, dog or cat infection with *T. cruzi* between ethnic groups indicated that Toba indigenous households were at a higher risk of vector-borne transmission than Creoles. In all study sites, community-wide residual spraying with pyrethroid insecticides drastically reduced the prevalence of house infestation and abundance of *T. infestans*, but its early impact was much lower than expected. Several pieces of evidence suggested that post-spraying infestations were mainly due to residual foci that survived pyrethroid applications (i.e., high bug abundance and an unbiased stage structure; similar wing geometric morphometry and genetic haplotypes of ITS2 and *cytB*; a positive association between post-spraying and pre-spraying bug abundance, and persistence of *T. cruzi*-infected triatomine bugs). Screening bioassays indicated that *T. infestans* populations had diminished susceptibility to pyrethroids in the Argentine and Bolivian study sites. The origins of such diminished susceptibility to pyrethroids in *T. infestans* populations in two of the three study sites remain uncertain, given the prior history of insecticidal treatment. In spite of selective insecticide sprays of the detected foci, *T. infestans* was not fully eliminated after three years in the three sites. In Paraguay, the use of a trained dog was instrumental to identify the first foci of sylvatic *T. infestans* discovered in the Paraguayan Chaco, whereas no such sylvatic foci were detected in the Argentinean and Bolivian study sites. The project's intervention activities demonstrated that standard operating procedures conducted by vector control programs are less effective than assumed and cannot eliminate *T. infestans* from highly infested districts in the Gran Chaco.

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# II

# WORKSHOP INTERNACIONAL DE LA ENFERMEDAD DE CHAGAS, VECTORES TRIATOMINOS, *Trypanosoma cruzi* Y TRIATOMA VIRUS



## LIBRO DE RESÚMENES

Del 17 al 20 de SEPTIEMBRE DEL 2012

COCHABAMBA - BOLIVIA

**II International Workshop on Chagas Disease,  
triatomine vectors,  
*Trypanosoma cruzi*, and Triatoma virus**



## II International Workshop on Chagas Disease, triatomine vectors, *Trypanosoma cruzi*, and *Triatoma* virus

In memoriam of Dr François Noireau

Facultad de Medicina, IIBISMED-CUMETROP, Universidad Mayor de San Simón,  
Cochabamba, Bolivia

September 17-20, 2012

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### Workshop objectives

- To inform interested stakeholders about the current Chagas disease burden and control strategies.
- To discuss current and future methods and technologies oriented to control triatomines and other insect vectors.
- To get feedback from associations, industry sector, and research organizations about using *Triatoma* virus as biological control agent.
- To assess research needs and cooperation opportunities between scientists working on human and animal trypanosomiasis, insect vectors and viruses.

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