

A new focus of Chagas disease transmitted by *Triatoma dimidiata* in the Veraguas Province of Panama



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Introduction:

Although the majority of the Panamanian territory has eco-epidemiological conditions suitable for *Trypanosoma cruzi* transmission; for decades Chagas disease research has concentrated in central regions adjacent to the Panama Canal. In these areas, *Rhodnius pallescens* is considered the main vector of the infection.

Triatoma dimidiata is an important vector of Chagas disease in some countries of Central America and in some regions of Colombia and Ecuador. However, there are scarce reports from Panama implicating *T. dimidiata* as an important vector of human *T. cruzi* infection. Considering the recent reports of houses infested with *T. dimidiata* in rural communities located in the Veraguas Province of Panama, health authorities have considered a priority to update the epidemiology of Chagas disease in this region of the country. It is on this foundation that a preliminary epidemiological and entomological study on Chagas disease was conducted.

Objectives:

- To investigate the ecological distribution of *T. dimidiata* in this area.
- To analyze the infection rate of *T. dimidiata* with *T. cruzi* and *T. rangeli*.
- To determine the triatomine bloodmeal sources.
- To investigate risk factors associated with *T. cruzi* infection in the area.
- To evaluate the seroprevalence of Chagas disease in these communities.

Materials and methods:

Area of research: Three rural communities (El Macho, La Sabaneta and El Peñoncito) located in the Northern part of El Cuay County, Santa Fe District (8°31' 0N; 81° 4'60W) in the Province of Veraguas (**Figure 1**). This region is a remote and extremely poor mountainous area located between 500 and 1200 m.a.s.l. A questionnaire was applied to assess epidemiological data on risk factors associated with the disease.

Collection of triatomines: Houses were actively explored for the presence of triatomines. In addition, plastic containers with a *T. dimidiata* picture adhere to its surface were distributed among trained local inhabitants for the collection of bugs inside their homes.

Blood feeding identification: *T. dimidiata* blood meal sources were identified by a dot blot technique.

Trypanosome infection rate: *T. dimidiata* infection with *T. cruzi* and/or *T. rangeli* was assessed by a PCR Multiplex technique.

***T. cruzi* human infection:** Human blood was collected on filter paper. The presence of antibodies against *T. cruzi* was assessed by three serological tests (western blot, dot-blot and a recombinant ELISA). Samples were considered positive when they showed reactivity in at least two of the serological tests used.

Results

- A high infestation/colonization index with *T. dimidiata* was observed in the three studied communities (72%; 26/36) (**Figure 2**).

- Most houses in these communities (97%; 35/36) were constructed of cane walls and dirt floors (**Figure 3**).

- Domestic animals inside houses, such as fowls, doves and dogs were common (92%; 33/36).

- *T. cruzi* infection rate observed in collected *T. dimidiata* was 16% (19/120).

- Host feeding profiles revealed that 26% (31/120) of collected triatomines had fed from human blood (**Figure 4**).

- A human seroprevalence of 3.2% (7/221) was detected.

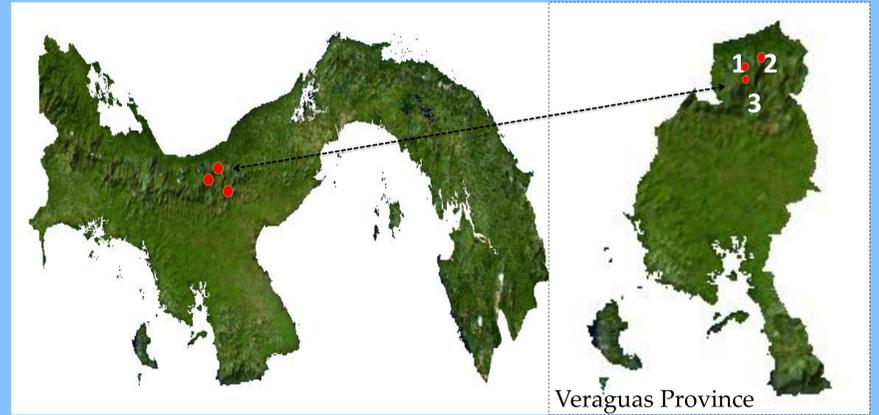


Figure 1: Map of Panama showing studied sites

Studied sites:
1. El Macho
2. Sabaneta
3. El Peñoncito

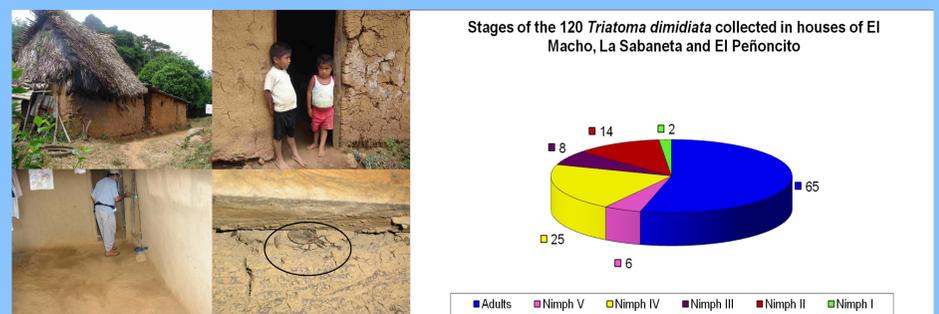


Figure 2

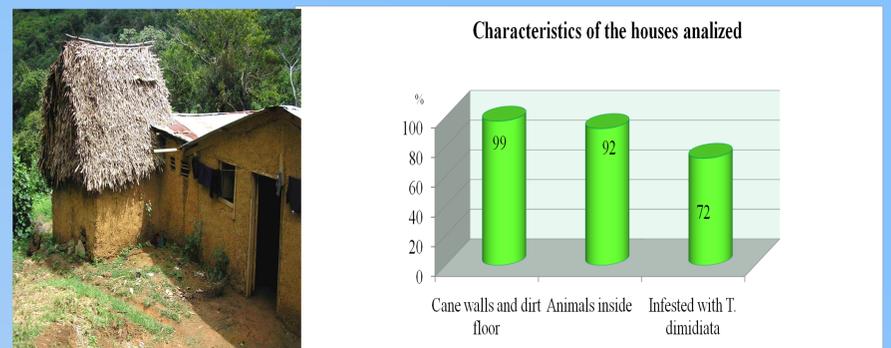


Figure 3

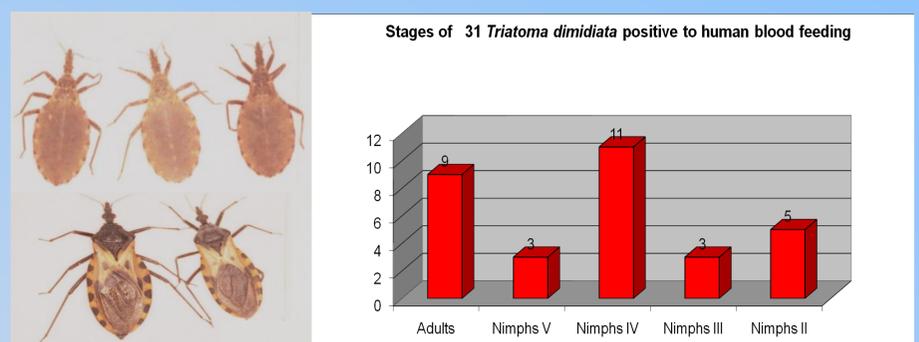


Figure 4

Conclusions

-The area under study presents eco-epidemiological conditions and risk factors suitable for the establishment of *T. dimidiata* domestic infestation/colonization.

-The entomological and serological results demonstrated that an active *T. cruzi* transmission is currently occurring in the human population from this area.

-*T. dimidiata* is likely to be the main vector in this new described endemic region. This is the first report of domestic triatomines in this area of Panama.

-This new epidemiological scenario deserves a more extensive investigation and demands immediate intervention by health authorities, such as insecticide spraying and physical improvement of infested homes.

-Community educational programs, regarding both the disease and control measures are essential in this underserved area of Panama.



The area presents eco-epidemiological conditions suitable for the domestic colonization.