

Peridomestic colonization of *Triatoma longipennis* (Hemiptera, Reduviidae) and *Triatoma barberi* (Hemiptera, Reduviidae) in a rural community with active transmission of *Trypanosoma cruzi* in Jalisco state, Mexico

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Abstract

Infestation of peridomiciles is likely a major risk factor for Chagas disease transmission in Jalisco state, Mexico. An entomological and serological survey of a typical village was conducted between July and September 2003. The peridomestic areas of 100 dwellings were visited and triatomines were searched manually in 369 potential sites. A total of 1821 *Triatoma longipennis* (93.2%) or *Triatoma barberi* was captured. Both species frequently occurred in sympatry. The infestation index was 60% for *T. longipennis* and 16% for *T. barberi*. *T. longipennis* occurred throughout the village. Colonization indices were high for *T. longipennis* (93%) and *T. barberi* (75%), suggesting that both species have adapted to peridomestic habitats. The bug population size was larger for *T. longipennis* than for *T. barberi*. Five very large colonies of *T. longipennis* were recorded whereas only 1 or 2 bugs were observed in 38% of the positive sites, which suggests intense dispersal activity. Both species exhibited high infection prevalence with *Trypanosoma cruzi* (46%). Only *T. cruzi* lineage I was detected. Human seroprevalence was 1.8%. This study serves as an entomological overview of peridomiciliar triatomine colonization in a Mexican village and highlights the current risk of Chagas disease transmission.

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Keywords: Peridomiciliar area; *Triatoma longipennis*; *Triatoma barberi*; Seroprevalence; Risk of transmission; Mexico

1. Introduction

Chagas disease is a permanent threat to a quarter of the Latin American population and is endemic to several Mexican states (Cruz-Reyes and Pickering-López, 2006). Human seroprevalence rates up to 20% have been reported in various endemic regions (Dumonteil, 1999) and seropositivity of human blood transfusion has been

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estimated at 1.5% (Guzman-Bracho, 2001). Moreover, clinical autochthonous cases of Chagas disease have been diagnosed (Guzman-Bracho, 2001) and 5000 people suffer from severe chronic Chagas miocardiopathy in Mexico according to the National Institute of Cardiology Ignacio Chavez in Mexico City, (Monteon-Padilla et al., 2002). In the state of Jalisco, serological follow-up in 124 municipalities from 1987 to 1994 indicated a seroprevalence of around 18% (Contreras et al., 2000).

In Mexico, 33 species of triatomine vectors exist (Galvao et al., 2003). Three species of the *Phyllosoma* complex, *Triatoma longipennis*, *T. pallidipennis* and *T. picturata*, are the most important vectors in the states of Jalisco and Nayarit (Magallón-Gastélum et al., 1998; Martínez-Ibarra et al., 2001). Recent entomological evaluation of communities in the occidental part of Mexico demonstrates the significance of peridomestic infestation by species of the *Phyllosoma* complex and suggests that the colonization of peridomestic areas is the main risk factor of Chagas disease transmission. Interestingly, intradomiciliary infestation and colonization were rare or absent (Brenière et al., 2004; Magallón-Gastélum et al., 2006). Previous reports have also identified *Triatoma barberi*, a species currently classified within the *Protracta* complex, and showed a large distribution with low abundance in the community (Magallón-Gastélum et al., 1998).

Because the species of the *Phyllosoma* complex are sylvatic, invasion or re-invasion of the peridomicile by sylvatic populations is a permanent threat in the region under study (Magallón-Gastélum et al., 2001, 2004). Conversely, sylvatic specimens of *T. barberi* have not yet been observed in the wild environment.

In the present work, an exhaustive entomological and serological survey was conducted to assess the distribution, densities, and colonization rates of both triatomine species in peridomestic habitats (outdoors) and investigate the status of the *Trypanosoma cruzi* transmission in a typical village of western Mexico.

2. Materials and methods

2.1. Study area

The study was conducted in the region, “Valles de Ameca” in “Los Guerrero” village (20°26′564″N, 103°53′872″W), a rural community of the San Martín de Hidalgo municipality in Jalisco State, 90 km away from Guadalajara (Fig. 1a). This semi-arid region is characterized by a deciduous seasonal forest, which was cleared to provide land for cultures around the village.

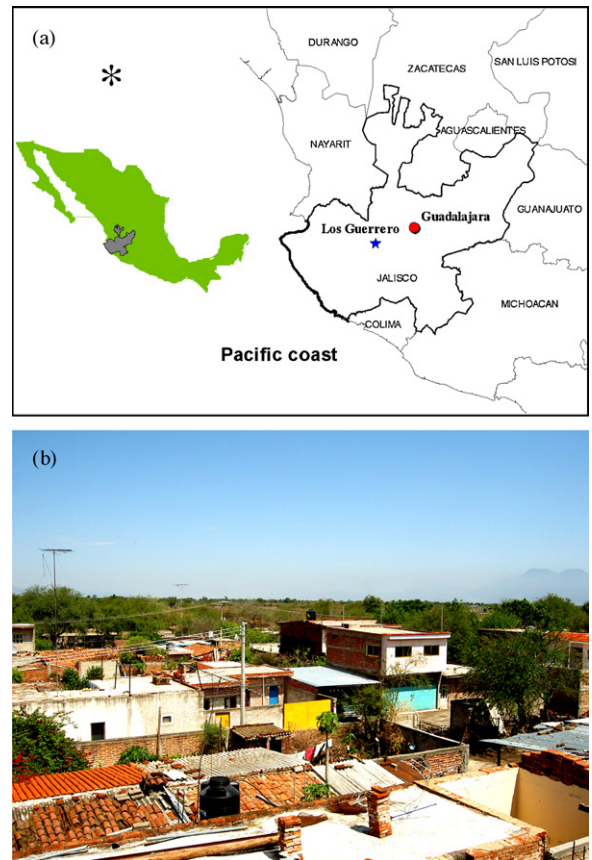


Fig. 1. (a) The smaller map identifies the Jalisco state in Mexico whereas the main map shows the localization of the studied village of Los Guerrero. (b) A panoramic photograph of Los Guerrero village taken from the roof of a church (see Fig. 4 for the localization of the church).

Until recently, the land was composed of numerous plots surrounded by rock pile walls, but mechanized agriculture has progressively changed the landscape into large fields. The main crops are sugarcane (*Saccharum officinarum*), corn (*Zea mays*), and maguey tequilero (*Agave tequilana*). The minimum and maximum annual average temperatures are 20 °C and 28 °C, respectively. Mean annual rainfall ranges between 987.6 mm and 1349 mm and the dry season extends from October until June (data collected at: Inegi organization with the following URL: <http://www.inegi.gov.mx/inegi/default.asp>). Before the survey, the village was mapped and each dwelling was plotted. Seven hundred inhabitants were registered at the local health center. The village was composed of 314 dwellings of which 151 (48%) were closed because people were living and working in other places. One hundred inhabited dwellings were randomly selected and mapped during the study.

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