Community Participation and Domiciliary Occurrence of Infected *Meccus longipennis* in Two Mexican Villages in Jalisco State

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**Abstract.** The entomological features of Chagas disease in two western Mexican villages were analyzed through triatomine collection by the inhabitants and active research in the peridomicile. The inhabitants collected the following comparable characteristics: 1) *Meccus longipennis* was the dominant species (>91%), 2) around 43% of the insects were collected indoors, 3) about 70% of triatomines were adults, 4) cumulative rates of infestation of the dwellings reached 40-50%, 5) the triatomine infection rate by *Trypanosoma cruzi* was >50%, and 6) the indoor triatomines frequently feed on humans (range 38.5-56.2%). However, the collection was twice as abundant in the first village and the peridomicile infestation, evaluated by the active collection, reached up to 60% and only 4.9% in the other village. Furthermore, females predominated in the first village, whereas males in the other. The current results allow discussing the course of action to prevent Chagas disease in this region.

**INTRODUCTION**

The three principal domiciliated vector species of Chagas disease, *Triatoma infestans* (Klug, 1834), *Rhodnius prolixus* (Stål, 1859), and *Triatoma dimidiata* (Latreille, 1811), have received great attention over the last decades. Sub-regional vector control initiatives in the Southern Cone and Andean regions of South America, and in Central America, have undoubtedly diminished the transmission of *Trypanosoma cruzi*, the agent of Chagas disease, in countries where programs have been active for several years. However, less attention has been given to other regions, including Mexico, where other triatomine species (i.e., sylvatic) are present, even though the seroprevalence and clinical data confirmed that Chagas disease was endemic in the majority of Mexican regions. Moreover, between 1988 and 2006, the Mexican national epidemiologic surveillance system reported 1,814 cases of Chagas disease infection, having the majority of cases detected in the last 5 years (77%). It is unclear whether the observed increase in Chagas disease incidence was caused by biotic and abiotic modifications of the environment, or whether the Public Health problem had not been adequately considered before.

In general terms, the transmission model linked to domiciliary vectors is coming out and is substituted by new features of vectorial transmission mainly associated with sylvatic triatomines.  

One exception is the insecticide resistance that has been recently documented in cases of the *T. infestans* domiciliary populations in Argentina. Three domestic transmission scenarios can typically be observed: 1) re-infestation by sylvatic populations (same or different species) after vector control of domiciliary populations; 2) expansion of human settlement in areas where environmental modifications favor the domestication of sylvatic autochthonous species; and 3) low endemic regions that have not yet gained adequate attention, but where vectors are concurrently sylvatic and domestic. The Mexican situation reflects the last two profiles. However, the study of emerging vector transmission systems is difficult because of the great diversity of triatomine species involved whose biological properties are poorly known. Biotic and abiotic modifications of the environment have become more and more important. The areas where sylvatic triatomines transmit disease caused by small-scale habitat colonization or temporary incursions are typically areas of low endemicity. Finally, low endemic areas may present specific challenges to seroprevalence surveys, diagnosis, and pathology. Human infection by sylvatic parasite strains needs to be better documented as unexpected clinical manifestations are possible.

In Mexico, at least 31 triatomine species have been described, 18 of them have been found naturally infecting human subjects by *T. cruzi*. All of these species are sylvatic, and except for *T. dimidiata*, they are only endemic to Mexico. The most remarkable factor of these investigations with Mexican species is the high rate of infection by *T. cruzi*, also observed for most of the main South American vectors, such as *T. infestans* and *Triatoma brasiliensis* (*Neiva, 1911*). Although several Mexican species have been found in human habitats, it remains difficult to measure the true role of each species in the transmission of disease as there exist few studies on the ecology, geographical distribution, behavior in the natural habitat, behavior in the natural medium, and relationship with the prevalence of human infection in corresponding areas. Furthermore, regarding the Meccus species complex, which includes *Meccus longipennis*, the species involved in the current study, controversy exists regarding their taxonomic status as species or subspecies because of their close genetic relationships.

The basic assumption of this work is that a better understanding of Chagas disease in Mexico should consider the zoanthropomonic systems (reservoir-vector-human), which occur in shared spaces. As analyses of entomological features on the community scale are undoubtedly primary to evaluate transmission risk, two rural communities in western Mexico, Los Guerro (Jalisco) and Cacaluta (Nayarit), were studied.