

Editorial

“El mal de Chagas” (Chagas Disease): A Mandatory Collaboration between Biological and Social Sciences for Effective Control of This “Disease of Poverty”

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How To Cite: Tibayrenc, M. “El mal de Chagas” (Chagas Disease): A Mandatory Collaboration between Biological and Social Sciences for Effective Control of This “Disease of Poverty”. *Disease Biology, Genetics, and Socioecology* **2025**, *1*(2), 7. <https://doi.org/10.53941/dbgs.2025.100007>.

Chagas disease is a parasitic illness caused by the protozoan *Trypanosoma cruzi* (Order: Trypanosomatida; Suborder: Kinetoplastida). It continues to be a serious health concern, particularly in Latin America, spanning from the southern United States to northern Argentina. Its wide ecogeographical range includes both sylvatic (wild) and domestic (human-associated) transmission cycles.

The disease’s distribution is primarily determined by the presence of its insect vectors—triatomine bugs belonging to the family Reduviidae, subfamily Triatominae (Figure 1).

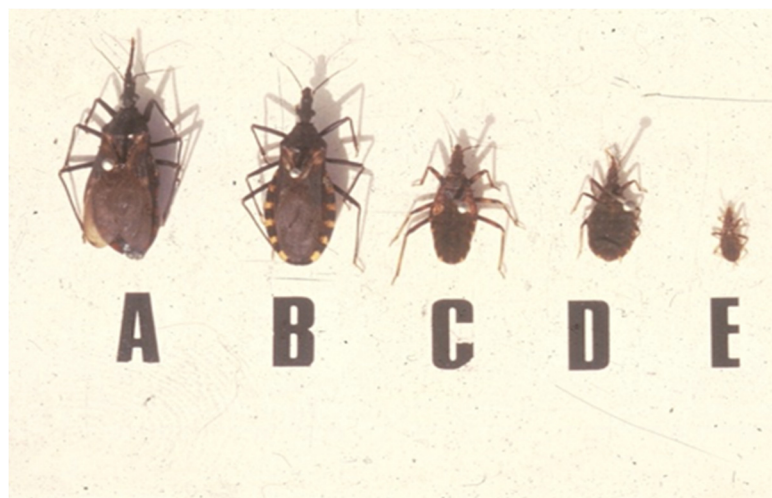


Figure 1. Specimens of *Triatoma infestans*, one of the primary vector species of Chagas disease in South America. From left to right: male, female, and larva. Both adults and larvae are obligatory blood feeders.

These blood-feeding insects inhabit various sylvatic ecosystems, including the Amazon rainforest. However, their primary threat to human health stems from populations that infest human dwellings (Figure 2). In many Latin American countries, triatomine bugs thrive in substandard housing conditions. In Bolivia, for example, traditional houses are often built from adobe—sun-dried clay bricks (Figure 2).



Figure 2. The author collecting triatomine bugs in Bolivia in the 1980s, assisted by young Aymara Native Americans. The walls are made of adobe (see text).

Adobe walls are riddled with cracks and holes where the bugs hide during the day and emerge at night to feed on sleeping individuals.

In Latin America, the burden of Chagas disease is closely linked to socioeconomic development. It is no coincidence that this illness has been labeled a “disease of poverty”. In the southern United States, although triatomine bugs are widespread and *T. cruzi* is harbored by wild mammals such as coyotes, raccoons, and opossums (*Didelphis*), locally acquired human cases are rare—largely because adobe housing is not common there.

T. cruzi, the parasite responsible for Chagas disease, has been the subject of extensive research, both basic and applied. It is likely one of the best-studied human pathogens and may be considered a classical scientific model alongside *Mus musculus*, *Drosophila melanogaster*, *Caenorhabditis elegans*, and *Escherichia coli*.

Notably, this scientific progress is largely due to the work of Latin American researchers. The parasite was discovered by Professor Carlos Chagas, a distinguished Brazilian scientist.

However, despite this profound understanding of the parasite’s biology, effective control strategies remain elusive. No vaccine exists, and available drugs are inadequate, with frequent cases of resistance and toxicity.

Therefore, a concerted effort combining biological research and social science is urgently needed to achieve meaningful control of Chagas disease. Beyond the development of vaccines and more effective, less toxic drugs, it is essential to implement social interventions such as health education, economic development, and housing improvement.

This special section on Chagas disease in *Disease: Biology, Genetics and Socioecology* presents the various dimensions of this multifaceted challenge, including the biology, genetics, and pharmacology of the parasite and its vectors, as well as the socioeconomic (“socioecological”) aspects of the disease. These contributions come from some of the world’s leading experts in the field.

Conflicts of Interest

The author declares no conflict of interest.