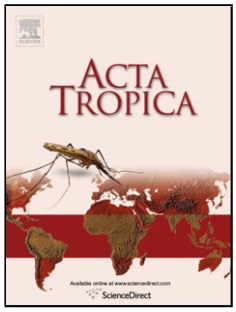


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# Evidence and importance of genetic exchange among field populations of *Trypanosoma cruzi*

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***Abstract***

Many eukaryotic pathogenic microrganisms that were previously assumed to propagate clonally have retained cryptic sexual cycles. The principal reproductive mode of *Trypanosoma cruzi*, the aetiological agent of Chagas disease, remains a controversial topic. Despite the existence of two recent natural hybrid lineages, a pervasive view is that recombination has been restrained at an evolutionary scale and is of little epidemiological relevance to contemporary parasite populations. This article reviews the growing number of field studies which indicate that natural hybridization in *T. cruzi* may be frequent, non-obligatory and idiosyncratic; potentially involving independent exchange of kinetoplast and nuclear genetic material as well as canonical meiotic mechanisms. Together these observations now challenge the traditional paradigm of preponderate clonal evolution in *T. cruzi* and highlight the need for additional, intensive and appropriately sampled field surveys, complemented by high resolution, combined nuclear and mitochondrial population genetics analyses.

## *Introduction*

The principal reproductive mode of a number of parasitic protozoan species is the subject of an enduring debate (Smith *et al.*, 1993; Tibayrenc *et al.*, 1986; 1990; Tibayrenc and Ayala, 1991; 2012; 2013; 2014a; 2014b; Ramírez and Llewellyn, 2014; Tomasini *et al.*, 2014a; 2014b). At the two extremes are the preponderate clonal evolution (PCE) model, which suggests that genetic exchange is too infrequent to break the predominant pattern of clonality, such that only 'restrained recombination' occurs at an evolutionary scale (Tibayrenc and Ayala, 2012; 2013; 2014a; 2014b), and the counter-proposition that hybridization is in fact pervasive, albeit challenging to detect, among some natural disease foci (Ramírez and Llewellyn, 2014).