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Karyosystematics of *Triatoma rubrofasciata* (De Geer, 1773) (Hemiptera: Reduviidae: Triatominae)

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Abstract

Triatoma rubrofasciata (De Geer) is the first species of triatomine described, and little is known on its vector biology. Studies are restricted to starvation resistance, interspecific morphometric variability, morphometry of testis follicles, coloration of the testicular peritoneal sheath, ultrastructure of the male accessory glands, phylogeny and cytogenetics. Thus, this study aims to address the karyosystematics of *T. rubrofasciata* and the possible events related to karyotype evolution of this species. Four adult males were analyzed cytogenetically. The analysis of meiotic metaphases of *T. rubrofasciata* allowed to confirm the karyotype of species, out more, 2n = 25 (22A + X_1X_2Y). This number is very important for taxonomic and evolutionary inferences on the species, because of the 88 triatomine species with described karyotype, only *T. rubrofasciata* exhibits 25 chromosomes. Based on the hypothesis of the karyotype 2n = 22 (20A + XY) as ancestral for triatomines, we propose three evolutionary hypotheses for the emergence of the karyotype of *T rubrofasciata*, all supported by agmatoploidy events (fission). Basically the hypotheses are 1) fission for a pair of autosomes, resulting in 22 autosomes and later fission of sex chromosome X; 2) fission of pair of autosomes and the sex chromosome X concomitantly; 3) fission of sex chromosome X and subsequently fission of pair of autosomes. Thus, this study highlights for the first time the importance of the number of chromosomes of *T. rubrofasciata* as characteristic diagnosis in Triatominae subfamily and describes three evolutionary hypotheses that possibly led the emergence of karyotype of this insect of global importance.

Key words: karyotype, cytotaxonomy, taxonomy, agmatoploidy

Introduction

Triatoma rubrofasciata (De Geer) (Hemiptera: Reduviidae: Triatominae) is an insect of great importance for global public health, since it is pantropical, and has already been captured in approximately 45 countries distributed in the Americas, Africa, Asia and Oceania (Diotaiut *et al.* 2000; Galvão *et al.* 2003). In addition, it is one of potential vectors of protozoan *Trypanosoma cruzi* (Chagas) (Kinetoplastida: Trypanosomatidae), the etiologic agent of Chagas disease, although *T. rubrofasciata* vector competence has not been yet fully explored.

The presence of *T. rubrofasciata* has been widely reported in the Americas (WHO 2011). There are reports of natural infection with *T. cruzi* (Sherlock & Serafim 1974; Brasil & Silva 1983) and adapting the domestic environment in Brazil (Fuentes *et al.* 1971; Brasil & Silva 1983). In the African continent, this species was reported in South Africa, Angola, Guinea, Tanzania, Sierra Leone and Congo (Galvão *et al.* 2003). Although there are few studies on the presence of these vectors in Africa, Asia and Western Pacific, it is believed that this triatomine was introduced through maritime routes (WHO 2011).

Entomoepidemiological studies for Chagas disease are extremely important in Africa, since the *T. cruzi* was isolated from African mammals (Hamilton *et al.* 2009). Knowing the general aspects of biology of *T. rubrofasciata* is fundamental to generate subsides that can assist in the prevention of Chagas' disease, because the main way to

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