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Short communication

Chromosomal characteristics and distribution of constitutive heterochromatin in the Matogrossensis and Rubrovaria subcomplexes

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ABSTRACT

Since 1966 the triatomines were grouped in complexes and specific subcomplexes. Although the complex and subcomplexes not have taxonomic importance, should be monophyletic groups and cytogenetic tools have proved to be of great importance to characterize these species groupings. Based on this, this paper aims to describe the chromosomal characteristics and heterochromatic pattern of Matogrossensis and Rubrovaria subcomplexes, in order to contribute to the taxonomic and evolutionary relationships of these vectors. In this study, at least three males from each species (*Triatoma baratai*, *Triatoma costalimai*, *Triatoma guazu*, *Triatoma jurbergi*, *Triatoma matogrossensis*, *Triatoma vandae*, *Triatoma williami*, *Triatoma carcavalloi*, *Triatoma circummaculata*, *Triatoma klugi*, *Triatoma pintodiasi* and *Triatoma rubrovaria*) were analyzed by means analyzed by means of cytogenetic techniques of C-banding. All species showed the same cytogenetic characteristics: 22 chromosomes, low variation in the size of autosomes, sex chromosome Y larger than X, initial prophase composed of only one heterochromatic chromocenter formed by the sex chromosomes X and Y (except for *T. pintodiasi* that presented the sex chromosomes individualized during all stages of prophase) and presence of constitutive heterochromatin restricted to sex chromosome Y. These characteristics, although common to Matogrossensis and Rubrovaria subcomplexes allow to distinguish these species of species grouped in most of South America subcomplexes, as Brasiliensis, Maculata, Sordida and Insfestans. Thus, the cytogenetic analysis was of extreme importance to differentiate both subcomplexes of the other subcomplexes of South America. However, probably due to evolutionary proximity existing between these subcomplexes was not possible to observar species differences that make up the Matogrossensis subcomplex of the Rubrovaria subcomplex. Therefore, we emphasize that new comparative analyzes, as experimental hybrid crosses and molecular cytogenetic analysis are necessary to clarify the evolutionary relationship between these important subcomplexes of vectors.

The triatomines are hematophagous insects vectors of the protozoan *Trypanosoma cruzi* Chagas, 1909, the etiologic agent of Chagas disease. These vectors are of great importance to public health, as about 7 million to 8 million people are estimated to be infected worldwide, mostly in Latin America and triatomines are considered as the main form of transmission (WHO, 2014).

Taxonomically, triatomines belong to the Hemiptera order, Heteroptera, suborder, Reduviidae family and Triatominae subfamily (Lent and Wygodzinsky, 1979). These vectors were clustered in complexes and specific subcomplexes (Usinger et al., 1966; Lent and Wygodzinsky, 1979; Carcavallo et al., 2000; Schofield and Galvão, 2009), based mainly of morphological and geographical distribution. However, Carcavallo et al. (2000) consider that "specific complex" is only the practical grouping of species and it does not exist as a taxonomic category in the International Code of Zoological Nomenclature.

Lent and Wygodzinsky (1979) based on morphology, proposed the division of triatomines the genus *Triatoma* in ten complexes and developed a dichotomous key to group the species in the respective complex. Recently, Schofield and Galvão (2009) based mainly of morphological and geographical distribution, grouped the triatomine in eight complexes and eight specific subcomplexes.

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Table 1
Cytogenetic characteristics of species of the Matogrossensis subcomplex.

Species	Chromosome number	Sex mechanism	Relative autosomal size	Relative size of sex chromosomes	Heteropycnotic pattern in prophase	C-banding		
						Autosomes	Sex chromosomes	
							X	Y
T. baratai	2*n* = 22	XY	Small variation	Y > X	Large chromocenter (sex chromosomes)	No	No	Yes
T. costalimai	2*n* = 22	XY	Small variation	Y > X	Large chromocenter (sex chromosomes)	No	No	Yes
T. deaneorum	–	–	–	–	–	–	–	–
T. guazu	2*n* = 22	XY	Small variation	Y > X	Large chromocenter (sex chromosomes)	No	No	Yes
T. jatai	–	–	–	–	–	–	–	–
T. jurbergi	2*n* = 22	XY	Small variation	Y > X	Large chromocenter (sex chromosomes)	No	No	Yes
T. matogrossensis	2*n* = 22	XY	Small variation	Y > X	Large chromocenter (sex chromosomes)	No	No	Yes
T. vandae	2*n* = 22	XY	Small variation	Y > X	Large chromocenter (sex chromosomes)	No	No	Yes
T. williami	2*n* = 22	XY	Small variation	Y > X	Large chromocenter (sex chromosomes)	No	No	Yes

Table 2
Cytogenetic characteristics of species of the Rubrovaria subcomplex.

Species	Chromosome number	Sex mechanism	Relative autosomal size	Relative size of sex chromosomes	Heteropycnotic pattern in prophase	C-Banding		
						Autosomes	Sex chromosomes	
							X	Y
T. carcavalloi	2*n* = 22	XY	Small variation	Y > X	Large chromocenter (sex chromosomes)	No	No	Yes
T. circummaculata	2*n* = 22	XY	Small variation	Y > X	Large chromocenter (sex chromosomes)	No	No	Yes
T. klugi	2*n* = 22	XY	Small variation	Y > X	Large chromocenter (sex chromosomes)	No	No	Yes
T. limai	–	–	–	–	–	–	–	–
T. oliveirai	–	–	–	–	–	–	–	–
T. pintodiasi	2*n* = 22	XY	Small variation	Y > X	X and Y individualized	No	No	Yes
T. rubrovaria	2*n* = 22	XY	Small variation	Y > X	Large chromocenter (sex chromosomes)	No	No	Yes