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Cytotaxonomy of the Brasiliensis subcomplex and the *Triatoma brasiliensis* complex (Hemiptera: Reduviidae: Triatominae)

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Abstract

We analyzed the classical cytotaxonomy of the Brasiliensis subcomplex (*Triatoma brasiliensis* Neiva, *T. juazeirensis* Costa & Felix, *T. melanica* Costa, Argolo & Felix, *T. melanocephala* Neiva & Pinto, *T. petrochiae* Pinto & Barreto, *T. lenti* Sherlock & Serafim, *T. sherlocki* Papa, Jurberg, Carcavallo, Cerqueira & Barata, *T. tibiamaculata* Pinto and *T. vitticeps* Stal) and the *T. brasiliensis* complex (*T. b. brasiliensis*, *T. b. macromelasoma* Neiva & Lent, *T. juazeirensis*, *T. melanica* and *T. sherlocki*). The five members of the *T. brasiliensis* complex share the same cytogenetic characteristics. Merely *T. sherlocki* show differences in spermatids, which confirms the status of more differentiated member of the complex. *T. lenti* also presented the same cytogenetic characteristics described for the species of the *T. brasiliensis* complex, which supports possible grouping of the species as sixth member of the complex, although further analysis as molecular and experimental crosses are needed to corroborate this hypothesis. *T. petrochiae*, *T. vitticeps*, *T. tibiamaculata* and *T. melanocephala* presented one or more characteristics that allow questioning grouping in the proposed Brasiliensis subcomplex. Thus, we suggested that Brasiliensis subcomplex and *T. brasiliensis* complex should be constituted by the same triatomines (*T. b. brasiliensis*, *T. b. macromelasoma*, *T. juazeirensis*, *T. melanica* and *T. sherlocki*). However, we draw attention to *T. lenti* and suggest that although new analyzes should be performed, possibly this species is the sixth member of the *T. brasiliensis* complex.

Key words: cytogenetics, spermatogenesis, *Triatoma lenti*

Introduction

The Triatominae subfamily is composed of 148 species distributed in 18 genera and six tribes (Abad-Franch *et al.* 2013; Alevi *et al.* 2013a; Jurberg *et al.* 2013; Poinar *et al.* 2013). These insects present five nymphal stages (N1, N2, N3, N4, N5) and one adult. After hatching, the triatomine are hematophagous strict and, once infected with the protozoan *Trypanosoma cruzi* Chagas (Kinetoplastida: Trypanosomatidae), can transmit the Chagas disease. Transmission occurs by the habit of defecating during the repast (Noireau *et al.* 2009).

The triatomines were grouped in complexes and subcomplexes specific by Schofield & Galvão (2009). The authors grouped in Infestans complex and the Brasiliensis subcomplex the species: *Triatoma brasiliensis* Neiva, *T. juazeirensis* Costa & Felix, *T. melanica* Costa, Argolo & Felix, *T. melanocephala* Neiva & Pinto, *T. petrochiae* Pinto & Barreto, *T. lenti* Sherlock & Serafim, *T. sherlocki* Papa, Jurberg, Carcavallo, Cerqueira & Barata, *T. tibiamaculata* Pinto and *T. vitticeps* Stal. However, to collate the species in the subcomplex, the authors used parameters as morphological characters and geographical disposition. This subcomplex species is endemic to Northeast Brazil and is of great epidemiological importance (Costa 2000; Almeida *et al.* 2009).

At first, it was believed that the species in Brasiliensis subcomplex were only populations of *T. brasiliensis* with chromatic polymorphism (Lent & Wygodzinsky, 1979). However, Costa and collaborators, by means of different aspects, redescribed *T. melanica* (Costa et al. 2006) and *T. b. macromelasoma*, Neiva & Lent (Costa *et al.*

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The five members of the *T. brasiliensis* complex share the same cytogenetic characteristics (Table 1), optimizing the grouping of these organisms in the complex. *T. lenti* also presents the same cytogenetic characteristics of the complex, which possible supports grouping of the species as sixth member of the complex, although molecular analyzes and experimental crosses are needed to corroborate this hypothesis. Have *T. petrochiae*, *T. vitticeps*, *T. tibiamaculata* and *T. melanocephala* had one or more characteristics that allow for questioning the grouping proposed form Brasiliensis subcomplex (Table 1).

Although Panzera *et al.* (2000) reported that *T. petrochiae* presents the same cytogenetic characteristics that *T. brasiliensis* species complex, we observed that the species has not heteropycnotic blocks dispersed in the nucleus and mainly the chromocenter is formed only by the sex chromosomes and not by association sex chromosomes with autosomes, as in other species of the complex (Panzera *et al.* 2000; Panzera *et al.* 2010; Alevi *et al.* 2013b).

Alevi and collaborators proposed the study of spermiogenesis as a tool to study the species Brasiliensis subcomplex (Alevi *et al.* 2013c) and to differentiate species morphologically related (Alevi *et al.* 2013d). With the exception of *T. sherlocki*, all the species of the *T. brasiliensis* complex presented the same cytogenetic characteristics during spermiogenesis, out more, the presence of two heteropycnotic filaments in spermatids (Table 2). However, we emphasize that *T. lenti* and *T. petrochiae* also had the same disposition of filaments heteropycnotic described for members, demonstrating that more studies are needed so that the actual position against the *T. brasiliensis* complex can to be clarified. *T. vitticeps*, *T. tibiamaculata* and *T. melanocephala* showed differences in the heteropyknotic pattern of spermatids, which helps to exclude these insects of subcomplex.

The peculiarity observed in spermatids *T. sherlocki* in relation to other members of *T. brasiliensis* complex (Table 2) only confirms the hypothesis that this species is the most differentiated of the complex (Almeida *et al.* 2009; Mendonça *et al.* 2009; Almeida *et al.* 2012). However, we draw attention to the fact that the differential characteristics observed in male gametes of this species is not a pre-zygotic barrier, as recently Correira *et al.* (2013) observed hybrid viability by experimental crossing between *T. sherlocki* with all species of the complex.

Thus, we suggest that Brasiliensis subcomplex and *T. brasiliensis* complex should be constituted by the same triatomines, out more, the subspecies *T. b. brasiliensis* and *T. b. macromelasoma,* and the species *T. juazeirensis*, *T. melanica* and *T. sherlocki*, as proposed by the studies of Costa and collaborators. However, we draw attention to *T. lenti* and suggest that although new analyzes should be performed, possibly this species is the sixth member of the *T. brasiliensis* complex.

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