



New evidence of the evolutionary relationship of the *flavida* complex with the genus *Panstrongylus* (Hemiptera, Triatominae) by karyosystematic

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Scientific note

The Triatominae subfamily (Hemiptera, Reduviidae) is composed of 152 species belonging to 18 genera and five tribes (Galvão, 2014; Alevi et al., 2016; Mendonça et al., 2016; Souza et al., 2016; Rosa et al., 2017). The Triatomini tribe is the most diverse and one of the most important from the point of views epidemiological (Galvão, 2014; WHO, 2015). Schofield and Galvão (2009) grouped these triatomines in complexes and specific subcomplexes mainly based on morphological characters and geographic disposition. The *flavida* complex consists of the species *Nesotriatoma bruneri* Usinger, 1944, *N. flavida* (Neiva, 1911) and *N. obscura* Maldonado and Farr, 1962 [although recently it has been suggested that *N. bruneri* and *N. flavida* should be again synonymized (Alevi et al., 2016)].

Recently, Justi et al. (2014, 2016) claim that although the complexes and subcomplexes show no taxonomic validity they must be monophyletic groups. Thus, the authors presented a phylogenetic reconstruction for the species groupings proposed by Schofield and Galvão (2009) and observed that many groups are not monophyletic (*brasiliensis*, *maculata*, *matogrossensis*, *flavida* and *sordida* subcomplexes). The *flavida* complex although it has formed a monophyletic group, curiously was presented as evolutionarily related to *Panstrongylus* genus, as has been observed by other authors (Hypsa et al., 2002).

Therefore, we will group all information related to the number and morphology of the chromosomes of

Nesotriatoma spp. and *Panstrongylus* spp. with intuited of analyze the chromosomal relationship of these triatomines.

All species of *Panstrongylus* genus (except *P. megistus* and *P. lutzi*) and *Nesotriatoma* genus presents the karyotype $2n = 23 (20A + X_1X_2Y)$ (Table 1). Furthermore, all species of both genera (except *P. lutzi*) showed the same system of sex determination, as well as the same chromosomal characteristics (Table 1).

Recently, by means of dated phylogeny was supported that the ancestral of *Nesotriatoma* arrived in the Antillean islands approximately 14.8-18.8 millions of years (associated with rodent subfamily Capromyinae) (Justi et al., 2016) and by phylogenetic analysis we can see that *Nesotriatoma* and *Panstrongylus* share an ancestor comum (Justi et al., 2014, 2016). Was suggested that the ancestor of these vectors presented karyotype $2n = 23$ and that during the divergence and karyotype evolution of species occurred one event punctual of simplidity in the autosome of *P. megistus* and agmatoploidy in the X sex chromosome of *P. lutzi* (Alevi and Azeredo-Oliveira, 2018).

Thus, by karyosystematic we confirm the phylogenetic relationship between *flavida* complex and *Panstrongylus* genus. We suggest that experimental hybrid crosses are to be conducted for analysis of possible prezygotic and postzygotic barriers installed in the *Panstrongylus* and *Nesotriatoma* genus.

Table 1. Chromosomal characteristics of the species of *flavida* complex and *Panstrongylus* genus.

Species	Chromosome number	Sex determination	Relative size of sex chromosomes	Relative size of autosomes	Reference
<i>N. flavida</i>	2n = 23	X ₁ X ₂ Y	Y>Xs	Small variation	Dujardin et al. (2002)
<i>N. bruneri</i>	2n = 23	X ₁ X ₂ Y	Y>Xs	Small variation	Alevi et al. (2016)
<i>N. obscura</i>	-	-	-	-	-
<i>P. chinai</i>	2n = 23	X ₁ X ₂ Y	Y>Xs	Small variation	Pérez et al. (2002)
<i>P. diasi</i>	-	-	-	-	-
<i>P. geniculatus</i>	2n = 23	X ₁ X ₂ Y	Y>Xs	Small variation	Pérez et al. (2002)
<i>P. guentheri</i>	-	-	-	-	-
<i>P. hispaniolae</i>	-	-	-	-	-
<i>P. howardi</i>	2n = 23	X ₁ X ₂ Y	Y>Xs	Small variation	Dujardin et al. (2002)
<i>P. humeralis</i>	-	-	-	-	-
<i>P. lenti</i>	-	-	-	-	-
<i>P. lutzi</i>	2n = 24	X ₁ X ₂ X ₃ Y	Y>Xs	Small variation	Santos et al. (2016), Alevi et al. (2017)
<i>P. lignarius</i>	2n = 23	X ₁ X ₂ Y	Y>Xs	Small variation	Pérez et al. (2002)
<i>P. megistus</i>	2n = 21	X ₁ X ₂ Y	Y>Xs	Small variation	Schreiber and Pellegrino (1950)
<i>P. mitarakaensis</i>	-	-	-	-	-
<i>P. rufotuberculatus</i>	2n = 23	X ₁ X ₂ Y	Y>Xs	Small variation	Pérez et al. (2002)
<i>P. tupynambai</i>	2n = 23	X ₁ X ₂ Y	Y>Xs	Small variation	Pérez et al. (2002)

X: X sex chromosome; Y: Y sex chromosome.

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