STRIDULATORY SOUND EMISSION OF *Panstrongylus rufotuberculatus* CHAMPION, 1899, (HEMIPTERA: REDUVIIDAE: TRIATOMINAE)

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Received November 6, 2003 – Accepted September 28, 2004 – Distributed May 31, 2006

(With 1 figure)

ABSTRACT

This study contains the first report of stridulatory sound observed in *Panstrongylus rufotuberculatus* Champion, 1899, and also a new record of this species in Venezuela. The conditions in which stridulation occurred are described, as well as the general environmental characteristics of the localities where it was found. This triatomine only performs the sound in conditions of extreme provocation.

Keywords: stridulation, sound, *Panstrongylus rufotuberculatus*, Triatominae, Venezuela.

RESUMO

Emissão de som estridulatório do *Panstrongylus rufotuberculatus* Champion, 1899, (Hemiptera: Reduviidae: Triatominae)

Este estudo contém o primeiro reporte da estridulação observada em *Panstrongylus rufotuberculatus* Champion, 1899, e um novo registro desta espécie na Venezuela. Descrevem-se as condições em que ocorre a estridulação, como também as características gerais das localidades onde foi capturado. Este triatomino só emite som em condições de extrema provocação.

Palavras-chave: estridulação, som, *Panstrongylus rufotuberculatus*, Triatomíneo, Venezuela.

INTRODUCTION

Stridulation occurs widely in Heteroptera, involving many different parts of the body and varying with the species (Chapman, 1998). In Reduviidae, (Hemiptera) the stridulatory system consists of a file of sulcus in the prosternum, with the tip of the rostrum forming the scraper. Stridulatory sulcus, the general shape, pilosity, the cuticular structure and the edges, as well as certain characteristics of the parallel groves, can be used for taxonomic purposes (Carcavallo *et al.*, 1998). It has been suggested that sound emission in insects plays a role in gender identification during copulation (Chapman, 1998). In the case of Triatominae, it has been established that such emissions are part of the intraspecific communication mechanisms (Schofield, 1977); for example, females that are non-receptive to *T. infestans* Klug, 1834 or *R. prolixus* Stal, 1859 use sound to reject males (Manrique & Lazzari, 1994; Manrique & Schilman, 2000). The stridulation may act as a mechanism for repelling potential predators (Leston, 1957), defensive behaviour or recognition between sex, for example in *R. prolixus* can indicated female reject males or defensive. The meaning keeps a relationship with the intensity and frequency of stridulatory sound, and this with inter-ridge distances on stridulatory grooves (Manrique & Schilman, 2000; Schilman *et al*., 2001).

The present study is the first record of audible sound in *Panstrongylus rufotuberculatus* Champion, 1899.

MATERIALS AND METHODS

During the capture of *Panstrongylus geniculatus* Latreille, 1811 in El Hatillo, Miranda State (Reyes-Lugo *et al.,* 2001), a male specimen of *Panstrongylus rufotuberculatus* Champion, 1899 was obtained at 22 h on may 04, 2001 near a light outside one of the buildings at the study site, and was kept alive in the laboratory for several days. A second male, which had been collected in the same way in San Diego de Los Altos in May 1999 and preserved since then in 70% etanol, has been included in this study. Identification of the specimens was carried out using the Triatominae keys of Ramiréz-Pérez (1985) and Carcavallo *et al.* (1998). Morphological studies of the stridulatory organ of both samples were realized with a Hitachi S-450 scanning electron microscopy. In addition the material was protected from breakage by using low acceleration (25 Kv).

RESULTS

When the live specimen of *P. rufotuberculatus* was held with a pincer by the thorax in a ventral position in order to extract a sample of faeces with a view to detecting the presence of *Trypanosoma cruzi*, the insect emitted a sound similar to that produced by sandpaper scraping wood. Part of the stridulatory organ can be seen in a photograph obtained with the scanning electron microscopy at 100x (Fig.1)

DISCUSSION

It could be confirmed that the stridulatory emission by *P. rufotuberculatus* was produced by a similar vibration to that described for *T. infestans* Klug, 1834 (Schofield, 1979), in other words by rubbing the tip of the reflexed proboscis along the transversely ridged prosternal groove with an anterior-posterior movement; the return stroke, posterior-anterior, is silent (Schofield, 1977). This vibratory movement was only observed when the sample was held with the pincer in the above-mentioned position, and it only lasted about five minutes, although the insect remained immobile for a longer period. In the silence of the laboratory, the stridulation was audible up to about one meter away. The sound emitted by *P. rufotuberculatus* in the laboratory only when held with a pincer in a ventral position, matches that reported in the case of other triatominae when submitted to conditions of extreme provocation such as the attack of a predator (*e.g.,* Leston, 1957; Schofield, 1979).

Although all Triatominae have a stridulatory organ, it seems that in the majority of species the sound has never been percieved by human ear (Mazzotti, 1970). Up to now only *Dipetalogaster maxima* Uhler, 1894 (Mazzotti, 1970; Schilman *et al.*, 2001), *Triatoma infestans* Klug, 1834; *T. guasayana* Wygodzinsky & Abalos, 1949; *T. sordida* Stal, 1859; (Schilman *et al*., 2001), *Panstrongylus megistus* Burmeister, 1835; (Schofield, 1977) and *Rhodnius prolixus* Stal, 1859

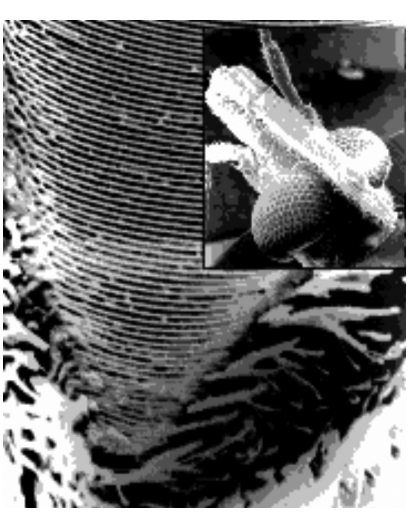

Fig. 1 — *P. rufotuberculatus* Champion 1899, photograph of the stridulatory organ at 100x; upper right insert showing the cephalic region (30x). Taken with Hitachi S-450 Scanning Electron Microscopy (acceleration 25 Kv).

(Manrique & Schilman, 2000; Schilman *et al*., 2001) have been described when disturbed or handled.

P. rufotuberculaus is found in Argentina, Bolivia, Brazil, Colombia, Costa Rica, Ecuador, Mexico, Panama, Peru and Venezuela (Schofield, 1994, Salomón *et al*., 1999). In the municipality of Amalfi in Antioquia, Colombia, *P. rufotuberculatus* is considered a high epidemiological risk for the transmission of *Trypanosoma cruzi* and represents 47% of captured triatomine, constituting the second most common reduvid caught inside buildings (Wolf *et al*., 2001). Likewise this triatomine has been reported in domestic environments in Peru, Bolivia and south of Ecuador (Abad-Franch *et al.*, 2001). Adults of this species are attracted by lights on walls outside houses (Salomón *et al*., 1999; Abad-Franch *et al.*, 2001). In Costa Rica *P. rufotuberculatus* can be found from sea level to 1,450 m, but seems to be more common at levels below 800 m (74.1%) and especially below 200 m (52.5% of the specimens); it tends to be more common during the first six months of the year (dry season and beginning of the rainy season) (Zeledón *et al.*, 2001).

In Bolivia four nymphs and one adult of *P. rufotuberculatus* were found colonizing a house located in a forest environment; it has also been found in Bolivia at altitudes that range between 1,500 to 2,600 m (Noireau *et al.*, 1994). This species has been found associated with wild mammals (kinkajous, bats and opossums) and adult specimens have been observed occasionally in human dwellings in Ecuador, Peru and Bolivia (Zeledón *et al.*, 2001).

In Venezuela, *P. rufotuberculatus* has rarely been collected although it has been reported throughout most of the country, namely in the states of Aragua, Carabobo, Cojedes, Distrito Federal, Falcón, Guarico, Lara, Monagas, Portuguesa, Sucre, Tachira, Trujillo, Yaracuy, Zulia, Territorio Delta Amacuro and Territorio Amazonas (Lent & Pifano, 1940, Cova-García & Suarez, 1959, Ramírez-Pérez, 1985). The findings in El Hatillo and San Diego de Los Altos are the first record of this species in Miranda State. Both places are about 25 km from Caracas, the former to the Southwest and the latter to the Southeast of the capital, and are located in the same region where *Panstrongylus geniculatus* Latreille, 1811 was first discovered to be colonizing domestic environments (Reyes-Lugo & Rodríguez-Acosta, 2000).

The small towns of El Hatillo and San Diego de Los Altos, in the highlands of Miranda State, are spread out in what was until recently transition cloud forest at a height of 1,000 to 1,300 m (Ewel *et al*., 1976), but which has been deeply modified by housing construction and asphalted roads. Thus, El Hatillo and San Diego de Los Altos essentially comprise a mosaic of forest areas and secondary savannahs of different dimensions. In the wooded areas there are still trees characteristic of humid and cloud forests, such as those belonging to the *Inga* spp., *Cressopia* spp., *Samanea* spp. and *Erythrina* spp. genera among others; while in the secondary savannahs there are 17 species of plants from nine families - Graminae (*Panicum maximum*, *Trachipogum hexandra*, *Andropogum bicornis*, *Stipa* sp., *Melinetum minutiflora),* Compositae *(Ichtyothere terminalis, Archirocline vargasiana),* Melastomataceae *(Miconia* sp.*),* Papilonaceae (*Crotalaria stipularis*), Rubiaceae (*Borreria* sp., *Coccocypselum lanceolatum, Declieuxia fructicosa),* Scrophulariaceae *(Capraria biflora),* Labiatae *(Hyptis mutabilis),* Convolvulaceae *(Ipomoea ochracea, Evolvulus* sp.*)* and Papilionaceae (*Phaseolus* sp.) (Vareschi, 1968; Steyermark & Huber, 1978). The mean annual temperature, relative environmental humidity and precipitation in the highlands of Miranda State are 21 °C ± 2, 85% ± 10 and 2000 mm respectively (Anonymous, 1998).

At the present the biological and P. C. R. analysis characterization of trypanosome isolated from the faeces of *P. rufotuberculatus* corresponds to *T. cruzi* (Díaz-Bello *et al*., 2002). These results are relevant because in Venezuela many aspects of the biology, ecology and behavior of this triatomine remain unknown.

Acknowledgments — We wish to thank the technician Milagros Díaz from the Electron Microscopy Department of the Odontology Faculty, Universidad Central de Venezuela, for her invaluable help during the scanning session and photographic processing, and Dr. Mirian Strauss from the Institute of Tropical Medicine, Cardiology Section, at the same university, for her suggestions.

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