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Third record of *Rhodnius amazonicus* and comparative study with *R. pictipes* (Hemiptera, Reduviidae, Triatominae)

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ABSTRACT

Rhodnius amazonicus Almeida et al. (1973) is a triatomine of rare occurrence. This species was found for the third time in Breves city, Pará state, Brazil. Morphometric and morphological studies were carried out on one male and one female. Lent and Wygodzinsky (1979) considered this species as a synonym of *R. pictipes,* until its revalidation after 23 years by Bérenger and Pluot-Sigwalt (2002). Considering the synonym mentioned above, a comparative study between these two species was performed in order to report the third encounter of this species, and increase the number of morphological characters that distinguish *R. amazonicus* from *R. pictipes*. The dorsal side of the head, the dorsal and ventral portions of the thorax, the dorsal, ventral and posterior sides of the female genitalia, eggs and the median process of the pygophore were examined by scanning electronic microscopy (SEM). The head, thorax, abdomen and egg parameters of these two species were also measured. The identification of characters on the head, stridulatory sulcus, mesosternum, metasternum, scutellum, process of urotergite I, external female genitalia, pygophore and eggs made the distinction between *R. amazonicus* and *R. pictipes* possible. This study has shown the new characters recorded and described for the first time for *R. amazonicus* and *R. pictipes* by SEM here made it possible to confirm the morphological separation between these two species. The morphometric analysis also confirmed that the above two taxa are different at specific level.

1. Introduction

The article published by Chagas (1909) describing the protozoan *Trypanosoma cruzi* and the epidemiological chain of American trypanosomiasis provided a significant advance in Triatominae studies (Chagas, 1909; Pinto, 1927). A parameter that can be used to evaluate this statement is that, beginning with the description of *Cimex rubrofasciatus* (currently, *Triatoma rubrofasciata*) by De Geer (1773), the number of described Triatominae rose to 59 species until 1907, but only 33 of them remained as valid (Lent and Wygodzinsky, 1979). However, just 17 years after the discovery of their medical importance, there were already 62 recognized species included in this group (Pinto, 1926), most of which still valid today.

While Lent and Wygodzinsky (1979) recognized 111 species of these vectors as valid, currently the subfamily Triatominae comprises 18 genera and 152 species (Galvão, 2014; Mendonça et al., 2016; Rosa et al., 2017). However, not all triatomine species have been studied in detail, either because their low epidemiological relevance (e.g. species of *Psammolestes* Bergroth, 1911) or because they have been recently discovered (*R. zeledoni* Jurberg et al., 2009; *R. marabaensis* Souza et al., 2016, *R. taquarussuensis* Rosa et al., 2017) or even for their rarity, such as *R. paraensis* Sherlock et al. (1977). Because of its rarity, there are only four publications including descriptions of the morphological characters of *Rhodnius amazonicus* (Almeida et al., 1973; Lent and Wygodzinsky, 1979; Bérenger and Pluot-Sigwalt, 2002; Galvão, 2014), this one being the fifth. Almeida et al. (1973) relied on the finding of a single female specimen, which was captured with light bait on October 24, 1965 in the Manaus-Itacoatiara road, Manaus city, Amazonas state, Brazil. The holotype of this species was deposited in the Parasitology Laboratory of INPA (National Institute of Amazonian Studies).

Although Almeida et al. (1973) had firstly considered the specimen to be *R. pictipes* Stål 1872, after a careful examination, they concluded

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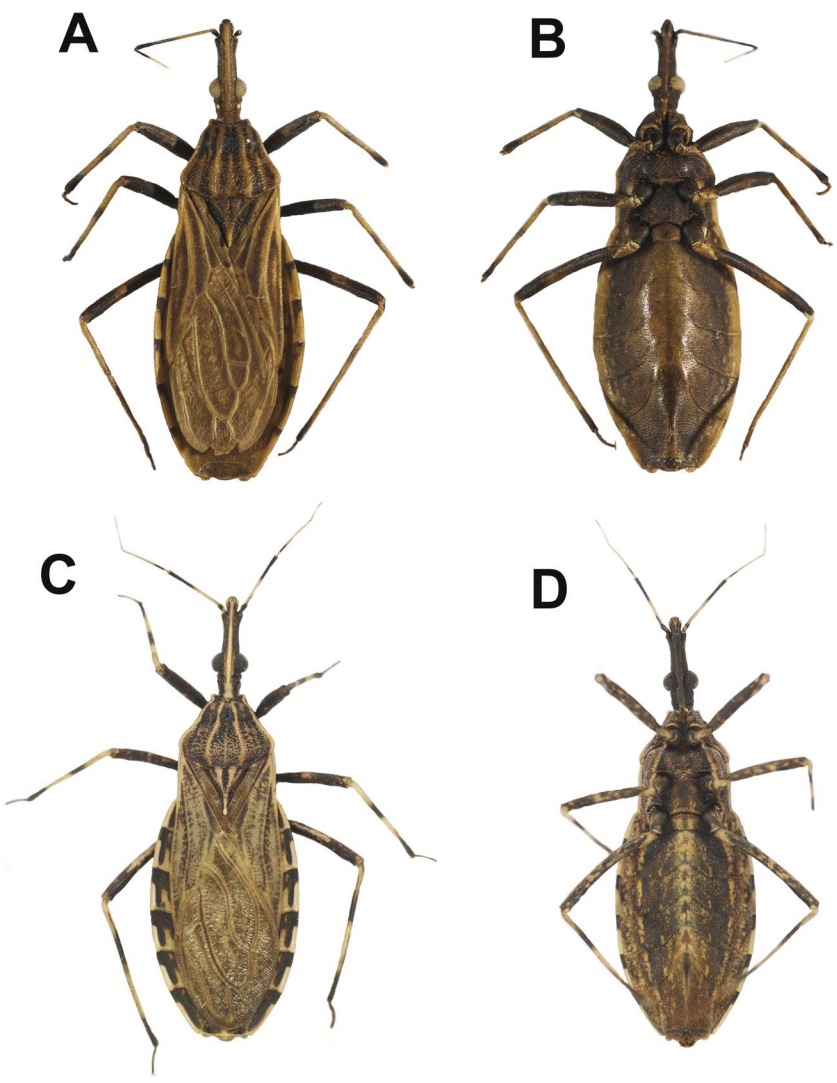

Fig. 1. *R. amazonicus* female. A- dorsal side; B- ventral side; *R. pictipes* female. C- dorsal side; D- ventral side.

that it was a new species, *R. amazonicus*. Lent and Wygodzinsky (1979) did not consider *R. amazonicus* as a valid species, but they reached that conclusion without examining the holotype and relying on a comparative study based on photographs. Furthermore, they mentioned that they did not find the differences reported by the authors of the taxon (Almeida et al., 1973). Additionally, because the only female considered to be *R. amazonicus* was collected with several *R. pictipes* specimens, the validity of the new species was questioned, leading to the conclusion that the holotype of *R. amazonicus* was an abnormal, poorly preserved specimen of *R. pictipes* (Lent and Wygodzinsky, 1979). However, in 2002, after finding an atypical couple among 100 specimens of *R. pictipes* collected in French Guiana, Bérenger and Pluot-Sigwalt (2002) revalidated *R. amazonicus*.

In this article, a male and a female of *R. amazonicus* found in Breves, Pará, were compared with males and females of *R. pictipes* maintained in a laboratory colony. The present study confirms and provides additional differences of characters between *R. amazonicus* and *R. pictipes* verified by the descriptors and revalidators (Almeida et al., 1973; Bérenger and Pluot-Sigwalt, 2002).

The terminology mainly follows Lent and Wygodzinsky (1979).

2. Material and methods

In July 2015, during a careful examination of dead triatomine specimens from the Entomology Laboratory of the Eighth Regional Health Center, Breves, Pará state, Brazil, among several specimens identified as *R. pictipes,* a couple with distinct features remained unidentified at first. In the Parasitology Laboratory of the Department of Biological Sciences of the Faculty of Pharmaceutical Sciences, Unesp-Araraquara, upon consultation of the key to *Rhodnius* species belonging to the *pictipes* group presented by Bérenger and Pluot-Sigwalt (2002), the unknown couple was finally identified as *R. amazonicus* and studied here (Figs. 1 A,B, 2 A,B).

The specimens of *R. pictipes* used in the present study were obtained from colonies kept at the Triatominae Insectarium of the Faculty of Pharmaceutical Sciences, São Paulo State University (Unesp/Araraquara, Triatominae Colonies of Araraquara – CTA 072) (Figs. 1 C,D, 2 C,D). The first specimens of this colony were received from the Evandro Chagas Institute, Belém, Pará state, Brazil, on January 18, 1998.

Eighteen characters of ten females and sixteen characters of ten males of *R. pictipes* (Table 1) were analyzed, as well as, seventeen characters of the female specimen and thirteen characters of the male specimen of *R. amazonicus*, in view of the absence of antennal segments (Rosa et al., 2010; Souza et al., 2016). Length and opercular opening of two eggs of *R. amazonicus* and thirty eggs of *R. pictipes* were measured (Table 1). The eggs of *R. amazonicus* were obtained by opening the abdomen to study the external female genitalia. We report that this is the second time we have studied eggs obtained from the ovaries of females. Variations between the parameters analyzed were estimated by Student's *t*-test, and values were calculated using the GraphPad Prism software (version 5.00, Windows, GraphPad Software, San Diego,