



Research article

First report of *Rhodnius amazonicus* Almeida, Santos & Sposina, 1973 (Hemiptera, Reduviidae, Triatominae) invading a dwelling in the state of Amapá, Brazil

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ABSTRACT

Rhodnius amazonicus has been previously reported in the Brazilian states of Amazonas and Pará, as well as in French Guiana. However, this is the first recorded presence of this species in Amapá, which is situated in the northern region of Brazil. The specimen was collected from a house in the rural area of the municipality of Porto Grande. Other triatomines, such as *Panstrongylus geniculatus*, *Rhodnius pictipes*, and *Eratyrus mucronatus*, were also found in the same locality in different houses. These species are vectors of *Trypanosoma cruzi*, which causes Chagas disease. Therefore, this report may contribute to understanding transmission in the state of Amapá, where new infections and outbreaks of Chagas disease have been recorded.

1. Introduction

Triatominae (Hemiptera: Reduviidae) are a diverse group of hematophagous insects, many of which are vector species of *Trypanosoma cruzi* (Chagas, 1909), the protozoan that causes Chagas disease [1]. Triatominae are primarily found in America and currently comprise 157 described species [2,3]. Although species can also be found in Asia and Oceania, no transmission of the Chagas protozoan occurs here [4].

Although, triatomines have a wide distribution in Brazil; only five species have been found in the state of Amapá. Four species, *Rhodnius pictipes* Stål, 1872, *Panstrongylus geniculatus* (Latreille, 1811), *Panstrongylus lignarius* (Walker, 1873), and *Eratyrus mucronatus* Stål, 1859 have specimens in the state collection “Entomofauna do Amapá,” located at the Institute for Scientific and Technological Research of the State of Amapá – IEPA [5]. The fifth species recorded in Amapá is *Rhodnius robustus* Larrousse, 1927, which is distributed in northern Brazil [6]. Following outbreaks of oral Chagas disease in the “Mazagão” region in the 1990s, a study Valente

Abbreviations: IEPA, Institute for Scientific and Technological Research of the State of Amapá.

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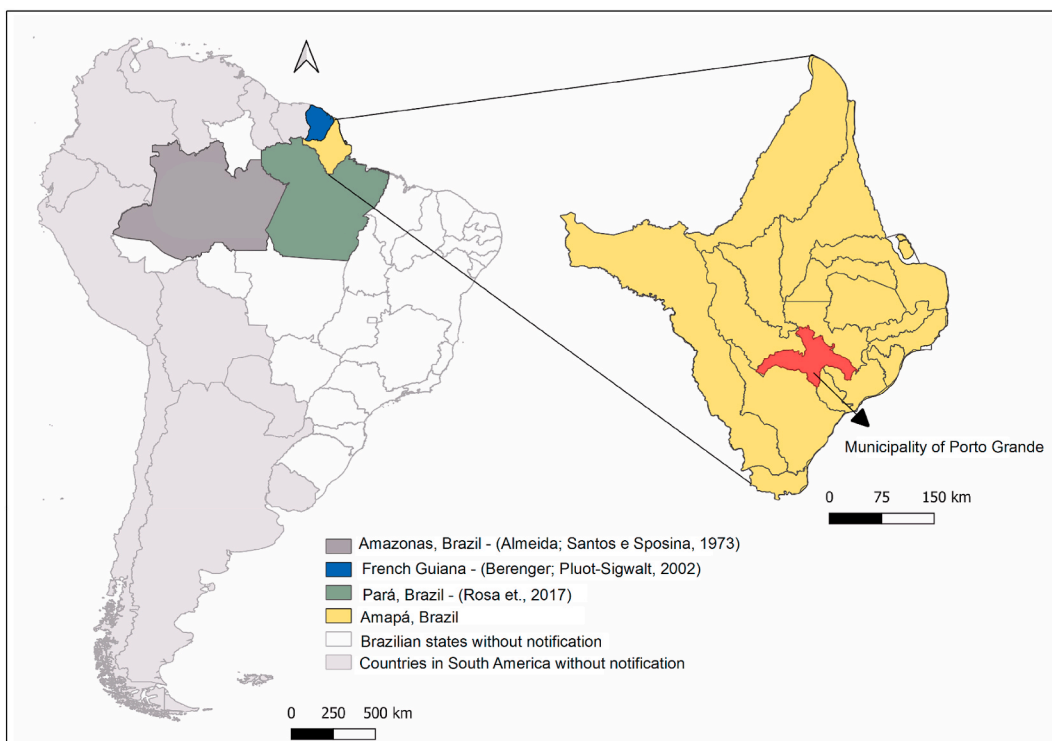


Fig. 1. Record of *Rhodnius amazonicus* encounters in 1973, 2002 and 2017, showing the municipality where the specimen was collected in the state of Amapá, Brazil.

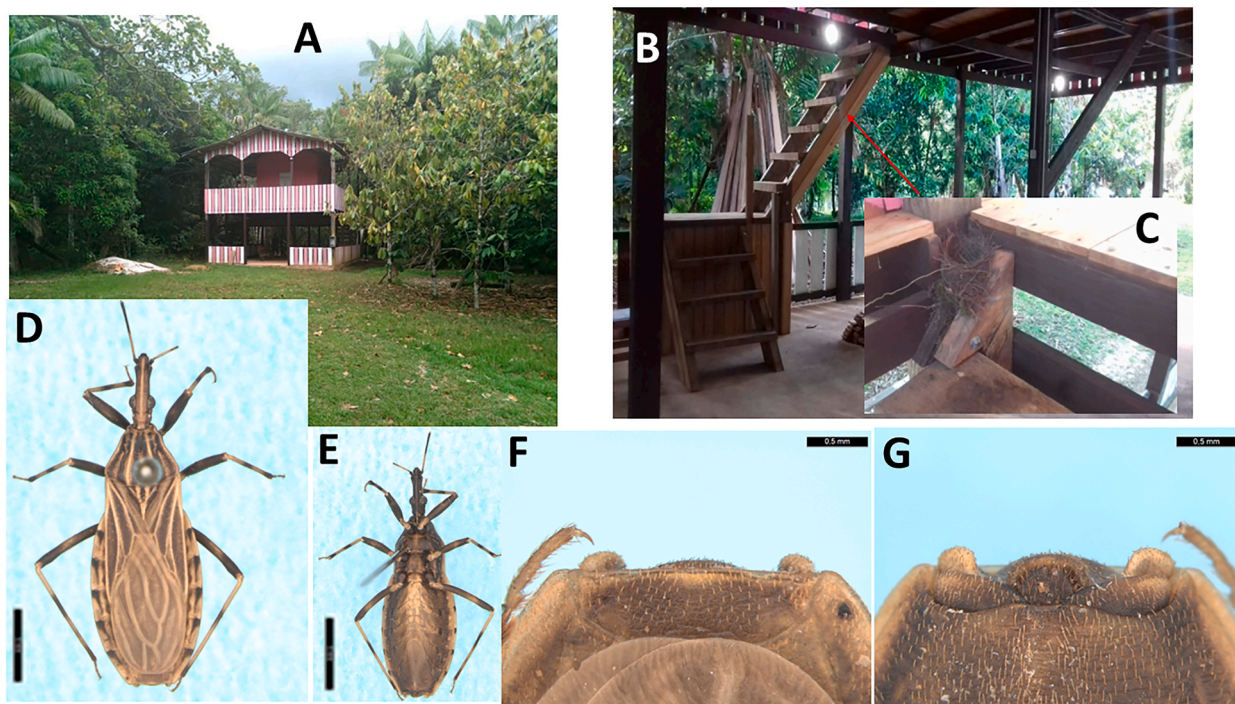


Fig. 2. Specimen collection site and image of *Rhodnius amazonicus*. A– House seen from the outside, demonstrating the proximity to the dense ombrophilous forest. B– Specimen collection location (red arrow). C – Bird’s nest; D – Specimen dorsal view, E – Ventral view and F and G – female external genitalia. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

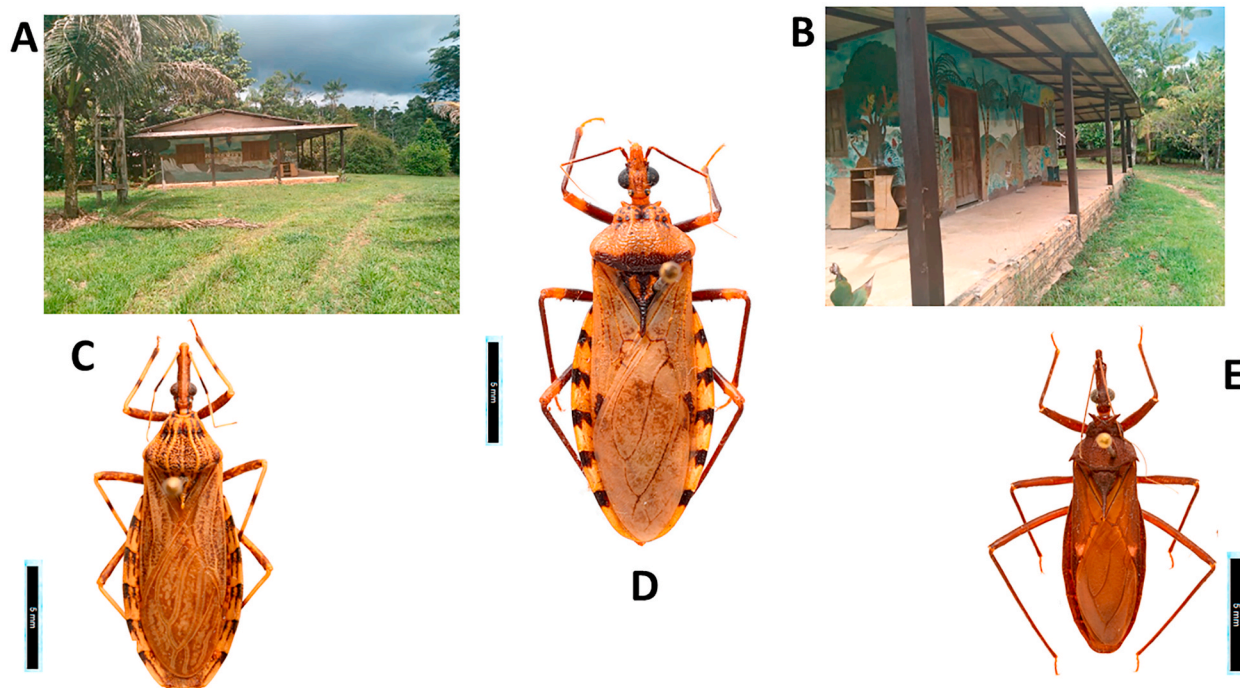


Fig. 3. Place of collection of specimens. A– front view of the home; B – Side view; C – *Rhodnius pictipes*; D – *Panstrongylus geniculatus* and E – *Eratyrus mucronatus*.

et al. [7] report that vectors were associated with specific households.

Therefore, continually updating the distribution of triatomines is important to understand the dispersion of vector species and optimize entomological surveillance actions in the Amazon region. New species, such as *Rhodnius amazonicus*, are rare but have already been found in French Guiana [8], Pará [9], and Amazonas [10]. Understanding species occupation scenarios, habitat and behavioral information is a useful starting point for public health investigations and predicting the ecological impacts of triatomines expansion in Amapá.

2. Material and methods

Specimens were collected through passive surveillance indoors in two residences located in Nova Canaã, a rural settlement in the municipality of Porto Grande, Amapá (Fig. 1). This area is characterized by a rugged relief with slopes of dense rainforest, which suffers anthropic pressure from deforestation for wood extraction and the opening of clearings for agriculture and livestock. The rural land had two houses (Fig. 2A–C and Fig. 3A and B), surrounded by dense vegetation composed of fruit and medicinal and native species, a common modification of the environment in the Amazon region. After capture, specimens were sent to the IEPA Medical Entomology Laboratory for identification. *Rhodnius amazonicus* was identified using the descriptions of Almeida et al. (1973) and Rosa et al. [9,10] (Fig. 2D–G). Other specimens were identified using the dichotomous key described in Galvão [6]. After identification, specimens were added to the “Entomofauna do Amapá” Collection of the IEPA. Parasitological analyses of feces were not performed as all insects were dead and, owing to their rigid exoskeleton, abdominal compression was impossible.

3. Results and discussion

The *R. amazonicus* (female) specimen (Fig. 2D and E) was collected from the Nova Canaã Settlement, Porto Grande Municipality, located approximately 150 km from the capital, Macapá, Amapá state, at 7 p.m. on August 20, 2020 at coordinates 0°33'37.5" N and 51°40'45.9" W at an elevation of 107.4 m. The specimen was captured alive indoors, in a kitchen with an open area, near the forest in the countryside (Fig. 2B and C), but died 3 days after collection. This is the first record of this species in Amapá.

According to reports, on the same night on which the specimen of *R. amazonicus* was collected by Galeno, Erika, the family spotted a marsupial while cleaning the area around the house, possibly of the genus *Didelphis* sp. (Didelphimorphia, Didelphidae) Linnaeus, 1758, popularly known as “mucura” or “gambá.” In addition to *R. amazonicus*, we also identified a specimen of *R. pictipes* (Fig. 3C). *Rhodnius* are known to inhabit palm trees, which are also shelters for marsupials; therefore, there might be an association between these species (Gaunt and Miles 2000). Indeed, palm trees (*Oenocarpus bacaba* Mart, 1823) were present a few meters from the home, and there are already reports of triatomines infesting these trees in the Amazon [11]. In the Amazon region, the presence of *R. pictipes* in the domestic environment shows the ability of this species to spread and further highlights the need to investigate silent cases of

Table 1

Triatomines found indoors in August 2020, in the municipality of Porto Grande, state of Amapá.

Species	Date	Local	Description of the place	Collection voucher
<i>Panstrongylus geniculatus</i>	08/14/2020	Bathroom	Wall	IEPA HEM 000288
<i>Rhodnius pictipes</i>	08/15/2020	Bathroom	Wall	IEPA HEM 000289
<i>Rhodnius amazonicus</i>	08/20/2020	Kitchen (open area)	Stairs	IEPA HEM 000290
<i>Eratyrus mucronatus</i>	08/21/2020	Kitchen (closed area)	Wall	IEPA HEM 000291
	08/21/2020	bedroom	Wall (next to the hammock)	IEPA HEM 000292

Chagas disease in populations living in rural areas, especially among riverside dwellers, who have constant contact with açai, which is associated with oral outbreaks [7,12,13].

There are already 16 species of *Rhodnius* recorded in the Triatominae subfamily, which are generally associated with ecotopes, such as palm trees, and some species have specific habitat preferences [14]. Records of *R. pictipes* have been found in epiphytes (Bromeliaceae) associated with palm trees, and they have been reported to feed on blood from horses, rodents, and birds [15].

Another species recorded was *E. mucronatus* (Fig. 3E). Two specimens were found at night: one in the kitchen (near an artificial light source) and the other in the bedroom (near a hammock). In Brazil, this species is distributed in the states of Amazonas, Amapá, Acre, Mato Grosso, Maranhão, Pará, Rondônia, and Tocantins [5,16,17] and is found in other South American countries, including Colombia, Bolivia, Ecuador, Guiana, French Guiana, Suriname, and Venezuela [18]. This species is attracted to artificial light sources and, in the natural environment, it is often found in palm trees and tree hollows, which are potential nests for marsupials and bats [19, 20]. In the Amazon region, colonies were observed in the wild and had generations that developed in up to 274 days [21].

A single *P. geniculatus* specimen was collected in the house (Fig. 3D). Previous reports have found this species in close proximity to humans and in peridomestic areas associated with pig breeding sites and indoors [22–24]. Castro et al. [25] reported that it was the most common species caught in light attraction traps installed at the canopy level.

After approximately 1 week of passive surveillance indoors in a rural area of the municipality of Porto Grande, four different species of triatomines were identified (see Table 1). Importantly, *Rhodnius amazonicus* was recorded for the first time in Amapá, highlighting the diversity of Chagas disease vectors in Amapá and the importance of entomological surveillance in the Amazon region.

4. Conclusions

The first recorded presence of the species *R. amazonicus* in Amapá and the report of other triatomines that are vector fauna of the Amazon region highlights the need of new investigations in the state of Amapá. These results can elucidate triatomine distribution and ecology in the northern region of Brazil and help guide public health research and actions.

Author contribution statement

Érika Galeno, Josiane Müller, Wellington Santos, and Jader Oliveira: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper. Allan Kardec Galardo: Conceived and designed the experiments; Contributed reagents, materials, analysis tools or data; Wrote the paper.

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Data availability statement

Data included in article/supplementary material/referenced in article.

Declaration of interest's statement

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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