Scientific Note

Two new records of Triatominae (Hemiptera: Reduviidae) from Roraima state, Brazil

Dos nuevos registros de Triatominae (Hemiptera: Reduviidae) en el estado de Roraima, Brasil

Jaime de Liege Gama Neto1,2, Jader de Oliveira3*, João Aristeu da Rosa3, Francisco Maciel dos Santos3, Valdenor Alves Macedo1 and Williasmá Costa da Silva1

1 Núcleo Estadual de Entomologia, Coordenadoria Geral de Vigilância em Saúde (CGVS), Boa vista, RR, Brasil.
2 Coordenção de Ciências Biológicas e da Saúde, Universidade Estadual de Roraima (UIERR), Boa vista, RR, Brasil.
3 Departamento de Ciências Biológicas, Faculdade de Ciências Farmacêuticas (UNESP), Araraquara, SP, Brasil. *Corresponding author: e-mail: jdr.oliveira@hotmail.com

ZooBank: urn:lsid:zoobank.org:pub: D62A3C65-7B95-4337-980F-DE9D37D38C92
https://doi.org/10.35249/rche.46.2.20.23

Abstract. Adult triatomines were collected with a luminous trap and by hand in June and November 2016 in the Mucajai and São João da Baliza counties, in Center-Southern and Southern Roraima, Brazil. *Eratyrus mucronatus* Stål, 1859 and *Rhodnius montenegrensis* Rosa et al. 2012 are recorded for the first time in the Roraima state. The finding of *E. mucronatus* and *R. montenegrensis* in that area has expanded their known geographical distribution within Brazil and increased the number of records of triatomine species in Roraima state from 4 to 6.

Key words: Chagas disease, *Eratyrus mucronatus*, *Rhodnius montenegrensis*.

Resumen. Triatominos adultos fueron recolectados con una trampa luminosa y manualmente en junio y noviembre de 2016 en los estados de Mucajai y São João da Baliza, en el centro-sur y sur de Roraima, Brasil. Se registran por primera vez *Eratyrus mucronatus* Stål, 1859 y *Rhodnius montenegrensis* Rosa et al. 2012, en el estado de Roraima. El hallazgo de estas especies amplía la distribución geográfica conocida hasta ahora en Brasil e incrementa de 4 a 6 el número de registros de especies de triatominos en este estado.

Palabras clave: Enfermedad de Chagas, *Eratyrus mucronatus*, *Rhodnius montenegrensis*.

Triatominae is a subfamily of hematophagous insects, widely distributed in the Americas and important from a public health viewpoint for being vectors of *Trypanosoma cruzi* Chagas, 1909, which is the etiologic agent of the human trypanosomiasis known as Chagas disease (Otálor-Luna et al. 2015; Sandoval et al. 2010; Coura and Dias 2009).

Currently, Triatominae includes 154 species, of which 67 have been found in Brazil (Dorn et al. 2018; Lima-Cordón et al. 2019; Nascimento et al. 2019; Oliveira et al. 2018; Poinar 2019). Although around 20 species of Triatominae (COURA and JUNQUEIRA 2015; GALVÃO 2014; GALVÃO et al. 2003; ROSA et al. 2012), have been recorded in the North region of the country, only four of them *Panstrongylus geniculatus* (Latreille, 1811), *Triatoma maculata* (Erichson, 1848), *Rhodnius pictipes* Stål, 1972 and *Rhodnius robustus* Larrousse, 1927 have...
been registered in the state of Roraima, which suggests that triatomine species have been undersampled there (Luitgards-Moura et al. 2005; Ricardo-Silva et al. 2016).

In Southern Roraima, *R. pictipes* and *R. robustus* were found in the peridomicile and extradomicile (Luitgards-Moura et al. 2005) in association with maripa palms (*Attalea maripa* (Aubl.) Mart.), whereas in Northern Roraima *P. geniculatus* and *T. maculata* were found both in the intradomicile and peridomicile, especially in henhouses (Luitgards-Moura et al. 2005). *T. maculata* was also found in the domiciles of an old residential complex in the urban area of Boa Vista, associated with pigeon nests (Ricardo-Silva et al. 2016).

In this regard, this work aims to record the occurrence of *Eratyrus mucronatus* Stål, 1859 and *Rhodnius montenegrensis* Rosa et al. 2012 in the state of Roraima.

*Eratyrus mucronatus* was collected in June 2016 inside a dwelling in Mucajai. *R. montenegrensis* was captured both in Mucajai and São João da Baliza, in September and November 2016. In Mucajai, specimens of *R. montenegrensis* were captured in a forest environment using a Pennsylvania light trap; in São João da Baliza the specimens were captured manually with the aid of tweezers inside dwellings. Some specimens were also captured in the extradomicile after being attracted to a light pole. The specimens were captured in June and November 2016 in the cities of Mucajai and São João da Baliza, in the center-south and south regions of Roraima, respectively (Fig. 1).

The vegetation in Mucajai basically consists of dense tropical rainforests of low and medium altitude, except in the far northeast of the city, where sparse grass and scattered shrubs dominate the landscape, a vegetation similar to “Cerrado” and locally known as *lavrado* (‘ploughed land’). The city has a tropical monsoon climate with temperatures varying between 20 °C and 35 °C. The rainy season takes place between mid-April and the beginning of August. The vegetation and climate in the city of São João da Baliza are typical of Amazonian region: tropical rainforests and tropical monsoon climate with temperatures ranging from 28 °C to 38 °C and high rainfall levels, the annual average being 1,500 mm.
A sample of the specimens identified as *E. mucronatus* and *R. montenegrensis* was preserved in 70% alcohol and sent to the laboratory of the Faculty of Pharmaceutical Sciences of the São Paulo State University (Unesp) for confirmation of the species. Photographs were taken with a FUJI Fine Pix S-4000 digital camera attached to an Olympus SZ61 stereo microscope. All the research material was dry preserved or preserved in 70% alcohol (in the case of *R. montenegrensis*) and kept in the laboratory of the Roraima State Nucleus of Entomology (NEE). The map was made by the program QGIS software 3.10.2.

**New records.** *Eratyrus mucronatus.* Brazil. 1 adult male, city of Mucajai, Vicinal Cachoeirinha, 2°19’47.4’’N / 60°50’50.7’’W, 03/06/2016, Santos, F.M. col. (NEE) (CEJMSB 859). *Rhodnius montenegrensis.* Brazil. 1 adult male, city of São João da Baliza, Vicinal 21, km 3, Recanto do Cajueiro, 2°29’05,98’’N / 59°29’30,76’’W, 16/11/2016, Santos, F.M. col. (NEE). 2 adult females, city of São João da Baliza, Vicinal Tamandaré I, 2°28’51,62” N; 60°55’33,82” W, 18/09/2015, Gama Neto, J.L. col. (NEE) (CEJMSB 860).

The species were identified based on the identification key proposed by Galvão (2014) and, when necessary, by checking their original description (Rosa et al. 2012).

**Discussion**

The genus *Eratyrus* contains two species, *E. cuspidatus* and *E. mucronatus*, both being characterized by having the first segment of the rostrum very long when adults, ending at halfway the distance between the antenniferous tubercle and the anterior border of the eye; the scutellum having an oblique apical process with the shape of a pointed thorn, as lengthy as or lengthier than the main body of the scutellum (Galvão 2014; Páez-Rondón et al. 2019).

*Eratyrus mucronatus* (Fig. 2) is primarily sylvatic (Monte et al. 2014) and widely distributed in Central and South Americas, with records of occurrence in Bolivia, Brazil, Colombia, Ecuador, French Guiana, Guatemala, Guyana, Panama, Peru, Suriname, Trinidad and Tobago, Venezuela; always east of the Andes and never in altitudes above 700 m (Carcavallo et al. 1998, 2003).

In Brazil, *E. mucronatus* occurs in tropical rainforests in the states of Acre, Amapá, Amazonas, Maranhão, Mato Grosso, Pará, Rondônia and Tocantins, and is found in palm trees, rocks and tree hollows (Galvão et al. 2003; Meneguetti et al. 2011; Obara et al. 2015; Rebêlo et al. 1998). Since it has been found naturally infected with *T. cruzi* (Depickère et al. 2012; Galvão 2014; Guhl 2007; Noireau et al. 1995; Rojas et al. 2008; Torres and Cabrera 2010) and is strongly attracted to artificial light sources, occasionally invading houses (Páez-Rondón et al. 2019; Monte et al. 2014; Morocoima et al. 2010; Rangel-Avendaño et al. 2011; Soto Vivas et al. 2001), it can be regarded as a candidate vector of *T. cruzi* to humans. Therefore, it is important to have its occurrence updated and to identify the localities where this species has been found inside dwellings (Obara et al. 2015).

*Rhodnius montenegrensis* is also primarily sylvatic and was found in palm trees of the genera *Attalea* and *Orbignya* (Rosa et al. 2012) in the Brazilian states of Acre and Rondônia (Meneguetti et al. 2015; Rosa et al. 2012). Only recently it was found in Roraima, but the hypothesis that the previous specimens collected were erroneously identified as *R. robustus* can not be ruled out because adults of these two species are very similar, except that *R. montenegrensis* has yellow legs with a black stripe on the posterior portion of the tibia, ventral portion of the abdomen with yellow stains interspersed with dark ones, and dark respiratory spiracles (Fig. 3), whereas *R. robustus* has brown legs without any black stripe on the tibia, ventral portion of the abdomen without yellow stains interspersed with dark ones, and respiratory spiracles surrounded by yellow (Rosa et al. 2012).
Females of *R. montenegrensis* have already been captured in a dwelling in the rural area of the city of Rio Branco, Acre, possibly attracted by light (Meneguetti et al. 2015), similarly to what happened with some specimens collected in this work. The two females captured in Acre were naturally infected by trypanosomatids, and more studies are necessary to provide a better understanding of the role of this species in the transmission of *T. cruzi* to humans.

In the Apolo region, Bolivia, its domiciliation has already been demonstrated, particularly in the peridomicile, being infected with *T. cruzi* (Depickère et al. 2012). In Manaus, its intrusion without domicile has already been observed (Castro et al. 2010), but it is usually found in home environments (Depickère et al. 2012; Obara et al. 2013). It has already been collected casually in a forest reserve in the state of Rondônia, and through light traps, without positivity for *T. cruzi* (Meneguetti et al. 2011). Some studies suggest that *E. mucronatus* can adapt quickly to stable artificial ecotopes, when their natural habitats are destroyed by anthropic actions (Otálora-Luna et al. 2015), showing its potential as a wild vector of Chagas disease, even though considered by some researchers as a wild species of little epidemiological importance (Cuba et al. 2002; Lent and Wygodzinsky 1979).

Now that *E. mucronatus* and *R. montenegrensis* were found in Roraima, there are six Triatominae species recorded for the state. Nevertheless, further research probably can lead to other species being found there.
Acknowledgements

The second author thanks to CAPES (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior 001”).

Literature Cited

Carcavallo, R., Giron, I., Jurberg, J. and Lent, H. (1998) Geographical distribution and altitudinal dispersion/ dispersão geográfica e dispersão altitudinal. In: Atlas of Chagas’ Disease Vectors in The Americas. p. 143.

Castro, M.C.M., Barrett, T.V., Santos, W.S., Abad-Franch, F. and Rafael, J.A. (2010) Attraction of Chagas disease vectors (Triatominae) to artificial light sources in the canopy of primary Amazon rainforest. Memórias do Instituto Oswaldo Cruz, 105: 1061-1064.

Chagas, C. (1909) Nova tripanozomíaze humana. Estudos sôbre a morfologia e o ciclo evolutivo do Schizotrypanum cruzi n. gen., n. sp.; agente etiolójico de nova entidade mórbida do homem. Memorias do Instituto Oswaldo Cruz, 1: 159-218.

Coura, J.R. and Junqueira, A.C.V. (2015) Surveillance, health promotion and control of chagas disease in the Amazon Region - Medical attention in the Brazilian Amazon Region: A proposal. Memorias do Instituto Oswaldo Cruz, 110(7): 825-830. https://doi.org/10.1590/0074-02760150153

Depickère, S., Durán, P., López, R., Martínez, E. and Chávez, T. (2012) After five years of chemical control: Colonies of the triatomine Eratyrus mucronatus are still present in Bolivia. Acta Tropica, 123(3): 234-238. https://doi.org/10.1016/j.actatropica.2012.05.005

Dorn, P.L., Justi, S.A., Dale, C., Stevens, L., Galvão, C., Lima-Cordón, R. and Monroy, C. (2018) Description of Triatoma moplan sp. n. from a cave in Belize (Hemiptera, Reduviidae, Triatominae). ZooKeys, 775: 69-95. https://doi.org/10.3897/zookeys.775.22553
Galvão, C. (2014) Vetores da Doença de Chagas no Brasil (SciELO Boo). Curitiba: 2014. https://doi.org/10.7476/9788598203096

Galvão, C., Carcavallo, R., Rocha, D. da S. and Jurberg, J. (2003) A checklist of the current valid species of the subfamily Triatominae Jeannel, 1919 (Hemiptera, Reduviidae) and their geographical distribution, with nomenclatural and taxonomic notes. Zootaxa, 202(1): 1. https://doi.org/10.11646/zootaxa.202.1.1

Galvão, C., Jurberg, J., Carcavallo, R.U., Mena Segura, C.A., Girón, I.G. and Curto De Casas, S.I. (1998) Distribuição geográfica e dispersão alti-latitudinal de alguns gêneros e espécies do tribo Triatomini Jeannel, 1919 (Hemiptera, Reduviidae, Triatominae). Memorias do Instituto Oswaldo Cruz, 93(1): 33-37.

Guhl, F. (2007) Chagas disease in Andean countries. Memorias do Instituto Oswaldo Cruz, 102(1): 29-37. https://doi.org/10.1590/S0074-02762007005000099

Lent, H. and Wygodzinsky, P. (1979) Revision of the Triatominae Hemiptera, Reduviidae, and their significance as vectors of Chagas’ disease. Bulletin of the American Museum of Natural History, 163(3): 123-520.

Lima-Cordón, R.A., Monroy, M.C., Stevens, L., Rodas, A., Rodas, G.A., Dorn, P.L. and Justi, S.A. (2019) Description of Triatoma huchuetanangaensis sp. n., a potential Chagas disease vector (Hemiptera, Reduviidae, Triatominae). ZooKeys, 820: 51-70. https://doi.org/10.3897/zookeys.820.27258

Luitgards-Moura, J.F., Borges-Pereira, J., Costa, J., Zauza, P.L. and Rosa-Freitas, M.G. (2005) On the possibility of autochthonous chagas disease in Roraima, Amazon Region, Brazil, 2000-2001. Revista do Instituto de Medicina Tropical de Sao Paulo, 47(1): 45-54.

Meneguetti, D.U. de O., Trevisan, O., Rosa, R.M. and Camargo, L.M.A. (2011) First report of Eratyrus mucronatus Stal, 1859 (Hemiptera, Reduviidae, Triatominae), in the State of Rondônia, Brazil. Revista Da Sociedade Brasileira de Medicina Tropical, 44(4): 511-512. https://doi.org/10.1590/s0037-8682201000400022

Meneguetti, D.U. de O., Tojal, S.D., Rosa, J.A. da, Miranda, P.R.M. de and Camargo, L.M.A. (2015) First report of Rhodnius montenegrensis (Hemiptera, Reduviidae, Triatominae) in the State of Acre, Brazil. Revista Da Sociedade Brasileira de Medicina Tropical, 48(4): 471-473. https://doi.org/10.1590/0037-8682-0029-2015

Monte, G.L.S., Tadei, W.P. and Farias, T.M. (2014) Ecoepidemiology and biology of Eratyrus mucronatus Stál, 1859 (Hemiptera: Reduviidae: Triatominae), a sylvatic vector of chagas disease in the brazilian amazon. Revista Da Sociedade Brasileira de Medicina Tropical, 47(6): 723-727. https://doi.org/10.1590/0037-8682-0263-2014

Morocoima, A., Chique, J., Herrera, L. and Urdaneta-Morales, S. (2010) Eratyrus mucronatus (Stal, 1859) (Hemiptera, Reduviidae, Triatominae): Primer registro para el estado Anzoátegui (Venezuela). Boletin de Malarialogia y Salud Ambiental, 50(2): 307-310.

Nascimento, J.D., Ravazi, A., Alevi, K.C.C., Pardo-Diaz, C., Salgado-Roa, F.C., da Rosa, J.A. and Ramírez, J.D. (2019) Taxonomical over splitting in the Rhodnius prolirus (Insecta: Hemiptera: Reduviidae) clade: Are R. taquarussuensis (da Rosa et al., 2017) and R. neglectus (Lent, 1954) the same species? PLOS ONE, 14(2): e0213043. https://doi.org/10.1371/journal.pone.0211285

Noireau, F., Bossoeno, R., Carrasco, J., Telleria, F., Vargas, C., Camacho, N. and Breniere, S.F. (1995) Sylvatic triatomines (Hemiptera: Reduviidae) in Bolivia: trends towards domesticity and possible infection with Trypanosoma cruzi (Kinetoplastida: Trypanosomatidae). Journal of Medical Entomology Medical Entomology, 32: 594-598.

Obara, M.T., Cardoso, A.D.S., Pinto, M.C.G., Albuquerque e Silva, R., Souza, C.R. de and Gurgel-Gonçalves, R. (2015) Eratyrus mucronatus Stál, 1859 (Hemiptera: Reduviidae: Triatominae): first report in the State of Acre, Brazil, and updated geographic distribution in South America. Check List, 9(4): 851. https://doi.org/10.15560/9.4.851
Oliveira, J., Ayala, J.M., Justi, S.A., da Rosa, J.A. and Galvão, C. (2018) Description of a new species of Nesotriatoma Usinger, 1944 from Cuba and revalidation of synonymy between Nesotriatoma bruni (Usinger, 1944) and N. flavida (Neiva, 1911) (Hemiptera, Reduviidae, Triatominae). *Journal of Vector Ecology, 43*(1): 148-157. https://doi.org/10.1111/jvec.12294

Otálora-Luna, F., Aldana, E. y Viloria, A. (2015) Triatomines or humans: who are the invaders? *Ludus Vitalis, 23*(43): 223-230.

Páez-Rondón, O., Aldana, E., Otálora-Luna, F. and Cantillo-Barraza, O. (2019) Redescripción de las especies del género Eratyrus Stål (Hemiptera: Reduviidae: Triatominae): nueva propuesta para la distinción interespecífica y una breve nota biogeográfica. *Revista Chilena de Entomología, 45*(3): 471-490.

Poinar, G. (2019) A primitive triatomine bug, *Paleotriatoma metaxytaxa* gen. et sp. nov. (Hemiptera: Reduviidae: Triatominae), in mid-Cretaceous amber from northern Myanmar. *Cretaceous Research, 93*: 90-97. https://doi.org/10.1016/j.cretres.2018.09.004

Rangel-Avendaño, F., Péfaur, J., Lizano, E., Aldana, E., Olivares, D.V. and Concepción, L. (2011) *Eratyrus mucronatus* (HEMIPTERA, TRIATOMINAE) domiciliado y alimentado con sangre humana y canina en el estado Mérida, Venezuela: un riesgo ponteical para la transmisión de la enfermedad de Chagas: Nota técnica. *Revista Científica, 21*(5): 421-424.

Rebêlo, J.M.M., Lopes De Barros, V.L. and Araújo Mendes, W. (1998) Espécies de Triatominae (Hemiptera: Reduviidae) do Estado do Maranhão, Brasil. *Cadernos de Saúde Pública, 14*(1): 187-192. https://doi.org/10.1590/S0102-311X1998000100027

Ricardo-Silva, A., Gonçalves, T.C.M., Luitgards-Moura, J.F., Lopes, C.M., da Silva, S.P., Bastos, A.Q. and Freitas, M.R.G. (2016) *Triatoma maculata* colonises urban domiciles in Boa Vista, Roraima, Brazil. *Memorias do Instituto Oswaldo Cruz, 111*(11): 703-706. https://doi.org/10.1590/0074-027601600026

Rojas, M.E., Várquez, P., Villarreal, M.F., Velandia, C., Vergara, L., Morán-Borges, Y.H. and Bonfante-Cabarcas, R.A. (2008) An entomological and seroepidemiological study of Chagas’ disease in an area in central-western Venezuela infested with *Triatoma maculata* (Erichson 1848). *Cadernos de Saúde Publica, 24*(10): 2323-2333.

Torres, D.B. and Cabrera, R. (2010) Geographical distribution and intra domiciliary capture of sylvatic triatomines in the convención province, Cusco, Peru. *Revista do Instituto de Medicina Tropical de Sao Paulo, 52*(3): 157-160. https://doi.org/10.1590/S0036-46652010000300008
