

Checklist of jumping plant-lice (Hemiptera, Sternorrhyncha, Psyllidae) from Mato Grosso, Brazil

Checklist de psílídeos (Hemiptera, Sternorrhyncha, Psylloidea) de Mato Grosso, Brasil

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Abstract

Psyllids or jumping plant-lice are small phloem-feeding insects characterised by narrow host ranges, i.e., the plants on which they develop. This work shows the results of a survey of the superfamily Psylloidea in different biomes of Mato Grosso state. In total, 29 described genera and 24 described species are listed. The Cerrado biome showed the highest diversity, followed by the Amazon and Pantanal. Compared with a checklist published for Brazil in 2012, the present paper increases significantly the knowledge on the biodiversity of the state of Mato Grosso. In addition to the species recorded here for the first time from Mato Grosso (*Diaphorina citri*, *Heteropsylla caldwelli*, *Pseudophacopteron longicaudatum*, *Tainarys myracrodruie* and *Trioza struthanthi*), we provide also new records for other Brazilian states: *Isogonoceraia divergipennis* – from Maranhão, Rio Grande do Sul, Rio de Janeiro and Santa Catarina; *Heteropsylla caldwelli* – from Goiás and São Paulo; *Euphalerus clitoriae* – from Ceará, Goiás, Pará, Paraná and Santa Catarina; *Trioza tabebuiae* – from Minas Gerais, São Paulo and Santa Catarina; and *Trioza struthanthi* from São Paulo.

Keywords: Biodiversity; Brazilian biomes; Distribution; Insecta

Resumo

Os psílídeos são insetos pequenos que se alimentam do floema e se caracterizam por apresentarem uma pequena faixa de plantas hospedeiras em que se desenvolvem. Este trabalho teve como objetivo prospectar e identificar insetos da superfamília de Psylloidea que ocorrem associados a diferentes biomas no Mato Grosso e que resultou na coleta de 29 gêneros descritos, com 24 espécies identificadas. O Cerrado foi o bioma que apresentou a maior diversidade, seguido pela Amazônia e Pantanal. Comparando com a última lista de psílídeos publicada para o Brasil, em 2012, este artigo contribuiu significativamente para o aumento do conhecimento da biodiversidade de Mato Grosso. Além das espécies registradas para o Mato Grosso (*Diaphorina citri*, *Heteropsylla caldwelli*, *Pseudophacopteron longicaudatum*, *Tainarys myracrodruie* e *Trioza struthanthi*), também apresentamos novos registros para outros estados brasileiros: *Isogonoceraia divergipennis* – no Maranhão, Rio Grande do Sul, Rio de Janeiro e Santa Catarina; *Heteropsylla caldwelli* – em Goiás e São Paulo; *Euphalerus clitoriae* – no Ceará, Goiás, Pará, Paraná e Santa Catarina; *Trioza tabebuiae* – em Minas Gerais, São Paulo e Santa Catarina; e *Trioza struthanthi* em São Paulo.

Palavras-chave: Biodiversidade; Biomas brasileiros; Distribuição; Insecta

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Introduction

Mato Grosso, the third largest state of Brazil, is located in the Midwest of the country, and contains parts of the Amazon, Cerrado and Pantanal biomes. Along with this extensive territorial area, encompassing three different biomes and an immense plant diversity, it is expected that the insect fauna, especially phytophages such as psyllids, is very rich. Psyllids constitute the superfamily Psylloidea in the Hemiptera: Sternorrhyncha. They are phloem feeders and typically monophagous or oligophagous. Some species are pests in agriculture, forestry or horticulture (Burckhardt 1994; Hollis 2004; Hodkinson 2009; Burckhardt et al. 2014) and can cause severe damage to host plants, such as *Glycaspis brimblecombei* Moore, 1964 to *Eucalyptus* spp. Others, like *Diaphorina citri* Kuwayama, 1908 and *Bactericera cockerelli* (Šulc, 1909) are even more dangerous because they transmit plant pathogens that cause serious diseases of their hosts.

Burckhardt and Queiroz (2012) recorded 73 psyllid species from Brazil and only four species from Mato Grosso state. The first species of Psylloidea cited for MT was *Apsyllopsis mexicana* (CRAWFORD, 1914), as *Limbopsylla beeryi* (CALDWELL, 1944) by Brown and Hodkinson (1988). Twenty years later, Santana (2008) reported for the first time the occurrence of *Blastopsylla occidentalis* Taylor, 1985 in Mato Grosso, followed by Peres Filho et al. (2011), who reported the presence of *Glycaspis brimblecombei* (MOORE, 1964) in the region of Cuiabá and Primavera do Leste. *Euphalerus clitoriae* (BURCKHARDT; GUAJARÁ, 2000) was first recorded in the state by Burckhardt and Queiroz (2012).

Limataphalara lautereri Burckhardt and Queiroz 2013, was described from the material collected in Mato Grosso (Tabaporã and Sinop) (BURCKHARDT; QUEIROZ, 2013). *Isogonoceraia divergipennis* White and Hodkinson, 1980, was reported from Mato Grosso in 2016 and *Trioza tabebuiae* BURCKHARDT; SANTANA, 2001 in 2017 and both were collected near Sorriso (MAZZARDO et al., 2016; 2017). Burckhardt and Queiroz (2020) recorded for Mato Grosso *Apsyllopsis mexicana*, *Colophorina bororo*, *Colophorina tupi*, *Jataiba basifistula*, *Mitrapsylla copaiferae*, *Mitrapsylla gloriae*, *Platycorypha cultrata* and *Platycorypha leptopeus*.

Knowing the severe damage caused by some species of this group, such as gall formation, leaf deformation, disease vectors, in different countries and continents, with huge economic losses, it is extremely important to know the species present in this large area that comprises the state of Mato Grosso, not only in plantations, but also in native areas. Thus, this work aimed to prospect and identify insects of the Psylloidea superfamily that occur associated with different biomes in Mato Grosso.

Material and methods

Twenty-two collections were performed from September 2013 to March 2019. The periodicity of the collections varied according to the wet and dry seasons in the region as well as the opportunity for field work. An entomological net was used to collect the insects, by sweeping the edges of planted and natural forest present in the study area. The collection sites were georeferenced and all information about the locality, type of vegetation and host plants were recorded in a field book. The plant names were revised according to Flora do Brasil.

The psyllids collected in the net were sucked with an entomological aspirator, stored in tubes containing 70% non-denaturated ethanol and properly labelled: date of collection, location, geographic coordinates and name of collector. The collections were made with the permits of IBAMA/SISBIO numbers 13362 and 11832 - Permanent license for the collection of zoological material and 41169 - Permits for activities with scientific purpose for the preservation areas: Pantanal Mato-grossense National Park and Chapada dos Guimarães, MT state.

All samples were taken to the Southern Amazon Biological Collection Entomology Laboratory - ABAM at the Federal University of Mato Grosso - UFMT, Sinop University Campus, where, with the aid of a stereoscopic microscope, they were sorted and the adults (male and

female) and the immatures were counted.

Specimens were identified by DB using the psyllid collection of the NHMB and following publications with identification keys and descriptions: families, subfamilies and genera: Brown and Hodkinson (1988), Burckhardt (1994), Burckhardt *et al.* (1999) and Burckhardt and Queiroz (2020); *Diaphorina* Kuwayama, 1908: Mathur (1975); *Isogonoceraia* Tuthill, 1964: White and Hodkinson (1980); *Euphalerus* Schwarz, 1904: Burckhardt and Guajará (2000); *Pseudophacopteron* Enderlein, 1921: Malenovský *et al.* (2015); *Tainarys* Brèthes, 1920: Burckhardt and Queiroz (2017); *Trioza* Foerster, 1848: Santana and Burckhardt (2001), Burckhardt *et al.* (2017). Vouchers are deposited in the following collections: DZUP - Coleção Entomológica Padre Jesus Santiago Moure, Centro Politécnico, Universidade Federal do Paraná, Curitiba, Paraná, Brazil; MZSP - Museu de Zoologia da Universidade de São Paulo, São Paulo, São Paulo, Brazil; NHMB - Naturhistorisches Museum, Basel, Switzerland.

In the text, the following Brazilian states are cited: Acre (AC), Alagoas (AL), Amazonas (AM), Bahia (BA), Ceará (CE), Espírito Santo (ES), Goiás (GO), Maranhão (MA), Mato Grosso (MT), Mato Grosso do Sul (MS), Minas Gerais (MG), Pará (PA), Paraíba (PB), Paraná (PR), Pernambuco (PE), Piauí (PI), Rio de Janeiro (RJ), Rio Grande do Sul (RS), Roraima (RR), Santa Catarina (SC), São Paulo (SP), Sergipe (SE), Tocantins (TO) as well as Distrito Federal (DF).

Results and discussion

The collection areas involved the three biomes present in Mato Grosso and covered 30 municipalities (Acorizal, Alto Garças, Barão de Melgaço, Cáceres, Chapada dos Guimarães, Claudia, Colíder, Cotriguaçu, Cuiabá, Diamantino, Guarantã do Norte, Itaúba, Itiquira, Juína, Lucas do Rio Verde, Nobres, Nova Guarita, Nova Mutum, Nova Santa Helena, Nova Ubiratã, Poconé, Porto dos Gaúchos, Rosário Oeste, Santa Carmem, Santo Antônio do Leverger, Sinop, Sorriso, Tabaporã, Terra Nova do Norte and Vera) resulting in the collection of 29 described genera (*Allophorina**, *Apsyllopsis*, *Blastopsylla*, *Calophya**, *Caradocia**, *Ciriactremum**, *Colophorina*, *Diaphorina*, *Diclidophlebia*, *Epiacizzia**, *Eucersopsylla*, *Euphalerus*, *Euryconus*, *Glycaspis*, *Heteropsylla*, *Isogonoceraia*, *Jataiba*, *Leuronota*, *Limataphalara*, *Mastigimas*, *Mitropsylla*, *Padaukia*, *Paracarsidara*, *Phacosemoides*, *Platycorypha*, *Pseudophacopteron*, *Trioza*, *Trioza*, *Trioza*, and *Tuthillia*) (*genera without named species in MT) and several undescribed genera.

Over 50 species were collected in the state of Mato Grosso, many which undescribed. Of these, 24 described species were identified, five of them new to the state of Mato Grosso: *Diaphorina citri* Kuwayama, 1908, *Heteropsylla caldwelli* Burckhardt, 1987, *Pseudophacopteron longicaudatum* Malenovský *et al.*, 2015, *Tainarys myracrodru* Burckhardt and Queiroz, 2017 and *Trioza struthanthi* Burckhardt *et al.* 2017 (Figure 1). For these species, the distribution is revised, being detailed by states in Brazil and municipalities in MT state, adding, for some of them, new records for other Brazilian states, as presented below.

Aphalaridae

Aphalarinae

Limataphalara lautereri Burckhardt and Queiroz, 2013.

Distribution. Brazil: MS, MT (Sinop 11°52'17.2"S, 55°35'44.6"W; Sorriso 12°25'43.5"S, 55°47'47.5"W; 12°25'42.3"S, 55°47'46.8"W; 12°25'27.8"S, 55°51'01.2"W; Tabaporã 11°18.828'S, 55°57.691'W; 11°20'00.0"S, 55°50'30.0"W), PA (BURCKHARDT; QUEIROZ, 2013). Vouchers: NHMB 00002992, NHMB 00002993, NHMB 00003024.

Host-plant. *Nectandra cuspidata* Nees and Mart. (Lauraceae) (BURCKHARDT; QUEIROZ, 2013).

Rhinocolinae

Tainarys myracrodru Burckhardt and Queiroz, 2017.

New record. MT (Cuiabá 15°36'34.6"S, 56°03'54.7"W; road MT 251 to Chapada dos Guimarães,

Restaurante Chapadão, 170 m, 25.vii.2018, road side vegetation, Queiroz D. L.). Vouchers: NHMB.

Distribution. Brazil: DF, MG, MS, SP (BURCKHARDT; QUEIROZ, 2017).

Host plant. *Astronium graveolens* Jacq., *Myracrodruon rundeuva* Allemão (Anacardiaceae) (BURCKHARDT; QUEIROZ, 2013).

Spondyliaspidae

Blastosylla occidentalis Taylor, 1985.

Distribution. Originating from Australia, introduced into New Zealand and several countries in Africa, the Americas, Asia and Europe (OUVRARD, 2019). Brazil: BA, CE (QUEIROZ *et al.*, 2018), GO (BURCKHARDT *et al.*, 1999), MG, MS (BURCKHARDT; QUEIROZ, 2012), MT (Cuiabá 15°36'34.6"S, 56°03'54.7"W – SANTANA, 2008), Poconé 16°21'09.7"S, 56°28'32.9"W; Sinop 11°51'45.5"S, 55°22'43.8"W; Sorriso 12°23'35.34"S, 055°47'33.50"W), PA (SALIBA *et al.*, 2019) PR, SP (SANTANA, 2008), RS (QUEIROZ *et al.*, 2018). Vouchers: NHMB.

Host-plant. Several species of *Corymbia* and *Eucalyptus* (Myrtaceae) (BURCKHARDT *et al.*, 1999; OUVARD, 2019).

Glycaspis brimblecombei Moore, 1964.

Distribution. Originating from Australia, introduced into New Zealand and several countries in Africa, the Americas, Asia and Europe (OUVRARD, 2019), Brazil: BA, DF, ES, GO, MG, MS, MT (Sinop 11°51'45.5"S, 55°22'43.8"W; Sorriso 12°25'42.3"S, 55°47'46.8"W), PA (SALIBA *et al.*, 2019) PE, PR, RS, SC, SP, TO (BURCKHARDT; QUEIROZ, 2012; SILVA *et al.*, 2013). Vouchers: NHMB 00003055.

Host-plant. *Eucalyptus* sp. (Myrtaceae).

Calophyidae

Mastigimatininae

Mastigimas anjosi Burckhardt *et al.* 2011.

Distribution. Trinidad, Venezuela (BURCKHARDT; QUEIROZ; DROHOJOWSKA, 2013), Brazil: MG, MT (Sinop 12°23'35.34"S, 55°47'33.50"W; Sorriso 12°25'38.10"S, 55°47'44.60"W), PR, RS, SP (BURCKHARDT *et al.*, 2011; BURCKHARDT; QUEIROZ, 2012; BURCKHARDT; QUEIROZ; DROHOJOWSKA, 2013). Vouchers: NMB-PSYLL0005885.

Host-plant. *Cedrela fissilis* Vell. and *Toona ciliata* M. Roem. var. *australis* (Meliaceae) e (QUEIROZ; BURCKHARDT; ANJOS, 2013).

Liviidae

Euphyllurinae

Diaphorina citri Kuwayama, 1908.

New record. MT (Cuiabá 15°34'21.4"S, 56°05'26.1"W, 22.viii.2012, 180 m, D. L. Queiroz). Vouchers: NHMB DLQ333.

Distribution. Originating from Asia, introduced into the Americas, Iran, the Arabian Peninsula, Réunion, Kenya, Nigéria and Tanzania (OUVRARD, 2019). In Brazil: AL, BA, CE, GO, MA, MG, PA, PE, PR, RJ, RR, SE, SP (BURCKHARDT; QUEIROZ, 2012; FARIAS *et al.*, 2018).

Host-plant. *Citrus* spp., *Murraya paniculata* (L.) (Rutaceae) (HALBERT; MANJUNATH, 2014).

Phacopterionidae

Phacosemoides sicki Costa Lima and Guitton, 1962.

Distribution. Brazil: MT (Sorriso 12°33'6"S, 55°43'17"W – MAZZARDO *et al.*, 2017), PA (BURCKHARDT; QUEIROZ, 2012). Vouchers: NHMB 00002999, NHMB 00003000, NHMB 00003001, NHMB 00003002.

Host-plant. Unknown (BURCKHARDT; QUEIROZ, 2012).

Pseudophacopteron longicaudatum Malenovský *et al.* 2015.

New record. MT (Cuiabá - 15°34'36.0"S, 56°06'06.0"W, 200 m, 3.xi.2012, D. L. Queiroz 57). Vouchers: NHMB #DLQ358.

Distribution. Brazil: DF, GO, MG, MS, PR, SP (MALENOVSKÝ *et al.*, 2015).

Host plant. *Aspidosperma tomentosum* Mart. and Zucc. and *A. macrocarpon* Mart. and Zucc. (Apocynaceae) (MALENOVSKÝ *et al.*, 2015).

Psyllidae

Ciriacreminae

Isogonoceraia divergipennis White and Hodkinson, 1980.

New record. MA (Araioses 3°03'48.0"S, 41°59'54.0"W, Povoado Parangi, BR-402 9 km from MA-PI border, 30 m, 29.vi.2016); RS (Barra do Guaraí 30°12'28.1"S, 57°33'31.0"W, Saladeira/along Rio Quará, Burckhardt D. and Queiroz D. L.); RJ (Itatiaia 22°27'45.4"S, 44°35'33.0"W, Parque Nacional do Itatiaia, park entrance, 600 m, 16–17.iv.2019, degraded Atlantic forest, Burckhardt D. and Queiroz D. L.; 22°28'57.7"S, 44°34'14.2"W, Parque Nacional do Itatiaia, park entrance, 16–17.iv.2019, degraded Atlantic forest, Burckhardt D. and Queiroz D. L.; 22°27'45.4"S, 44°35'33.0"W, Parque Nacional do Itatiaia, park entrance, 16–17.iv.2019, degraded Atlantic forest); SC (Pomerode 26°44'42.0"S, 49°10'36.0"W, 60–110 m, 29.iv.2013, park vegetation, degraded Atlantic forest; sweeping vegetation, Burckhardt D. and Queiroz D. L.). Vouchers: NMB-PSYLL0005240, NMB-PSYLL0005226.

Distribution. Brazil: BA (WHITE; HODKINSON 1980), MG, MT (Sorriso 12°23'35.34"S, 55°47'33.50"W – MAZZARDO *et al.* 2016: 2017), Cáceres 16°08'02.5"S, 57°41'34.4"W; 16°07'48.0"S, 57°41'02.6"W; Chapada dos Guimarães 15°27'54.60"S, 55°43'11.90"W; Poconé 15°56'11.7"S, 56°55'55.8"W; Sinop 11°51'06.2"S, 55°31'31.9"W; 12°00'62.4"S, 55°14'35.4"W), PR, SP (SANTANA; BURCKHARDT, 2002; BURCKHARDT; QUEIROZ, 2012).

Host-plant. *Cenostigma pluviosum* (DC.) E. Gagnon and G.P. Lewis var. *pluviosum* (Fabaceae) (BURCKHARDT; QUEIROZ, 2012).

Heteropsylla caldwelli Burckhardt, 1987.

New record. GO (Alto Paraíso do Goiás 14°09'37.4"S, 47°47'29.4"W, near São Jorge, Parque Nacional da Chapada dos Veadeiros, around researchers' accommodations, 1060 m, 15.ii.2018, cerrado vegetation, planted trees, Queiroz D. L. and Burckhardt D.), MT (Cáceres 16°02'23.7"S, 57°33'57.8"W, 144m, 9.iii.2017, Ben-Hur, R. e Barreto, M.R. #455); SP (Piracicaba 22°42'38.9"S, 47°37'55.9"W, Universidade de São Paulo, ESALQ (Escola Superior de Agricultura "Luiz de Queiroz") campus, 550 m, 6.ii.2018, park vegetation; Santa Maria da Serra 22°40'56.3"S, 48°18'17.6"W, Mina Velha, 450 m, 7.ii.2018, vegetable and fruit gardens, edge of cerrado; Queiroz D. L. and Burckhardt D.). Vouchers: NMB-PSYLL0005236.

Distribution. Brazil: MG, PR, RS (MACHADO *et al.*, 2017).

Host-plant. *Albizia edwallii* (Hoehne) Barneby and J. W. Grimes, *Albizia hassleri* (Chodat), *Anadenanthera colubrina* (Vell.) Brenan, *Anadenanthera peregrina* var. *falcata* (Benth.), *Enterolobium contortisiliquum* (Vell.), *Senegalia polyphylla* (DC.) Britton and Rose (Fabaceae) (MACHADO *et al.*, 2017).

Jataiba basifistula Burckhardt and Queiroz 2020.

Distribution. Brazil: AC, MT (Rosário Oeste 14°31'41.5"S, 55°48'16.9"W) (BURCKHARDT; QUEIROZ, 2020). Vouchers: NHMB.

Host plant. Unknown (BURCKHARDT; QUEIROZ, 2020).

Mitropsylla copaiferae Burckhardt and Queiroz 2020.

Distribution. Brazil: GO, MG, MT (Barão de Melgaço 16°20'18.6"S, 55°49'18.1"W; Nova Mutum 13°47'16.1"S, 56°17'25.8"W; Sorriso 12°32'46.0"S, 55°43'32.2"W; 12°25'30.0"S, 55°47'48.1"W;

12°24'19.1"S, 55°49'25.7"W; 12°24'04.0"S, 55°49'24.2"W), MS, SP (BURCKHARDT; QUEIROZ, 2020). Vouchers: MZSP #141(4)

Host-plant. *Copaifera langsdorffii* Desf., perhaps also *Copaifera marginata* Benth (BURCKHARDT; QUEIROZ, 2020).

Mitrapsylla gloriae Burckhardt and Queiroz 2020.

Distribution. Brazil: DF, GO, MT (Barão de Melgaço 16°20'18.6"S, 55°49'18.1"W; Cuiabá 15°20'43.1"S, 55°50'42.0"W; Itiquira 17°30'50.0"S, 54°44'24.4"W), MS, MG, PR, SC, SP (BURCKHARDT; QUEIROZ, 2020). Vouchers: NMB-PSYLL0004730, NMB-PSYLL0004854.

Host-plant. *Copaifera langsdorffii* Desf., *C. marginata* Benth. (Fabaceae) (BURCKHARDT; QUEIROZ, 2020).

Macrocorsinae

Apsyllopsis mexicana (Crawford 1914).

Distribution. Mexico and Panama (BURCKHARDT; QUEIROZ, 2020). Brazil: CE, GO, MA, MG, MS, MT (Acorizal 15°11'42.0"S, 56°15'24.0"W; Alto Garças 16°54'00.0"S, 53°39'18.0"W; Chapada dos Guimarães 15°28'19.30"S, 55°45'57.70"W; 15°28'05.10"S, 55°45'32.00"W; Cuiabá 15°36'34.6"S, 56°03'54.7"W; Diamantino 13°50'58.70"S, 56°28'51.50"W; Guarantã do Norte 09°57'44.0"S, 54°53'24.8"W; Lucas do Rio Verde 13°07'01.60"S, 55°53'52.10"W; Nobres 14°34'13.60"S, 55°51'23.30"W; Nova Guarita 10°13'16.90"S, 55°22'52.40"W; 10°12'04.70"S, 55°25'52.20"W; Nova Mutum 13°42'08.30"S, 56°04'16.30"W; 13°47'50.60"S, 56°01'41.10"W; 13°47'35.80"S, 55°56'09.20"W; Poconé, Santo Antônio do Leverger 16°14'43.8"S, 55°47'05.3"W; Sinop 11°51'54.0"S, 55°31'18.0"W; Sorriso 12°25'34.00"S, 55°47'39.70"W; Terra Nova do Norte 10°36'23.10"S, 55°04'17.90"W), PA (BURCKHARDT; QUEIROZ, 2012; 2020). Vouchers: NHMB 00003041, NMB-PSYLL0005709, NMB-PSYLL0005734, NMB-PSYLL0005751.

Host-plant. *Hymenaea* spp. (Fabaceae) (BURCKHARDT; QUEIROZ, 2020).

Colophorina bororo Burckhardt and Queiroz 2020.

Distribution. Brazil: MT (Sorriso 12°24'03.2"S, 55°49'23.9"W; 12°24'19.8"S, 55°49'25.7"W (BURCKHARDT; QUEIROZ, 2020). Vouchers: NMB-PSYLL0006498, NMB-PSYLL0006499.

Host-plant. *Copaifera oblongifolia* Mart. (Fabaceae) (BURCKHARDT; QUEIROZ, 2020).

Colophorina tupi Burckhardt and Queiroz 2020.

Distribution. Brazil: BA, GO, MG, MS, MT (Barão de Melgaço 16°20'18.6"S, 55°49'18.1"W; Cuiabá 15°20'43.1"S, 55°50'42.0"W), PR, SP (BURCKHARDT; QUEIROZ, 2020). Vouchers: NMB-PSYLL0005634, NHMB 00003039.

Host-plant. *Copaifera langsdorffii* Desf. (Fabaceae) (BURCKHARDT; QUEIROZ, 2020).

Euphalerus clitoriae Burckhardt and Guajará 2000.

New record. CE (Tianguá 3°39'36.0"S, 40°56'54.0"W; Serra da Ibiapaba, BR-222 km 302, 480 m, 4.vii.2016; sweeping vegetation, Queiroz D. L. and Burckhardt D.), GO (Mossâmedes, 16°07'04.8"S, 50°12'14.4"W, 690 m, 20.ii.2018, isolated trees in city and along pasture; sweeping vegetation), PA (Belém 1°24'54.0"S, 48°25'18.0"W, Embrapa campus, 20 m, 8-15.iv.2013, plantations and edge of degraded Amazonian forest; sweeping vegetation, Queiroz D. L. and Burckhardt D.), PR (Antonina 25°14'37.8"S, 48°45'04.0"W, Usina Parigot de Souza, 28 m, 17-20.vii.2017, roadside vegetation, Atlantic forest; sweeping vegetation, Queiroz D. L. and Burckhardt D.), SC (Pomerode 26°46'30.0"S, 49°13'06.0"W, 60-110 m, 29.iv.2013, park vegetation, degraded Atlantic forest; sweeping vegetation, Queiroz D. L. and Burckhardt D.). Vouchers: NHMB 00003040, NMB-PSYLL0005718, NMB-PSYLL0005715, NMB-PSYLL0005748, NMB-PSYLL0005213.

Distribution. Brazil: AL, BA, MG, MT (Cuiabá 15°34'21.4"S, 56°05'26.1"W; Nobres 14°32'41.70"S, 55°51'46.60"W; 14°32'43.30"S, 55°51'50.40"W; 14°34'13.60"S, 55°51'23.30"W; Rosário Oeste

14°34'13.6"S, 55°51'23.3"W; Sinop, Sorriso 12°25'31.1"S, 55°51'01.8"W; Tabaporã 11°18'48.0"S, 55°57'42.0"W), SP, PE, RJ (BURCKHARDT; QUEIROZ, 2012).

Host-plant. *Clitoria fairchildiana* R. A. Howard (Fabaceae) (BURCKHARDT; QUEIROZ, 2012).

Psyllinae

Padaukia macrolobii Burckhardt and Queiroz 2018.

Distribution. AM, MT (Colider 10°32'23.60"S, 55°28'38.20"W), RR (BURCKHARDT; QUEIROZ, 2018). Vouchers: MZSP #128(5).

Host-plant. *Macrolobium acaciifolium* (Benth.) Benth. (Fabaceae, Caesalpinoideae) (BURCKHARDT; QUEIROZ, 2018).

Platycorypha cultrata Burckhardt and Queiroz 2020.

Distribution. Brazil: MT (Chapada dos Guimarães 15°28'19.2"S, 55°45'57.6"W; 15°27'54.7"S, 55°43'12.0"W; Cuiabá 15°36'34.6"S, 56°03'54.7"W; Nova Mutum 13°35'34.8"S, 56°03'40.3"W) (BURCKHARDT; QUEIROZ, 2020). Vouchers: MZSP #587.

Host plant. Adults were collected on *Hymenaea courbaril* L. (Fabaceae) which is a likely host (BURCKHARDT; QUEIROZ, 2020).

Platycorypha leptopeus Burckhardt and Queiroz 2020.

Distribution. Brazil: MT (Sinop 11°52'24.6"S, 55°28'23.2"W) (BURCKHARDT; QUEIROZ, 2020). Vouchers: NMB-PSYLL0006443.

Host plant. Unknown (BURCKHARDT; QUEIROZ, 2020).

Platycorypha rostrata Burckhardt and Queiroz 2020.

Distribution. Brazil: MG, MS, MT (Nova Guarita 10°12'04.7"S, 55°25'52.3"W; Sinop 11°51'06.5"S, 55°30'03.6"W; Sorriso 12°32'46.0"S, 55°43'32.2"W); PI (BURCKHARDT; QUEIROZ, 2019). Vouchers: NMB-PSYLL0006455, NMB-PSYLL0006456.

Host plant. *Hymenaea* (Fabaceae) which is a likely host (BURCKHARDT; QUEIROZ, 2020).

Triozidae

Trioza tabebuiae Burckhardt and Santana 2001.

New record. MG (Três Marias 18°13'42.0"S, 45°13'12.0"W, BR 040, km 250, 760 m, 10.vii.2012, scrub along road; sweeping vegetation, Queiroz D. L. and Burckhardt D.; Presidente Olegário 18°20'28.3"S, 46°29'47.0"W, between Presidente Olegário and Lagamar, 950 m, 12.vii.2012, scrub along road; Queiroz D. L. and Burckhardt D.; Uberlândia, 19°11'01.3"S, 48°23'46.0"W, Panga, 810 m, 8.ii.2018, cerrado; Queiroz D. L. and Burckhardt D.), SP (Piracicaba 22°42'38.9"S, 47°37'55.9"W; Queiroz D. L. and Burckhardt D.), SC (Pomerode 26°44'42.0"S, 49°10'36.0"W, road Pomerode to Timbó, SC-416, 4 km from Timbó, Pousada Paraíso da Pesca, 270–380 m, 29.iv.2013, remnants of Atlantic forest; Queiroz D. L. and Burckhardt D.). Vouchers: NMB-PSYLL0005629, NMB-PSYLL0005625, NMB-PSYLL0005578, NMB-PSYLL0005643.

Distribution. Brazil: PA (BURCKHARDT; QUEIROZ, 2012), MT (Sorriso 12°24'08.10"S, 55°49'24.20"W) (MAZZARDO *et al.*, 2017).

Host-plant. *Handroanthus* spp. (Bignoniaceae) (BURCKHARDT; QUEIROZ, 2012).

Trioza struthanthi Burckhardt *et al.* 2017.

New record: MT (Cuiabá 15°22'46.2"S, 55°50'33.4"W, road to PN Chapada dos Guimarães, Rio Paciência, 300 m, 17.iii.2019, Queiroz D. L.), SP (São José do Barreiro 22°44'49.9"S, 44°37'00.1"W, Queiroz D. L. and Burckhardt D.). Vouchers: NMB-PSYLL0004455, NMB-PSYLL0004456, NMB-PSYLL0004457.

Distribution. Brazil: MG, PR, RS, SC (BURCKHARDT *et al.* 2017).

Host plant. *Struthanthus uraguensis* G. Don (Loranthaceae) (BURCKHARDT *et al.*, 2017).

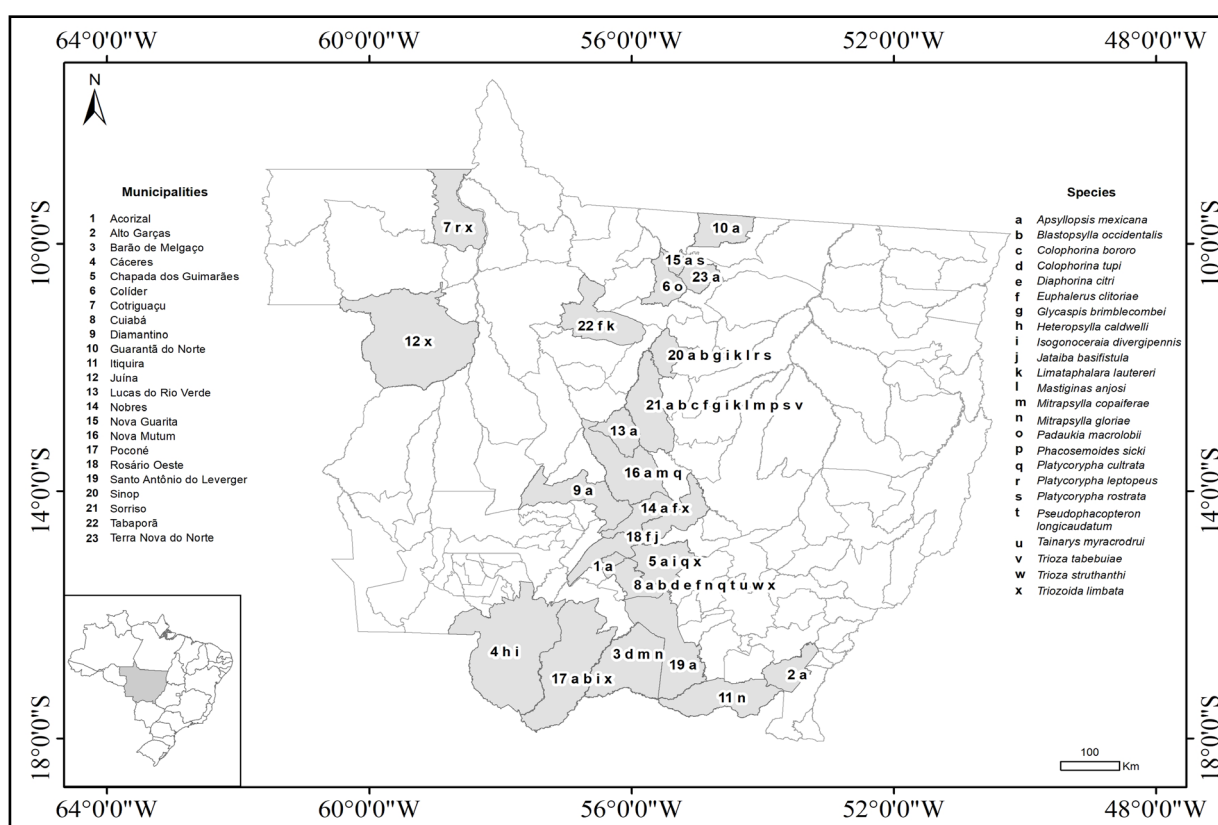
Triozoida limbata (Enderlein, 1918).

Distribution. América Central and do Sul (OUVRARD, 2019). Brazil: AM, BA, CE, ES, MA, MG, MS, MT (Chapada dos Guimarães 15°27'54.60"S, 55°43'11.90"W; Cotriguaçu 09°51'29,1"S, 058°14'92,7"W; 09°51'17.50"S, 58°14'55.60"W; 09°52.121"S, 058°13.779"W; 09°52'10.1"S, 058°13'40.9"W; 09°52'10.70"S, 58°13'43.70"W; 09°52'13.50"S, 58°13'42.90"W; Cuiabá 15°34'21.4"S, 56°05'26.1"W; Juína 11°30'04.10"S, 58°59'18.10"W; Nobres 14°33'11.00"S, 55°49'35.80"W; 14°33'00.90"S, 55°50'11.90"W; Poconé 16°30'24.60"S, 56°24'48.40"W), PA, PB, PE, PR, RJ, RR, SC, SP (QUEIROZ *et al.*, 2018; OUVRARD, 2019). Vouchers: NMB-PSYLL0005560, NMB-PSYLL0005635, NMB-PSYLL0005718.

Host-plant. *Psidium guajava* L. (Myrtaceae) (BURCKHARDT; QUEIROZ, 2012).

Figure 1 – Distribution of psyllid species in the state of Mato Grosso

Figura 1 – Distribuição de espécies de psilídeos no estado de Mato Grosso



Source: Authors (2019)

Regarding the distribution of species in relation to biomes, four of the collected psyllids were found in the 3 regions. When analysed by biome, the Cerrado was the one with the highest diversity with 24 species collected, 09 of them only present in this biome, followed by the Amazon and the Pantanal with 18 and 8 species respectively. However, this may be an artefact of uneven collecting efforts per biome. The Cerrado biome was with 48% the most sampled, followed by the Amazon (32%) and Pantanal (20%).

Considering the Cerrado-forest transition region, in this area were collected over 70% of all species of this work. For Silva and Bates (2002), in the savannah, a mosaic of savanna-forest transition regions corresponds to approximately 24% and dry forests correspond to 4% of the area. The regions comprised between the municipalities of Claudia and Gaúcha do Norte

(MT), are in the so-called transition zone of the Amazon and savannah domains, forming the division of the vegetation biomes of MT, being an area of strong pressure from selective logging (NUNES; SILVA; FERRAZ, 2017), highlighting the need for biodiversity inventories. Mainly or secondarily, the Amazon biome is present in 93 municipalities, the savannah Biome in 92 and the Pantanal in 15 municipalities out of 141 of the state.

In the Pantanal, the dry season varies in intensity (LOPES *et al.*, 2017) and depends on the distribution and amount of rainfall, which varies within and between years and sub-regions and is subject to burning, which brings additional stress to animals that inhabit the region, increasing its mortality. Although collections in the Pantanal were carried out in both dry and rainy seasons, few species (8) were found. Most psyllids are associated with new leaves and shoots with tender tissues. However, frequent heavy rains make establishment of insects on plants more difficult. In Pantanal the two seasons are well defined with one very dry and the other with torrential rain, it may be that the collections were not done at the best time to find the insect peaks. These results highlight the need for more collections in this biome, also observing the different phenological phases of the plants.

Species distribution is usually associated with the distribution of their host plants and, in the present study this was true for *Apsyllopsis mexicana*, *Blastopsylla occidentalis*, *Isogonoceraia divergipennis* and *Trioizoida limbata* that were collected from their respective hosts in all biomes. However, it is important to emphasize that more collections need to be performed to better characterize the distribution of species as well as other species may be collected.

The information presented here also broadens the knowledge on the geographical distribution of some pest psyllids, such as *Blastopsylla occidentalis*, *Diaphorina citri*, *Glycaspis brimblecombei*, *Mastigimas anjosi* and *Trioizoida limbata*, which are important for defining their coverage regions as well as for setting up the phytosanitary history based on pest fluctuation.

Conclusion

This article contributed 5 new records for the state of Mato Grosso. It also brings new records for the states of Ceará, Goiás, Maranhão, Minas Gerais, Pará, Paraná, Rio de Janeiro, Rio Grande do Sul, Santa Catarina and São Paulo.

Acknowledgements

For the support / funding: Conselho Nacional de Desenvolvimento Científico e Tecnológico Process 164887 / 2017-2, Pró-Reitoria de Pesquisa Project 417/2015. Fundação de Amparo à Pesquisa do Estado de Mato Grosso - Universal Notice 224315/2015. To the taxonomists M. L. Brotto and J. T. W. Motta (Municipal Botanical Museum, Curitiba, PR) for the identification of the host plants. For help in collecting: R. Ben-Hur (Universidade Federal de Mato Grosso - UFMT, Sinop, MT), T. Mazzardo (UFMT, Sinop, MT), L.A. Pezzini (UFMT, Sinop, MT), G.D. Cort (Embrapa, Colombo, PR), P.S.B. Pucci (Embrapa, Colombo, PR) and D.I. Rendón-Mera (Universidade Federal do Paraná - UFPR, Curitiba, PR). The authors thank the anonymous reviewers.

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