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Scientific Note

New host records for fruit flies and parasitoids in guavira [*Campomanesia adamantium* (Cambess.) O. Berg; Myrtaceae] in Mato Grosso do Sul, Brazil

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Abstract. Fruit flies are important pests of fruit crops and may also infest native fruit species under cultivation. Guavira (*Campomanesia adamantium* (Cambess.) O. Berg; Myrtaceae), a native Cerrado fruit with increasing agronomic potential in central Brazil, remains poorly studied with respect to its associated frugivorous flies and parasitoids. In this study, ripe guavira fruits were collected in a cultivated area in Campo Grande, Mato Grosso do Sul, Brazil, and maintained under laboratory conditions for insect emergence. A total of 1,166 larvae were obtained, of which 1,070 reached the pupal stage and 860 completed development. The fruit flies obtained were *Anastrepha fraterculus* (Wiedemann, 1830), *Anastrepha obliqua* (Macquart, 1835), *Anastrepha sororcula* Zucchi, 1979, *Anastrepha striata* Schiner, 1868, *Ceratitis capitata* (Wiedemann, 1824), and *Neosilba pendula* (Bezzi, 1919), whereas the parasitoids were *Doryctobracon areolatus* (Szépligeti, 1911), *Utetes anastrephae* (Viereck, 1913), *Opius bellus* Gahan, 1930, and *Ganaspis pelleranoi* (Brèthes, 1924). *Anastrepha fraterculus* was the most abundant fruit fly species and *D. areolatus* the most frequent parasitoid. The results expand the known entomofauna associated with cultivated guavira and include the first records of *A. striata*, *A. obliqua*, *C. capitata*, *U. anastrephae*, *O. bellus*, and *G. pelleranoi* from *C. adamantium* fruits in Mato Grosso do Sul, Brazil.

Keywords: *Anastrepha fraterculus*, *Ceratitis capitata*, *Neosilba pendula*, Biological control, Host association.

Fruit flies (Diptera: Tephritoidea) are among the most important pests of fruit crops in Brazil, causing economic losses through fruit damage and the costs associated with their control (Morgante 1991; Nava & Botton 2010). In addition to commercial fruit crops, native fruit species may also serve as hosts for frugivorous flies and their parasitoids.

Guavira (*Campomanesia adamantium* (Cambess.) O. Berg; Myrtaceae), a native species of the Brazilian Cerrado, is attracting increasing agronomic interest in Mato Grosso do Sul due to its regional importance and cultivation potential (AGRAER 2022). However, information on the fruit fly species associated with cultivated guavira fruits remains limited. Thus, this study reports the fruit flies and associated parasitoids obtained from cultivated guavira fruits in Campo Grande, Mato Grosso do Sul, Brazil.

Ripe guavira fruits (20 kg) were collected in November 2022 from the cultivation area of the Research Center of the Agency for Agrarian Development and Rural Extension (AGRAER/CEPAER), in Campo Grande, Mato Grosso do Sul, Brazil (20°27'00"S, 54°37'00"W; 537 m a.s.l.). Fruits showing signs of infestation were collected directly from the plants and transported to the Entomology Laboratory of the Catholic University Dom Bosco (UCDB).

In the laboratory, the fruits were maintained in rearing units adapted from those described by Uchôa-Fernandes & Zucchi (1999) (Fig. 1) to allow larval recovery, pupation, and adult emergence. Emerged flies and parasitoids were preserved in 96% ethanol and identified using specialized taxonomic keys (Malavasi & Zucchi 2000; Wharton et al. 1997; Uchôa et al. 2023; Barreto et al. 2023; Uchôa & Bomfim 2023).

A total of 1,166 larvae were obtained from the collected fruits. Of these, 1,070 reached the pupal stage and 860 completed development to adulthood, resulting in an overall viability of approximately 74%.

Abundance and relative frequency within each group are summarized in Tab. 1. Among the emerged flies, 760 individuals were identified, including 623 specimens of the genus *Anastrepha* Schiner, 1868, 71 of *Ceratitis capitata* (Wiedemann, 1824), and 66 of *Neosilba pendula* (Bezzi, 1919). The genus *Anastrepha* was represented by four identified species: *Anastrepha fraterculus* (Wiedemann, 1830) (189 specimens), *Anastrepha obliqua* (Macquart, 1835) (103), *Anastrepha sororcula* Zucchi, 1979 (81), and *Anastrepha striata* Schiner, 1868 (76). In addition, 174 male *Anastrepha* specimens were not identified to species level due to the lack of appropriate keys. Although *Ceratitis capitata* was present, its relative frequency (9.3%) was lower than that of *Anastrepha* spp., suggesting a predominance of native tephritids in this host.

A total of 100 adult parasitoids were obtained, including *Doryctobracon areolatus* (Szépligeti, 1911) (46 specimens), *Utetes anastrephae* (Viereck, 1913) (40), *Opius bellus* Gahan, 1930 (12), and *Ganaspis pelleranoi* (Brèthes, 1924) (2). *Doryctobracon areolatus* was the most frequently recovered parasitoid species and is widely reported as one of the main parasitoids of fruit flies in Brazil (Wharton et al. 1997; Paranhos et al. 2019; Uchôa et al. 2023).

The species recorded are consistent with previous reports involving guavira and other Myrtaceae species in Brazil (Uchôa-Fernandes et al. 2002; Santos et al. 2018; Almeida et al. 2019; Silva et al. 2019). Likewise, parasitoids of the genera *Doryctobracon* Enderlein, 1920, *Utetes* Förster, 1862, *Opius* Wesmael, 1835, and *Ganaspis* Förster, 1869

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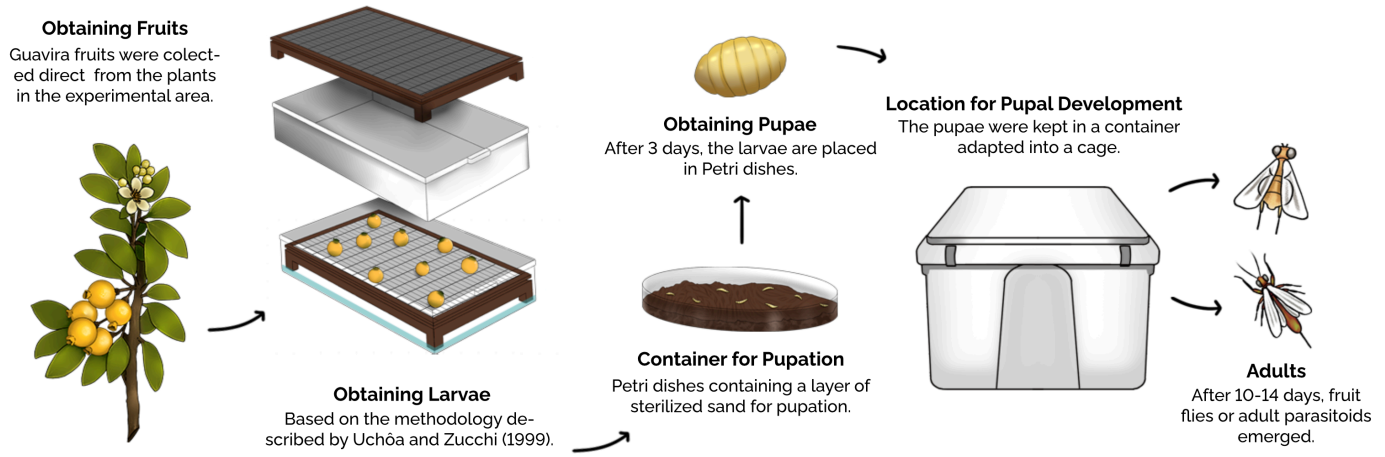


Figure 1. Rearing units used for the recovery of fruit flies (Diptera: Tephritoidea) and their parasitoids from guavira fruits, *Campomanesia adamantium* (Cambess.) O. Berg (Myrtaceae), adapted from Uchôa-Fernandes & Zucchi (1999). Fruits were held until larval recovery, pupation, and adult emergence. Illustration by Lucas Corrêa (@Lucartoon).

Table 1. Abundance and frequency (%) of fruit flies and associated parasitoids obtained from *Campomanesia adamantium* (Cambess.) O. Berg (Myrtaceae) fruits in Campo Grande, Mato Grosso do Sul, Brazil.

Taxon	Total (n)	Male	Female	Frequency* (%)
Fruit flies				
Anastrepha fraterculus (Wiedemann, 1830)	189	–	–	24.9
Anastrepha obliqua (Macquart, 1835)	103	–	–	13.6
Anastrepha sororcula Zucchi, 1979	81	–	–	10.7
Anastrepha striata Schiner, 1868	76	–	–	10.0
Anastrepha spp.	174	174	–	22.9
Ceratitis capitata (Wiedemann, 1824)	71	–	–	9.3
Neosilba pendula (Bezzi, 1919)	66	–	–	8.7
Total flies	760	–	–	100.0
Parasitoids				
Doryctobracon areolatus (Szépligeti, 1911)	46	17	29	46.0
Utetes anastrephae (Viereck, 1913)	40	14	26	40.0
Opius bellus Gahan, 1930	12	10	2	12.0
Ganaspis pelleranoi (Brèthes, 1924)	2	2	0	2.0
Total parasitoids	100	43	57	100.0

***** Frequency (%) was calculated based on the total number of individuals within each group (fruit flies or parasitoids).

have previously been associated with fruit flies infesting Myrtaceae fruits.

An important contribution of this study is the documentation of new host association records for fruit flies and parasitoids in *C. adamantium* in Mato Grosso do Sul. These include the first records of *A. striata*, *A. obliqua*, and *C. capitata*, as well as the parasitoids *U. anastrephae*, *O. bellus*, and *G. pelleranoi*, associated with guavira fruits in this state.

These findings indicate that cultivated guavira may host fruit fly species of economic importance, as well as parasitoids with potential relevance for biological control programs. These new records also highlight the potential role of *C. adamantium* as a reservoir for both pest species and their natural enemies in agroecosystems, providing baseline information for monitoring and integrated pest management strategies in native fruit systems (Parra 2019; Paranhos et al. 1999).

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Conflict of Interest Statement

The authors declare that they have no conflict of interest.

Authors' Contributions

BF: Conceptualization, Data curation, Investigation, Methodology, Writing – original draft. ARR: Supervision, Validation, Writing – review & editing. DEN: Methodology, Validation, Writing – review & editing. AMPD: Investigation, Validation, Writing – review & editing. ACAA: Resources, Investigation. CEO: Supervision, Validation, Writing – review & editing.

Ethical Approval

Not applicable.

Data availability

The data supporting the findings of this study are available in the Mendeley Data repository at https://doi.org/10.17632/mmmmp9t92z.1.

Generative AI Statement

The authors declare that no artificial intelligence (AI) tools or AI-assisted technologies were used in the conception, preparation, writing, data analysis, or generation of figures for this manuscript.

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