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Short Communication

First record of *Anastrepha bahiensis* Lima (Diptera: Tephritidae) infesting fruits of *Averrhoa carambola* L. in the eastern Amazon, Brazil

Thayná Pereira Façanha^a, Walkymário de Paulo Lemos^{ib},*, Leandro Carvalho da Silva^b, Ana Ruth Ferreira Ramos^b, Janisete Gomes Silva^c

^a Universidade Federal do Pará, Programa de Pós Graduação em Agriculuras Amazônicas (PPGAA), Belém, PA, Brazil

^b Embrapa Amazônia Oriental, Laboratório de Entomologia, Belém, PA, Brazil

^c Universidade Estadual de Santa Cruz, Departamento de Ciências Biológicas, Ilhéus, BA, Brazil



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ABSTRACT

We report for the first time field infestation under natural conditions by *Anastrepha bahiensis* on star fruit (*Averrhoa carambola* L., Oxalidaceae) in the state of Pará, Eastern Amazon, Brazil. This report reinforces the importance of field infestation studies on fruit flies in the Brazilian Amazon.

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Anastrepha Schiner, 1868 is the most diverse and economically important genus within the Tephritidae family in the New World, where it is endemic. This genus comprises over 300 species distributed in 28 species groups based on morphology and host use (Uramoto et al., 2008; Uchôa and Nicácio, 2010; Norrbom et al., 2012, 2018).

In Brazil, there are currently 121 species of *Anastrepha*, out of which 61 species have been reported in the northern region of Brazil (Zucchi and Moraes, 2008), and 22 species have been reported in the state of Pará, in the Eastern Amazon (Lemos et al., 2011a). The majority of the most polyphagous and economically important species belong to the *fraterculus* group, which currently encompasses 38 species such as *Anastrepha fraterculus* (Wiedemann, 1830), *A. obliqua* (Macquart, 1835), *A. sororcula* Zucchi, 1979, and *A. zenilldae* Zucchi, 1979 (Zucchi, 2000; Norrbom et al., 2018). However, depending on the region of the country, other species may assume primary pest status and be important due to the type of hosts they attack and their relative abundance (Lemos et al., 2011b).

Anastrepha bahiensis Lima, 1937 has already been reported in nine Brazilian states infesting a total of 14 hosts species in the families Annonaceae, Rosaceae, and Ulmaceae, with a marked preference for Moraceae, and Myrtaceae. In the Amazon region, this

species had been previously reported the in the states of Amazonas, Amapá, and Roraima (Zucchi and Moraes, 2008; Zucchi et al., 2011).

In a preliminary host survey (data unpublished), we detected *A. bahiensis* infesting star fruit (*Averrhoa carambola* L., Oxalidaceae), and thus, we wanted to confirm both new records of this species in the state of Pará as well as the newly reported host. Therefore, we collected star fruit in Marapanim (01°00'24.9"S, 047°38'00.3"W), in the northeastern region of the state of Pará in 2016. Two samplings were carried out. Ripe fruits were randomly collected from the trees and newly fallen fruit were collected from the ground. We counted, weighed, and placed the collected fruit in plastic trays with a layer of vermiculite, which were covered with voile cloth until larvae emerged and pupated. We placed all pupae obtained in 30-mL plastic containers with a layer of vermiculite and covered with voile cloth until emergence of adults. Voucher specimens were deposited at Embrapa Amazônia Oriental.

We collected a total of 41 fruits weighing 3 kg from which 130 fruit fly pupae were recovered. A total of 30 adults (3 ♂ and 27 ♀) emerged (23%). This low emergence may indicate that fruits of *A. carambola* are serving only as repositories for the fruit flies recorded in our study. According to Souza Filho (1999), infestation rates can indicate a particular fruit species importance as fruit flies host and be an indicator of population level, allowing to know the susceptibility of the host to a specific pest. However, plant species, their genotypes and climatic conditions are factors that influence the degree of infestation of fruit flies in different hosts (Branco, 1999).

* Corresponding author.

E-mail: walkymario.lemos@embrapa.br (W.P. Lemos).

The adults belonged to three distinct species: *A. obliqua*, *A. fraterculus*, and *A. bahiensis*, with 17, 7 and 3 individuals, respectively. The rates of puparia infestation by fruit were 3.7 (soil) and 2.7 (plant), and by weight were 47.7 (soil) and 17.8 (plant). Pupae viability rates ranged from 17.8 to 27.0% in plant and soil samples, respectively.

Our results report for the first time field infestation under natural conditions by *A. bahiensis* on *A. carambola* in the state of Pará, Eastern Amazon, Brazil. Until the beginning of this decade, there were records of *A. bahiensis* for only two Amazonian states: Amapá and Amazonas (Zucchi et al., 2011). In 2011, it was reported also in the state of Roraima (Marsaro Júnior et al., 2011). Therefore, the relevance of our research is that our results elucidated the current knowledge regarding the distribution of *A. bahiensis* in Brazil and also recognized yet another host in a new family to the list of 14 known hosts for *A. bahiensis* (Zucchi and Moraes, 2008). Star fruit is an exotic tree species in Brazil, and heretofore there were records of its infestation by only five tephritid species (*A. fraterculus*, *A. obliqua*, *A. sororcula*, *A. striata*, and *Ceratitis capitata*) in Pará (Lemos et al., 2011a).

The Brazilian Amazon is a vast and species-rich region with many different fruit-bearing species that host populations of tephritids. Lapses and gaps in monitoring and management could facilitate development of tephritid damage to fruit crops, and this may in turn allow tephritids to become an agronomic pest of regional importance. Our results reinforce the importance of ongoing and future field infestation studies on fruit flies in the Brazilian Amazon.

Contributors

All authors conceived the research and went to field to perform the experiment. The first author wrote a first version of the manuscript and all authors contributed equally reviewing critically the manuscript for important content. All authors approved the final version of this paper.

Conflicts of interest

The authors declare no conflicts of interest.

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