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New occurrences of *Anastrepha* Schiner (Diptera: Tephritidae) in the state of Minas Gerais, Brazil*

Novas ocorrências de **Anastrepha** *Schiner (Diptera: Tephritidae) no estado de Minas Gerais, Brasil*

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ABSTRACT: Occurrences of *Anastrepha barbiellinii* Lima, *Anastrepha connexa* Lima, *Anastrepha consobrina* (Loew), *Anastrepha kuhlmanni* Lima, *Anastrepha leptozona* Hendel, and *Anastrepha xanthochaeta* Hendel are recorded for the first time in the state of Minas Gerais, Brazil. The species were captured in McPhail traps baited with hydrolyzed protein (5%) in orchards of cultivated species and in a remnant of the Atlantic Forest in the municipality of Viçosa, Minas Gerais, or obtained from the collection of species deposited in the Regional Museum of Entomology (UFVB) of the Universidade Federal de Viçosa, *Campus* Viçosa, in the state of Minas Gerais.

KEYWORDS: fruit flies; tephritidae; diversity; geographic distribution.

RESUMO: Ocorrências de *Anastrepha barbiellinii* Lima, *Anastrepha connexa* Lima, *Anastrepha consobrina* (Loew), *Anastrepha kuhlmanni* Lima, *Anastrepha leptozona* Hendel e *Anastrepha xanthochaeta* Hendel são registradas pela primeira vez no estado de Minas Gerais, Brasil. As espécies foram capturadas em armadilhas do tipo McPhail com um atrativo alimentar de proteína hidrolisada (5%) em três pomares de espécies cultivadas e um remanescente de Mata Atlântica no município de Viçosa, Minas Gerais, ou obtidas por meio de levantamento de espécies de Tephritidae depositadas no Museu Regional de Entomologia (UFVB) da Universidade Federal de Viçosa, *Campus* Viçosa, estado de Minas Gerais.

PALAVRAS-CHAVE: mosca-das-frutas; tefritídeos; diversidade; distribuição geográfica.

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Anastrepha Schiner, 1868 (Diptera: Tephritidae), is the most diverse genus of the Tephritidae family in the Neotropical region, with more than 250 species described (URAMOTO; ZUCCHI, 2010; NORRBOM; KORYTKOWSKI, 2012). Brazil has 121 species recorded (ZUCCHI; MORAES, 2008), of which 30 are reported in the state of Minas Gerais (ZUCCHI; MORAES, 2008; DUARTE et al., 2015). Some *Anastrepha* species have their distribution limited to tropical and subtropical forests, while others occur in all regions of Brazil (MALAVASI, 2000; ZUCCHI, 2007).

This study aimed to report new occurrence records of fruit flies in Minas Gerais. The studies were carried out in four areas: two fruit orchards in the *Campus* of the Universidade Federal de Viçosa (UFV) (20°45'S, 42°51'W, 696 m; 20°45'S, 42°52'W, 667 m), a private fruit orchard (20°50'S, 42°54'W, 718 m), and a remnant of the Atlantic Forest, with 194 ha of secondary vegetation of the seasonal semideciduous forest subtype, with a high proportion of evergreen species (ALONSO, 1977), known as "Mata do Córrego do Paraíso" (20°46'S, 45°50'W, 600–700 m), located about 8 km from the UFV *Campus*. In addition, a survey was conducted on fruit fly species (Diptera: Tephritidae) deposited in the Regional Museum of Entomology (UFVB) at the Universidade Federal de Viçosa, *Campus* Viçosa.

They were captured in a McPhail trap baited with 300 mL of 5% hydrolyzed protein. The traps were distributed in the tree canopies of cultivated and wild fruit trees, about 1.5 m from the ground. Each week the material was checked with the help of a sieve and fine point tweezers. Afterward, the traps were washed, and the baits were renewed. At each procedure, fruit flies were quantified, sexed, properly labeled, and fixed in 70% alcohol for later identification.

The samples were collected between June 2007 and December 2010 with a total of 20 traps, distributed randomly and representatively in each environment, with six traps placed in UFV orchards, two in the private orchard, and twelve in the remnant of the Atlantic Forest. We collected 13,152 specimens of fruit flies of the genus *Anastrepha* (7,101 females and 6,051 males). Among them, three females of *Anastrepha barbiellinii* Lima, 1938, were captured with a frequency of 0.61%; and two females of *Anastrepha leptozona* Hendel, 1914, showed 0.41% of frequency in the identified species. The presence of both species was recorded for the first time in the state of Minas Gerais.

Anastrepha barbiellinii has only one known host in Brazil — *Pereskia* sp. (Cactaceae) (ZUCCHI; MORAES, 2008). Its occurrence in this country has been registered in the states of Mato Grosso do Sul (midwest region); Espírito Santo, Rio de Janeiro, and São Paulo (southeast region); Paraná, Rio Grande do Sul, and Santa Catarina (south region). *Anastrepha leptozona* has been recorded infesting 13 hosts from five different botanical families in Brazil — Anacardiaceae, Icacinaceae, Myrtaceae, Rubiaceae, and Sapotaceae —, in 15 states — Acre, Amapá, Amazonas, Rondônia, Roraima, and Tocantins (north region); Bahia, Maranhão, and Piauí (northeast region); Goiás, Mato Grosso, and Mato Grosso do Sul (midwest region); Espírito Santo, Rio de Janeiro, and São Paulo (southeast region) (ZUCCHI; MORAES, 2008).

Four species of the genus *Anastrepha* were identified and deposited in UFVB, all without prior record in the state of Minas Gerais: *Anastrepha connexa* Lima, 1934 (1♀, collected in X.1938), identified by Dr. Ângelo Moreira da Costa Lima, from Universidade Federal Rural do Rio de Janeiro (UFRRJ), in 1939; *A. consobrina* (Loew, 1873) (1♀, collected in IX.1938), *A. kuhlmanni* Lima, 1934 (5♀, collected in VIII.1939) and *A. xanthochaeta* Hendel, 1914 (1♀, collected in III.1939), identified by Dr. Roberto Antonio Zucchi, from Escola Superior de Agronomia Luiz de Queiros, Universidade de São Paulo (USP), in 1981. *Anastrepha connexa* has been registered in Brazil only in the state of São Paulo and has no known host in the country (ZUCCHI; MORAES, 2008). *Anastrepha consobrina* has been reported in the states of Bahia, Maranhão, Espírito Santo, Rio de Janeiro, and São Paulo; *A. kuhlmanni* in Rio de Janeiro, São Paulo, and Santa Catarina; and *A. xanthochaeta* in São Paulo, Paraná, Rio Grande do Sul, and Santa Catarina, having known hosts in the Passifloraceae family (ZUCCHI, 1978; ZUCCHI; MORAES, 2008).

Currently, the genus *Anastrepha* has 30 fruit fly species present in Minas Gerais (ZUCCHI; MORAES, 2008). However, with the new occurrence recorded in this study, this number increased to 36 species (Table 1).

Table 1. Species of the genus *Anastrepha* (Tephritidae) registered in the state of Minas Gerais, Brazil, and additional references cited.

Species	Place of occurrence (municipality)	References
Anastrepha aczeli (Blanchard, 1961)	Bambuí	DUARTE et al. (2015)
Anastrepha alveata (Stone, 1942)	Itacarambi, Jaíba, Janaúba, Nova Porteirinha	CANAL et al. (1998a); ALVARENGA et al. (2010)
Anastrepha barbiellinii (Lima, 1938*)	Viçosa	Present study
Anastrepha bahiensis (Lima, 1937)	Jaíba, Janaúba	CANAL et al. (1998a); ALVARENGA et al. (2010)

Continue...

Table 1. Continuation.

Species	Place of occurrence (municipality)	References
Anastrepha barnesi (Aldrich, 1925)	Janaúba, Nova Porteirinha	CANAL et al. (1998a)
Anastrepha bezzii (Lima, 1934)	Viçosa	SANTOS et al. (1993); PIROVANI et al. (2010)
Anastrepha bistrigata (Bezzi, 1919)	Lavras, Viçosa	ZUCCHI (1978); PIROVANI et al. (2010)
Anastrepha connexa (Lima, 1934*)	Viçosa	Present study
Anastrepha consobrina (Loew, 1873)*	Viçosa	Present study
Anastrepha daciformis (Bezzi, 1909)	Jaíba	CANAL et al. (1998a)
Anastrepha dissimilis (Stone, 1942)	Itacarambi, Jaíba, Janaúba, Nova Porteirinha, Viçosa	CANAL et al. (1998a); PIROVANI et al. (2010); CAMARGOS et al. (2015)
Anastrepha distincta (Greene, 1934)	Jaíba, Janaúba, Nova Porteirinha, Viçosa	CANAL et al. (1998a); PIROVANI et al. (2010)
Anastrepha entodonta Canal, (Uramoto and Zucchi, 2013)	Jaíba, Janaúba, Nova Porteirinha	CANAL et al. (2013); CAMARGOS et al. (2015)
Anastrepha flavipennis (Greene, 1934)	Jaíba	CANAL et al. (1998a)
Anastrepha fraterculus (Wiedemman, 1830)	Itacarambi, Itajubá, Jaíba, Janaúba, Nova Porteirinha, Viçosa	ZUCCHI (1978); CARVALHO (1988); ROSSI et al. (1988); CANAL et al. (1998a, 1998b); PIROVANI et al. (2010); ALVARENGA et al. (2010); SOUZA et al. (2012); MACHADO et al. (2012); CAMARGOS et al. (2015)
Anastrepha furcata (Lima, 1934)	Viçosa	PIROVANI et al. (2010)
Anastrepha grandis (Macquart, 1846)	Caldas, Viçosa	ROSSI et al. (1988); PIROVANI et al. (2010)
Anastrepha hadropickeli Canal (Uramoto and Zucchi, 2013)	Itacarambi, Jaíba, Janaúba, Nova Porteirinha	CANAL et al. (2013); CAMARGOS et al. (2015)
Anastrepha hambletoni (Lima, 1934)	Viçosa	ZUCCHI (1978);
Anastrepha kuhlmanni (Lima, 1934*)	Viçosa	Present study
Anastrepha leptozona (Hendel, 1914*)	Viçosa	Present study
Anastrepha manihoti (Lima, 1934)	Jaíba, Viçosa	ZUCCHI (1978); PIROVANI et al. (2010); CAMARGOS et al. (2015)
Anastrepha minensis (Lima, 1937)	Viçosa	ZUCCHI (1978); PIROVANI et al. (2010)
Anastrepha montei (Lima, 1934)	Belo Horizonte, Itacarambi, Jaíba, Janaúba, Nova Porteirinha, Viçosa	ZUCCHI (1978); CANAL et al. (1998a); PIROVANI et al. (2010)
Anastrepha nigripalpis (Hendel, 1914)	Nova Porteirinha	CANAL et al. (1998a)
Anastrepha obliqua (Macquart, 1835)	Itacarambi, Jaíba, Janaúba, Nova Porteirinha, Viçosa	CANAL et al. (1998a, 1998b); ALVARENGA et al. (2010); PIROVANI et al. (2010); SOUZA et al. (2012); CAMARGOS et al. (2015)
Anastrepha pickeli (Lima, 1934)	Jaíba, Janaúba, Nova Porteirinha, Viçosa	ZUCCHI (1978); CANAL et al. (1998a); PIROVANI et al. (2010); ALVARENGA et al. (2010); CAMARGOS et al. (2015)
Anastrepha pseudoparallela (Loew, 1873)	Viçosa	PIROVANI et al. (2010)
Anastrepha serpentina (Wiedemman, 1830)	Jaíba, Matias Barbosa, Viçosa	ZUCCHI (1978); CANAL et al. (1998a); PIROVANI et al. (2010)
Anastrepha similis (Greene, 1934)	Bambuí	DUARTE et al. (2015)

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Table 1. Continuation.

Species	Place of occurrence (municipality)	References
Anastrepha sororcula (Zucchi, 1979)	Itacarambi, Jaíba, Janaúba, Nova Porteirinha, Viçosa	CARVALHO (1988); CANAL et al. (1998a, 1998b); PIROVANI et al. (2010); ALVARENGA et al. (2010); SOUZA et al. (2012)
Anastrepha turpiniae (Stone, 1942)	Jaíba	SOUZA et al. (2012)
Anastrepha undosa (Stone, 1942)	Itacarambi, Jaíba	CANAL et al. (1998a)
Anastrepha xanthochaeta (Hendel, 1914*)	Viçosa	Present study
Anastrepha zenildae (Zucchi, 1979)	Itacarambi, Jaíba, Janaúba, Nova Porteirinha	CANAL et al. (1998a, 1998b); ALVARENGA et al. (2010); SOUZA et al. (2012); CAMARGOS et al. (2015)
Anastrepha zernyi (Lima, 1934)	Jaíba	CANAL et al. (1998a)

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