



New Findings of *Anastrepha* (Diptera: Tephritidae) in the State of Espírito Santo, Brazil

Authors: Martins, David Dos Santos, Fornazier, Maurício José, Uramoto, Keiko, Ventura, José Aires, Ferreira, Paulo Sérgio Fiuza, et al.

Source: Florida Entomologist, 95(3) : 794-797

Published By: Florida Entomological Society

URL: <https://doi.org/10.1653/024.095.0337>

The BioOne Digital Library (<https://bioone.org/>) provides worldwide distribution for more than 580 journals and eBooks from BioOne's community of over 150 nonprofit societies, research institutions, and university presses in the biological, ecological, and environmental sciences. The BioOne Digital Library encompasses the flagship aggregation BioOne Complete (<https://bioone.org/subscribe>), the BioOne Complete Archive (<https://bioone.org/archive>), and the BioOne eBooks program offerings ESA eBook Collection (<https://bioone.org/esa-ebooks>) and CSIRO Publishing BioSelect Collection (<https://bioone.org/csiro-ebooks>).

Your use of this PDF, the BioOne Digital Library, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Digital Library content is strictly limited to personal, educational, and non-commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne is an innovative nonprofit that sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

NEW FINDINGS OF *ANASTREPHA* (DIPTERA: TEPHRITIDAE) IN THE STATE OF ESPÍRITO SANTO, BRAZIL

DAVID DOS SANTOS MARTINS^{1,3}, MAURÍCIO JOSÉ FORNAZIER^{1,3}, KEIKO URAMOTO², JOSÉ AIRES VENTURA¹,
PAULO SÉRGIO FIUZA FERREIRA³ AND JOSÉ COLA ZANUNCIO³

¹Instituto Capixaba de Pesquisa, Assistência Técnica e Extensão Rural (INCAPER). Rua Afonso Sarlo, 160, Bento Ferreira. CEP 29052-010. Vitória, Espírito Santo, Brasil

²Moscamed Brasil. Av. C1, 992 - Quadra D 13, Lote 15, Distrito Industrial do São Francisco, CEP 48.908-000, Juazeiro, Bahia, Brasil

³Departamento de Entomologia, Universidade Federal de Viçosa (UFV), Av. Peter Henry Rolfs s/n, Campus Universitário, CEP 36570-000, Viçosa, Minas Gerais, Brasil

*Corresponding author; E-mail: zanuncio@ufv.br

Anastrepha Schiner is a genus of Tephritidae with the largest diversity of species in the Neotropical region, and it is an important pest group that impacts fruit production (Norrbon et al. 1999). Species of *Anastrepha* are pests of horticulture and responsible for quarantine restrictions on imports of fruits and vegetables in many countries (Aluja & Mangan 2008; Hennessey et al. 2009; Nicácio & Uchôa 2011). *Anastrepha* has 267 valid species (Zucchi 2007; Canal 2010; Norrbom & Korytkowski 2007, 2009, 2011, 2012; Uramoto & Zucchi 2010; Norrbom & Uchôa 2011) with 112 (42%) recorded for Brazil, representing the greatest diversity of species of this genus in the world (Zucchi 2008).

In Brazil, State of Espírito Santo has one of the largest fruit fly diversities in the country (Zucchi 2008). Surveys including fragments of Atlantic rainforest in the north of Espírito Santo increased the records of *Anastrepha* species from 23 (Martins et al. 2000) to 36, confirming the widespread occurrence of this group of insects and contributed to better knowledge of its diversity (Uramoto et al. 2008ab; Zucchi 2008; Uramoto & Zucchi 2010).

Fruit flies adults were captured in 288 sites in 74 municipalities with McPhail traps baited with 5% protein hydrolyzed from Jul 1993 through Jul 2010. All traps were installed on tree branches, around 2-6 m above the ground. Females of *Anastrepha* were identified at the Department of Genetics and Evolutionary Biology, University of São Paulo, Brazil. Voucher specimens were deposited in the collection of the Department of Entomology and Acarology, Escola Superior de Agricultura Luiz de Queiróz, University of São Paulo (ESALQ/USP).

Anastrepha daciformis Bezzi, *Anastrepha dissimilis* Stone, *Anastrepha mixta* Zucchi and *Anastrepha parallela* (Wiedemann) are new records for Espírito Santo. (Table 1).

One specimen of *A. daciformis* was captured in an area around mangrove vegetation with *Eugenia uniflora* L., *Malpighia glabra* L., *Mangifera indica* L., *Mimusops commersonii* (G. Don) Engl.,

Psidium guajava L., *Syzygium malaccense* (L.) Merr. & L.M. Perry and *Terminalia catappa* L. on its surroundings. *Eugenia* sp. and *Psidium guajava* were associated with *A. daciformis* in Argentina (Norrbon 1998), but its host is unknown in Brazil (Zucchi 2008).

One specimen of *A. dissimilis* was captured occasionally in a *Carica papaya* L. orchard in State of Espírito Santo. This species was also collected in orchards of *Citrus reticulata* Blanco x *C. sinensis* (L.) ('Murcott' tangor) (Silva et al. 2006) and *Citrus sinensis* Osbeck (Chiaradia et al. 2004). Nonetheless, this species presents low frequency of captures in traps and has no host related; however it has been reported in all Brazilian regions (Araújo et al. 2005; Zucchi 2008) and in Argentina, Colombia, Guyana, Haiti, Peru and Trinidad (Carrejo & Gonzales 1994; Norrbom 2004).

One specimen of *A. mixta* was collected in a *Carica papaya* orchard in the municipality of Linhares. This species up to now has been reported only in Brazil (Norrbon 2004) in the States of Mato Grosso and Amapá with no host determination (Uchôa-Fernandes et al. 2002; Trindade & Uchôa 2011).

Anastrepha parallela was captured occasionally in *Carica papaya* orchards. This species has been recorded as abundant in an Atlantic rainforest fragment at "Vale Natural Reserve" in Linhares, and on plants of the family Sterculiaceae (= Malvaceae) in State of Bahia (Nascimento & Carvalho 2000; Zucchi 2008), *Pouteria caimito* (Ruiz & Pav.) Radlk. (Sapotaceae) and *Sterculia apetala* (Jacq.) H. Karst. (Sterculiaceae = Malvaceae) in Colombia (Carrejo & Gonzales 1994).

The 4 new findings in our report extend from 36 to 40 the species of *Anastrepha* registered in the State of Espírito Santo, Brazil.

SUMMARY

Anastrepha Schiner is the genus of Tephritidae with the greatest diversity in the Neotropical region and the largest number of species in Brazil,

TABLE 1. FIRST RECORDS OF *ANASTREPHA* SPECIES CAPTURED IN THE STATE OF ESPÍRITO SANTO, BRAZIL, MUNICIPALITY OF COLLECTION (CITY), GEOGRAPHICAL COORDINATES (COORDINATES), NUMBER OF SPECIMENS COLLECTED (NO. FEM.) AND BRAZILIAN REGIONS AND STATES WITH RECORDS OF SPECIES (REGIONS / STATES), JULY 1993 TO JULY 2010.

Species	Trapping sites			Regions ² / States ³
	City	Coordinates	No. Fem. ¹	
<i>Anastrepha daciformis</i> Bezzi	Vitória	20°16'34"S/40°18'21"W	1	NE (PE, RN), CO (MT, MS), SE (MG, SP), S (SC, RS)
<i>Anastrepha dissimilis</i> Stone	Linhares	19°04'00"S/40°00'37"W	1	N (AP, PA), NE (BA, CE, MA, PE, PI, RN), CO (MT, MS), SE (MG, SP), S (SC, RS)
<i>Anastrepha mixta</i> Zucchi	Linhares	19°15'06"S/40°04'05"W	1	N (AP), CO (MT)
<i>Anastrepha parallela</i> (Wiedemann)	Linhares	19°26'35"S/40°03'02"W	1	NE (BA)
		19°03'52"S/40°01'08"W	1	
		19°16'44"S/40°07'57"W	1	
		19°30'58"S/40°17'02"W	2	
	Sooretama	19°08'06"S/39°58'32"W	7	
		19°08'54"S/40°04'01"W	496	
		19°09'56"S/40°06'34"W	1	
	Sooretama	19°07'49"S/40°03'31"W	1	
		19°06'55"S/40°05'21"W	2	
		19°03'59"S/40°02'24"W	1	

¹Number of females captured; ²Regions of Brazil: N- North, NE- Northeast, CO- Midwest, SE- Southeast, S- South; ³Brazilian States: AP- Amapá, BA- Bahia, CE- Ceará, MA- Maranhão, MG- Minas Gerais, MS- Mato Grosso do Sul, MT- Mato Grosso, PA- Pará, PE- Pernambuco, PI- Piauí, RN- Rio Grande do Norte, RS- Rio Grande do Sul, SC- Santa Catarina, SP- São Paulo.

and which imposes quarantine restrictions for imports of fruits and vegetables from countries in which it occurs. The objective of this paper is to present new records of *Anastrepha* species in State of Espírito Santo, Brazil. McPhail traps were used to capture adults in 74 municipalities. The occurrence of *A. daciformis* Bezzi, *A. dissimilis* Stone, *A. mixta* Zucchi and *A. parallela* (Wied.) are new records for the State of Espírito Santo.

Key Words: *Anastrepha daciformis*, *Anastrepha dissimilis*, *Anastrepha mixta*, *Anastrepha parallela*, fruit flies

RESUMO

Anastrepha Schiner tem a maior diversidade do gênero de Tephritidae na região Neotropical e o maior número de espécies no Brasil. Espécies-praga desse gênero são responsáveis por restrições quarentenárias à importação de frutas e vegetais para diversos países. O objetivo deste trabalho é apresentar novos registros de ocorrência de espécies de *Anastrepha* para o estado do Espírito Santo, Brasil. Armadilhas tipo McPhail foram utilizadas em 74 municípios. A ocorrência de *A. daciformis* Bezzi, *A. dissimilis* Stone, *A. mixta* Zucchi e *A. parallela* (Wied.) são novos registros para o Estado do Espírito Santo.

Palavras-chave: *Anastrepha daciformis*, *Anastrepha dissimilis*, *Anastrepha mixta*, *Anastrepha parallela*, moscas-das-frutas

ACKNOWLEDGMENTS

We express gratitude to Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq), Fundação de Amparo a Pesquisa do Estado de Minas Gerais (FAPEMIG) and Fundação de Amparo a Pesquisa do Estado do Espírito Santo (FAPES) for financial support.

REFERENCES CITED

- ALUJA, M., AND MANGAN, R. L. 2008. Fruit fly (Diptera: Tephritidae) host status determination: critical conceptual, methodological, and regulatory considerations. *Annu. Rev. Entomol.* 53: 473-502.
- ARAÚJO, E. L., MEDEIROS, M. K. M., SILVA, V. E., AND ZUCCHI, R. A. 2005. Moscas-das-frutas (Diptera: Tephritidae) no semi-árido do Rio Grande do Norte: plantas hospedeiras e índices de infestação. *Neotrop. Entomol.* 34: 889-894.
- CANAL, N. A. 2010. New species and records of *Anastrepha* Schiner (Diptera: Tephritidae) from Colombia. *Zootaxa* 2425: 32-44.
- CARREJO, N. S., AND GONZALES, O. R. 1994. Lista preliminar de las moscas de la fruta del género *Anastrepha* (Dip.: Tephritidae) en el Departamento del Valle del Cauca Cali, Colombia. *Bol. Mus. Ent. Univ. Valle* 2: 85-93.
- CHIARADIA, L. A., MILANEZ, J. M., AND DITTRICH, R. 2004. Flutuação populacional de moscas-das-frutas em pomares de citros no oeste de Santa Catarina, Brasil. *Cienc. Rural* 34: 337-343.
- HENNESSEY, M. K., GOULD, W. P., AND STECK, G. J. 2009. *Anastrepha edentata* and other fruit flies (Diptera: Tephritidae) detected on Key Largo, Florida. *Florida Entomol.* 92: 173-176.
- MARTINS, D. S., URAMOTO, K., AND MALAVASI, A. 2000. Espírito Santo, pp. 253-258. In A. Malavasi and R. A. Zucchi [eds.], *Moscas-das-frutas de importância econômica no Brasil: conhecimento básico e aplicado*. Ribeirão Preto, Holos, 327p.
- NASCIMENTO, A. S., AND CARVALHO, R. S. 2000. Bahia, pp. 235-239. In A. Malavasi, and R. A. Zucchi [eds.], *Mosca das frutas de importância econômica no Brasil: conhecimento básico e aplicado*. Holos Editora Ribeirão Preto. 327 pp.
- NICÁCIO, J., AND UCHÔA, M. A. 2011. Diversity of frugivorous flies (Diptera: Tephritidae and Lonchaeidae) and their relationship with host plants (Angiospermae) in environments of South Pantanal Region, Brazil. *Florida Entomol.* 94: 443-446.
- NORRBOM, A. L. 1998. A revision of the *Anastrepha daciformis* species group (Diptera: Tephritidae). *Proc. Entomol. Soc. Washington* 100: 160-192.
- NORRBOM, A. L. 2004. Fruit fly (Tephritidae) species database. Available at: <http://www.sel.barc.usda.gov:8080/diptera/Tephritidae/TephIntro.html>. Accessed on 24 May 2012.
- NORRBOM, A. L., AND KORYTKOWSKI, C. A. 2007. A new species, new synonymy, and taxonomic notes in the *Anastrepha schausi* group (Diptera: Tephritidae). *Zootaxa* 1497: 47-55.
- NORRBOM, A. L., AND KORYTKOWSKI, C. A. 2009. A revision of the *Anastrepha robusta* species group (Diptera: Tephritidae). *Zootaxa* 2182: 1-91.
- NORRBOM, A. L., AND KORYTKOWSKI, C. A. 2011. New species of and taxonomic notes on *Anastrepha* (Diptera: Tephritidae). *Zootaxa* 2740: 1-23.
- NORRBOM, A. L., AND UCHÔA, M. A. 2011. New species and records of *Anastrepha* (Diptera: Tephritidae) from Brazil. *Zootaxa* 2835: 61-67.
- NORRBOM, A. L., AND KORYTKOWSKI, C. A. 2012. A new species of *Anastrepha* (Diptera: Tephritidae) from Colombia, Costa Rica, and Panama. *Canadian Entomol.* 144: 158-168.
- NORRBOM, A. L., ZUCCHI, R. A., AND HERNÁNDEZ-ORTIZ, V. 1999. Phylogeny of the genera *Anastrepha* and *Toxotrypana* (Trypetinae: Toxotrypanini) based on morphology, pp. 299-342. In M. Aluja and A. L. Norrbom [eds.], *Fruit flies (Tephritidae): phylogeny and evolution of behavior*. CRC Press Boca Raton. 944 pp.
- SILVA, F. F., MEIRELLES, R. N., REDAELLI, L. R., AND DAL SOGLIO, F. K. 2006. Diversity of flies (Diptera: Tephritidae and Lonchaeidae) in organic citrus orchards in the Vale do Rio Caí, Rio Grande do Sul, Southern Brazil. *Neotrop. Entomol.* 35: 666-670.
- TRINDADE, R. B. R., AND UCHÔA, M. A. 2011. Species of fruit flies (Diptera: Tephritidae) in a transect of the Amazonian Rainforest in Oiapoque, Amapá, Brazil. *Zoologia-Curitiba* 28: 653-657.
- UCHÔA-FERNANDEZ, M. A., OLIVEIRA, I., MOLINA, R. M. S., AND ZUCCHI, R. A. 2002. Species diversity of frugivorous flies (Diptera: Tephritidae) from hosts in the Cerrado of the State of Mato Grosso do Sul, Brazil. *Neotrop. Entomol.* 31: 515-524.
- URAMOTO, K., AND ZUCCHI, R. A. 2010. New species of *Anastrepha* Schiner (Diptera: Tephritidae) from remnant area of the Atlantic Rain Forest and surroundings in the state of Espírito Santo, Brazil. *Zootaxa* 2535: 49-60.

- URAMOTO, K., MARTINS, D. S., AND ZUCCHI, R. A. 2008a. Fruit flies (Diptera: Tephritidae) and their associations with native host plants in a remnant area of the highly endangered Atlantic Rain Forest in the State of Espírito Santo, Brazil. *B. Entomol. Res.* 98: 457-466.
- URAMOTO, K., MARTINS, D. S., LIMA, R. C. A., AND ZUCCHI, R. A. 2008b. Host plant record for the fruit flies, *Anastrepha fumipennis* and *A. nascentoi* (Diptera: Tephritidae). *J. Insect Sci.* 8(45): 1-4.
- ZUCCHI, R. A. 2007. Diversidad, distribución y hospederos del género *Anastrepha* en Brasil, pp.77-100 *In* V. Hernández-Ortiz [ed.], *Moscas de las frutas en Latinoamérica* (Diptera: Tephritidae): diversidad, biología y manejo. México D.F. 167 pp.
- ZUCCHI, R. A. 2008. Fruit flies in Brazil - *Anastrepha* species and their hosts plants. Available at: www.lea.esalq.usp.br/anastrepha, updated on August 10, 2011. Accessed on 24 May 2012.