

## **Frugivorous Flies (Diptera: Tephritidae and Lonchaeidae) and Native Parasitoids (Hymenoptera) Associated with Pouteria caimito (Sapotaceae) in Brazil**

Authors: Fernandes, Daniell R. R., Vacari, Alessandra M., Araujo, Elton L., Guimarães, Jorge A., Bortoli, Sergio A. De, et al.

Source: Florida Entomologist, 96(1) : 255-257

Published By: Florida Entomological Society

URL: <https://doi.org/10.1653/024.096.0139>

---

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](http://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.

## FRUGIVOROUS FLIES (DIPTERA: TEPHRITIDAE AND LONCHAEIDAE) AND NATIVE PARASITOIDS (HYMENOPTERA) ASSOCIATED WITH *POUTERIA CAIMITO* (SAPOTACEAE) IN BRAZIL

DANIELL R. R. FERNANDES<sup>1\*</sup>, ALESSANDRA M. VACARI<sup>1</sup>, ELTON L. ARAUJO<sup>2</sup>, JORGE A. GUIMARÃES<sup>3</sup>, SERGIO A. DE BORTOLI<sup>1</sup> AND NELSON W. PERIOTO<sup>1,4</sup>

<sup>1</sup>Universidade Estadual Paulista, Faculdade de Ciências Agrárias e Veterinárias, Via de Acesso Prof. Paulo Donato Castellane, 14884-900, Jaboticabal, SP, Brazil

<sup>2</sup>Universidade Federal Rural do Semi-Árido. Km 47 da BR 110, s/n, 59625-900, Mossoró, RN, Brazil

<sup>3</sup>Empresa Brasileira de Pesquisa Agropecuária, Centro Nacional de Pesquisa de Hortaliças. Rodovia Brasília/Anápolis, Km 09 da BR 060, 70359-970, Brasília, DF, Brazil

<sup>4</sup>Agência Paulista de Tecnologia dos Agronegócios. Av. Bandeirantes, 2419, 14030-670, Ribeirão Preto, SP, Brazil

\*Corresponding author; E-mail: daniellrodrigo@hotmail.com

*Pouteria caimito* Radlk. (Ericales: Sapotaceae) is a fruit tree native from the Amazon region and found throughout several Latin American countries (Lorenzi et al. 2006). Its fruit has either an ovoid or spherical shape, with pulp usually translucent and peel yellowish (Almeida et al. 2008). In Brazil, this fruit tree is more commonly found in the northern region, but is currently being cultivated in orchards in different regions (Lorenzi et al. 2006; Nascimento et al. 2011).

Many species of Diptera infest fruits of *P. caimito* (Jirón et al. 1988; Carrejo & Gonzáles 1999; Raga et al. 2011). In Brazil, there are reports of 8 species of frugivorous flies associated with *P. caimito*: Tephritidae: *Anastrepha fraterculus* (Wiedemann), *A. leptozona* Hendel, *A. obliqua* (Macquart), *A. serpentina* (Wiedemann), *A. striata* Schiner and *Ceratitidis capitata* (Wiedemann); and Lonchaeidae: *Neosilba glaberrima* (Wiedemann) and *N. dimidiata* (Curran) (Zucchi 2000; Zucchi 2001; Raga et al. 2003; Zucchi et al. 2011; Strikis et al. 2011).

Concerning the diversity of parasitoids associated to frugivorous flies in *P. caimito* fruit, little information is available (Guimarães et al. 2003; Costa et al. 2009; Nicácio et al. 2011; Uchôa 2012). Only *Doryctobracon areolatus* (Szépligeti) (Hymenoptera: Braconidae) was recorded parasitizing *A. serpentina* on *P. caimito*, in Brazil (Bitencourt et al. 2011).

This study reports new associations between Tephritoidea and Drosophilidae (Diptera) and their parasitoids (Hymenoptera) in *P. caimito* fruit in Brazil and also presents their respective infestation and parasitism rates.

Fruits of *P. caimito* (5 kg/112 fruit) fallen onto the ground were collected from a mixed orchard located in the municipality of Jaboticabal (State of São Paulo) (S 21°14'12" W 48°17'12"), southeastern region of Brazil in October 2007. The fruits were collected from 2 trees, and taken to the laboratory, where they were stored in plastic trays (40 × 30

× 10 cm) each with a thin layer of sterilized sand and covered with organza. The trays were placed in a room at 25 ± 1 °C, RH 70 ± 10% and L:D h 12:12. After 15 days, the sand was sifted to collect the pupae, which were separated by family, quantified and kept in Petri dishes until the emergence of adult flies and/or parasitoids. The emerging insects were counted and stored in vials containing 70% alcohol until they were identified.

The infestation rate was calculated based on the number of pupae/kg of fruit and the parasitism established by the equation: parasitism% = (number of emerging parasitoids/number of pupae) × 100.

The total number of pupae obtained was 3,137: Tephritidae (84.6%), Lonchaeidae (14.9%) and Drosophilidae (0.5%). From the pupae, the following emerged: *A. serpentina* (100%) (Tephritidae); *Neosilba* spp. (females) (62.1%), *N. glaberrima* (31.1%), *Neosilba zadolicha* McAlpine & Steyskal (4.9%) and *Lonchaea* sp. (1.9%) (Lonchaeidae); *Zaprionus indianus* Gupta (100%) (Drosophilidae). Raga et al. (2003) had already observed *A. serpentina* and *N. glaberrima* in *P. caimito*. However, these are the first reports of *N. zadolicha* and *Z. indianus* infesting *P. caimito* fruits in Brazil. *Z. indianus* is originally from the African continent, and because of its recent introduction in Brazil, little is known about its hosts (Vilela 1999; Fernandes & Araujo 2011). The highest rate of infestation detected was that of Tephritidae (526.4 pupae/kg of fruit), followed by the Lonchaeidae (92.7 pupae/kg of fruit) and Drosophilidae (3.4 pupae/kg of fruit).

From the pupae, also emerged: 18 adult parasitoids of Tephritidae: *D. areolatus* (75%), *Odonosema albinerve* Kieffer (Hymenoptera: Figitidae) (20.8%) and *Spalangia simplex* Perkins (Hymenoptera: Pteromalidae) (4.2%); 12 parasitoids of Lonchaeidae: *Lopheucoila anastrephae* (Rohwer) (Hymenoptera: Figitidae) (91.7%) and *D. areolatus* (8.3%); and 1 parasitoid of Drosophilidae: *Drosophila* sp. (100%).

philidae - *S. simplex*. Bittencourt et al. (2011) had already observed *D. areolatus* as parasitoid of *A. serpentina* in fruit of *P. caimito* in Brazil. However, this is the first report of *O. albinerve* associated with *A. serpentina* on *P. caimito* fruits and the first record on the association between *S. simplex* with a species of the *Anastrepha* (*A. serpentina*), corroborating the information reported by Gibson (2009), which established the association of *S. simplex* with the Tephritidae. In addition, this study reports, for the first time, *L. anastrephae* parasitizing Lonchaeidae on *P. caimito* in Brazil and records *S. simplex* as a parasitoid of *Z. indianus*. The observed parasitism rates were of 0.9% in pupae of Tephritidae; 2.6% in Lonchaeidae and 5.9% in Drosophilidae.

Our results show that several species of frugivorous flies and their parasitoids are associated with the *P. caimito* fruit. In addition, new records are reported of the trophic associations which occur in *P. caimito* fruit, in Brazil.

#### SUMMARY

This study presents new reports on frugivorous flies and their parasitoids associated with the fruits of *Pouteria caimito* Radlk. (Sapotaceae), a plant native to the Amazon region. In addition to the new reports, this study also presents the infestation and parasitism rates, for dipterous and hymenopteran parasitoids, respectively.

Key Words: new associations, *Neosilba zado licha*, *Lopheucoila anastrephae*, *Odontosema albinerve*, *Zaprionus indianus*

#### RESUMO

Este estudo apresenta novos dados de ocorrência de moscas frugívoras e seus parasitoides, associados à *Pouteria caimito* Radlk. (Sapotaceae), planta nativa da região Amazônica. Além dos novos registros, também são apresentados dados de infestação e taxas de parasitismo, para dípteros e himenópteros parasitoides, respectivamente.

#### ACKNOWLEDGMENTS

We would like to thank Carlos Ribeiro Vilela (USP), Pedro Carlos Strikis (UNICAMP) and Valmir Antônio Costa (APTA-IB) for identifying the Drosophilidae, Lonchaeidae and Pteromalidae, respectively; Robson Thomaz Thuler (IFTM—Campus Uberaba), for the logistic support; Instituto Nacional de Ciência e Tecnologia dos Hymenoptera Parasitoides da Região Sudeste Brasileira (HYMPAR/Sudeste—CNPq/FAPESP/CAPES) for the financial support, and CNPq for the MSc scholarship to the first author.

#### REFERENCES CITED

ALMEIDA, E. J., JESUS, N., SCALOPPI, E. M. T., MARTINS, A. B. G., AND ARAÚJO, M. S. 2008. Propagação de três

- genótipos de abieiro (*Pouteria caimito*) por estaquia de ramos herbáceos. Acta Amazonica 38: 1-4.
- BITTENCOURT, M. A. L., SILVA, A. C. M., SILVA, V. E. S., BOMFIM, Z. V., GUIMARÃES, J. A., SOUZA-FILHO, M. F., AND ARAÚJO, E. L. 2011. Moscas-das-frutas (Diptera: Tephritidae) e seus parasitoides (Hymenoptera: Braconidae) associados às plantas hospedeiras no sul da Bahia. Neotrop. Entomol. 40: 405-406.
- CARREJO, N. S., AND GONZÁLEZ, R. 1999. Parasitoids reared from species of *Anastrepha* (Diptera: Tephritidae) in Valle del Cauca, Colombia. Florida Entomol. 82: 113-118.
- COSTA, S. G. M., QUERINO, R. B., RONCHI-TELES, B., PENTEADO-DIAS, A. M. M., AND ZUCCHI, R. A. 2009. Parasitoid diversity (Hymenoptera: Braconidae and Figitidae) on frugivorous larvae (Diptera: Tephritidae and Lonchaeidae) at Adolfo Ducke Forest Reserve, central amazon region, Manaus, Brazil. Brazilian J. Biol. 69: 363-370.
- FERNANDES, D. R. R., AND ARAÚJO, E. L. 2011. Ocorrência de *Zaprionus indianus* Gupta (Diptera: Drosophilidae) em frutos de juazeiro *Ziziphus joazeiro* Mart. (Rhamnaceae) no estado do Rio Grande do Norte. Rev. Brasileira Fruticultura 33: 1356-1358.
- GIBSON, G. A. P. 2009. Revision of New World Spalanginae (Hymenoptera: Pteromalidae). Zootaxa 2259: 1-159.
- GUIMARÃES, J. A., GALLARDO, F. E., DÍAZ, N. B., AND ZUCCHI, R. A. 2003. Eucoliinae species (Hymenoptera: Cynipoidea: Figitidae) parasitoids of fruit-infesting dipterous in Brazil: identity, geographical distribution and host associations. Zootaxa 278: 1-23.
- JIRÓN, L. F., SOTO-MANITIU, J., AND NORRBOM, A. L. 1988. A preliminary list of the fruit flies of the genus *Anastrepha* (Diptera: Tephritidae) in Costa Rica. Florida Entomol. 71: 130-137.
- LORENZI, H., BACHER, L., LACERDA, M., AND SARTORI, S. 2006. Frutas brasileiras e exóticas cultivadas: (de consumo in natura). Instituto Plantarum de Estudos da Flora LTDA. Nova Odessa. 672 pp.
- NASCIMENTO, W. M. O., MÜLLER, C. H., ARAÚJO, C. S., AND FLORES, B. C. 2011. Ensamblamento de frutos de abiu visando à proteção contra o ataque da mosca-das-frutas. Rev. Brasileira Fruticultura 33: 48-52.
- NICÁCIO, J. N., UCHÔA, M. A., FACCENDA, O., GUIMARÃES, J. A., AND MARINHO, C. F. 2011. Native larval parasitoids (Hymenoptera) of frugivorous Tephritoidea (Diptera) in South Pantanal Region, Brazil. Florida Entomol. 94: 407-419.
- RAGA, A., MACHADO, R. A., COSTA, A. A., SOUZA-FILHO, M. F., VEIGA, R. F. A., AND SAES, L. A. 2003. Primeiro relato de ocorrência de *Anastrepha serpentina* e *Anastrepha leptozona* (Dip.: Tephritidae) em abiu (*Pouteria caimito*) no Estado de São Paulo. Rev. Brasileira Fruticultura 25: 337-338.
- RAGA, A., SOUZA-FILHO, M. F., MACHADO, R. A., SATO, M. E., AND SILOTO, R. C. 2011. Host ranges and infestation indices of fruit flies (Tephritidae) and lances flies (Lonchaeidae) in São Paulo state, Brazil. Florida Entomol. 94: 787-794.
- STRIKIS, P. C., DEUS, E. G., SILVA, R. A., PEREIRA, J. D. B., JESUS, C. R., AND MARSARO-JÚNIOR, A. L. 2011. Conhecimento sobre Lonchaeidae na Amazônia brasileira, pp. 206-215 In R. A. Silva, W. P. Lemos and R. A. Zucchi [eds.], Moscas-das-frutas na Amazônia Brasileira - diversidade, hospedeiras e inimigos naturais. Embrapa, Macapá. 299 pp.

- UCHÔA, M. A. 2012. Fruit flies (Diptera: Tephritoidea): Biology, host plants, natural enemies, and the implications to their natural control, pp. 271-300 *In* M. L. Larramendy and S. Soloneski [eds.], Integrated Pest Management and Pest Control - Current and Future Tactics. In Tech Rijeka. 668 pp.
- VILELA, C. R. 1999. Is *Zaprionus indianus* Gupta, 1970 (Diptera: Drosophilidae) currently colonizing the Neotropical Region? *Drosophila Info. Serv.* 82: 37-39.
- ZUCCHI, R. A. 2000. Espécies de *Anastrepha*, sinonímias, plantas hospedeiras e parasitóides, pp. 41-48 *In* A. Malavasi and R. A. Zucchi [eds.], Moscas-das-frutas de importância econômica no Brasil: conhecimento básico e aplicado. Holos Editora, Ribeirão Preto. 327pp.
- ZUCCHI, R. A. 2001. Mosca-do-mediterrâneo, *Ceratitis capitata* (Diptera: Tephritidae), pp. 15-22 *In* E. F. Vilela, R. A. Zucchi and F. Cantor [eds.], Histórico e Impacto das Pragas Introduzidas no Brasil. 173 pp.
- ZUCCHI, R. A., SILVA, R. A., AND DEUS, E. G. 2011. Espécies de *Anastrepha* e seus hospedeiros na Amazônia Brasileira, pp. 51-70 *In* R. A. Silva, W. P. Lemos and R. A. Zucchi [eds.], Moscas-das-frutas na Amazônia Brasileira - diversidade, hospedeiros e inimigos naturais. Embrapa, Macapá. 299 pp.