



Acca sellowiana (Myrtaceae): A New Alternative Host for *Drosophila suzukii* (Diptera: Drosophilidae) in Brazil

Authors: Souza, Gabriely Koerich, Pikart, Tiago Georg, Oliveira, Viviane Lunelli de, Boff, Pedro, and Boff, Mari Inês Carissimi

Source: Florida Entomologist, 100(1) : 190-191

Published By: Florida Entomological Society

URL: <https://doi.org/10.1653/024.100.0131>

BioOne Complete (complete.BioOne.org) is a full-text database of 200 subscribed and open-access titles in the biological, ecological, and environmental sciences published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Complete website, 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 Complete 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 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.

Acca sellowiana (Myrtaceae): a new alternative host for *Drosophila suzukii* (Diptera: Drosophilidae) in Brazil

Gabriely Koerich Souza^{1,*}, Tiago Georg Pikart², Viviane Lunelli de Oliveira¹, Pedro Boff³, and Mari Inês Carissimi Boff

Feijoa (*Acca sellowiana* [Berg] Burret; Myrtaceae) is an evergreen shrub or short tree, 2 to 6 m in height (Weston 2010), and native to the highlands of southern Brazil and northeast Uruguay (Barni et al. 2004). Its fruit is similar in appearance, size, and texture to the common guava (*Psidium guajava* L.; Myrtaceae), but with the flesh having a distinctive sweet-tangy taste and a very aromatic flavor, and with a non-edible green skin (Amarante & Santos 2011). In addition, it is a good source of vitamins, minerals, and secondary metabolites with antibacterial, antioxidant, antiallergic, and immunological properties (Weston 2010).

Feijoa has been cultivated commercially in Colombia, the USA, the former Soviet Republics of the Caucasus region, and especially in New Zealand (Barni et al. 2004). In New Zealand, about 500 t of feijoa fruits are produced annually, and domestic sales generate around 1.7 million dollars (Plant and Food Research Institute of New Zealand Ltd. 2013). Despite the commercial potential of its fruit, feijoa is almost unknown in Brazil (Ducroquet et al. 2000), and its production faces several phytosanitary problems involving pests, especially the South American fruit fly, *Anastrepha fraterculus* (Wiedemann) (Diptera: Tephritidae), with infestations of up to 100% during the fruit ripening period (Ducroquet et al. 2000), and the guava weevil, *Conotrachelus psidii* Marshall (Coleoptera: Curculionidae), whose damage can lead to loss of up to almost 100% of the fruits in monoculture (Luckmann et al. 2009).

Recently, in addition to specimens of *A. fraterculus* and *C. psidii* that emerged from *A. sellowiana* fruits collected in the 2015/2016 season, we also obtained adult specimens of *Drosophila suzukii* (Matsumura) (Diptera: Drosophilidae), commonly known as the spotted wing drosophila. This is the first record of *D. suzukii* in *A. sellowiana* fruits collected in an orchard located in Lages, Santa Catarina, Brazil.

Acca sellowiana fruits bearing feeding and oviposition damage caused by *C. psidii* (Fig. 1) were collected from different trees in a feijoa orchard in the Estação Experimental de Lages (EEL) of the Empresa de Pesquisa Agropecuária e Extensão Rural de Santa Catarina (Epagri) in Lages, Santa Catarina, Brazil (27.8086°S, 50.3306°W), in Mar 2016. The fruits were placed in plastic containers and taken to the Laboratório de Pesquisa em Entomologia of the Centro de Ciências Agroveterinárias da Universidade do Estado de Santa Catarina (CAV-UDESC) in Lages, where they were washed in a 1% solution of sodium hypochlorite, transferred to plastic pots (750 mL) covered with voile and containing sterile moist vermiculite, and kept at 25

± 2 °C, 70 ± 10% RH, and a 12:12 h L:D photoperiod. Larvae, pupae, and adults that emerged from the fruits were collected every 2 d. Adult drosophilids were killed in a freezer, stored in 70% alcohol, and observed under a stereomicroscope for species identification according to EPPO (2013). Voucher specimens of *D. suzukii* were stored in 70% alcohol and deposited at the Museu de Entomologia of the CAV-UDESC.

Drosophila suzukii is native to Asia but has invaded Europe and North and South America (Hauser et al. 2009; Calabria et al. 2012; Deprá et al. 2014), where it has become a pest of soft and thin-skinned fruit crops as blackberries, blueberries, cherries, mulberries, raspberries, strawberries, some wine grape cultivars, and ornamental plants (Lee et al. 2011, 2015; Yu et al. 2013; Ioriatti et al. 2015). This is the first record of *D. suzukii* in feijoa. In addition, these results demonstrate the feasibility of feijoa as an alternative host for *D. suzukii*. Skin thickness of the feijoa fruit can reach 12 mm (Ducroquet et al. 2000), thus being considered a species of thick-skinned fruit and, therefore, unsuitable for *D. suzukii* oviposition, because the adult fly is unable to successfully lay eggs in the fruit flesh (Stewart et al. 2014). Although it is unlikely that *D. suzukii* may lay eggs in hard and thick-skinned fruit crops, this species is able to complete its development when thick-skinned fruits are damaged, rotten, or overripe (Steffan et al. 2013; Stewart et al. 2014). It has been reported before that feeding and oviposition damage caused by adults of *C. psidii* in feijoa fruit facilitate infections by pathogens such as *Colletotrichum* sp. (Phyllachoraceae) (Ducroquet et al. 2000) and, similarly, could have enabled females of *D. suzukii* to deposit eggs in the lesions present in the skin of the fruit (Fig. 1).

Our knowledge on preferred or alternative hosts of *D. suzukii* has been increasing from surveys done outside growing areas (Lee et al. 2015; Poyet et al. 2015). Reporting feijoa as an alternative host for *D. suzukii* is important because it has thick-skinned fruits, thus showing the possibility of this pest to adapt to different hosts available in the colonization areas. In addition, *A. sellowiana* is a fruit crop of economic importance in many countries, mainly in Asia, North and South America, and Oceania, and *D. suzukii* may become a pest of feijoa in these regions because it is native to Asia and is widely distributed in North America and Europe (Asplen et al. 2015).

In conclusion, we can affirm that *D. suzukii* is prevalent in Brazil. Furthermore, it can cause damage to *A. sellowiana* fruits and perhaps other native or cultivated fruit crops with thick-skinned fruits.

¹Centro de Ciências Agroveterinárias, Universidade do Estado de Santa Catarina, Lages, Santa Catarina, 88520-000, Brasil; E-mail: gaby.florestal@gmail.com (G. K. S.), vivilunelli.oliveira@gmail.com (V. L. O.), mari.boff@udesc.br (M. I. C. B.)

²Centro de Ciências Biológicas e da Natureza, Universidade Federal do Acre, Rio Branco, Acre, 69920-900, Brasil; E-mail: tiago.florestal@gmail.com (T. G. P.)

³Estação Experimental de Lages, Empresa de Pesquisa Agropecuária e Extensão Rural de Santa Catarina, Lages, Santa Catarina, 88502-970, Brasil; E-mail: boff.pedro@yahoo.com.br (P. B.)

*Corresponding author; E-mail: gaby.florestal@gmail.com (G. K. S.)



Fig. 1. *Acca sellowiana* fruit showing characteristic symptoms of *Conotrachelus psidii* attack: damage caused by feeding (black circles) and oviposition (white circles). An adult male of *C. psidii* is indicated by a black arrow, and an egg-laying adult female of *Drosophila* sp. is indicated by a white arrow.

The authors thank the Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq), Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES), Rede Guarani/Serra Geral - FAPESC TO 2015TR10672, and the Núcleo Agroecologia e Saúde Ambiental FAPESC/CNPq TO TR2012000363 for the financial support.

Summary

We report, for the first time, the occurrence and development of *Drosophila suzukii* Matsumura (Diptera: Drosophilidae) in fruits of *Acca sellowiana* (Berg) Burret (Myrtaceae). Although fruits of *A. sellowiana* present hard and thick skin, damage caused by another insect pest, *Conotrachelus psidii* Marshall (Coleoptera: Curculionidae), may have enabled fruit infestation by *D. suzukii*.

Key Words: feijoa; spotted wing drosophila; invasive pest; first report

Sumário

Registra-se, pela primeira vez, a ocorrência e desenvolvimento natural de *Drosophila suzukii* Matsumura (Diptera: Drosophilidae) em frutos de *Acca sellowiana* (Berg) Burret (Myrtaceae). Apesar dos frutos

de *A. sellowiana* apresentarem casca grossa e dura, danos causados por outro inseto-praga, *Conotrachelus psidii* Marshall (Coleoptera: Curculionidae), podem ter viabilizado a infestação destes por *D. suzukii*.

Palavras Chave: feijoa; drosófila-da-asa-manchada; praga exótica; primeiro registro

References Cited

- Amarante CVT, Santos KL. 2011. Goiabeira-serrana (*Acca sellowiana*). Revista Brasileira de Fruticultura 33: 1–2.
- Asplen M, Anfora G, Biondi A, Choi D-S, Chu D, Daane KM, Gilbert P, Gutierrez AP, Hoelmer KA, Hutchison WD, Isaacs R, Jiang Z-L, Kárpáti Z, Kimura MT, Pascual M, Phillips CR, Plantamp C, Ponti L, Véték G, Vogt H, Walton VM, Yu Y, Zappalà L, Desneux N. 2015. Invasion biology of spotted wing drosophila (*Drosophila suzukii*): a global perspective and future priorities. Journal of Pest Science 681: 469–494.
- Barni EJ, Ducroquet JP, Silva MC, Neto RB, Presser RF. 2004. Potencial de mercado para goiabeira-serrana catarinense. Epagri, Florianópolis, Brazil.
- Calabria G, Máca J, Bächli G, Serra L, Pascual M. 2012. First records of the potential pest species *Drosophila suzukii* (Diptera: Drosophilidae) in Europe. Journal of Applied Entomology 136: 139–147.
- Depré M, Poppe JL, Schmitz HJ, De Toni DC, Valente VLS. 2014. The first records of the invasive pest *Drosophila suzukii* in the South American continent. Journal of Pest Science 87: 379–383.
- Ducroquet JPHJ, Hickel ER, Nodari RO. 2000. Goiabeira-serrana (*Feijoa sellowiana*). Funep, Jaboticabal, Brazil.
- EPPO. 2013. Diagnostics PM 7/115 (1) *Drosophila suzukii*. Bulletin OEPP/EPPO Bulletin 43: 417–424.
- Hauser M, Gaimari S, Damus M. 2009. *Drosophila suzukii* new to North America. Fly Times 43: 12–15.
- Ioriatti C, Walton VM, Dalton D, Anfora G, Grassi A, Maistri S, Mazzoni V. 2015. *Drosophila suzukii* (Diptera: Drosophilidae) and its potential impact to wine grapes during harvest in two cool climate wine grape production regions. Journal of Economic Entomology 108: 1148–1155.
- Lee JC, Bruck DJ, Curry H, Edwards D, Haviland DR, Van Steenwyk RA, Yorgey BM. 2011. The susceptibility of small fruits and cherries to the spotted-wing drosophila, *Drosophila suzukii*. Pest Management Science 67: 1358–6137.
- Lee JC, Dreves AJ, Cave AM, Kawai S, Isaacs R, Miller JC, Van Timmeren S, Bruck DJ. 2015. Infestation of wild and ornamental non crop fruits by *Drosophila suzukii* (Diptera: Drosophilidae). Annals of the Entomological Society of America 108: 117–129.
- Luckmann AB, Rosa JM, Boff P. 2009. Danos e dispersão do gorgulho *Conotrachelus* sp. em goiabeira serrana (*Acca sellowiana*) sob monocultivo e ecossistemas “capões”. Revista Brasileira de Agroecologia 4: 1224–1228.
- Plant and Food Research Institute of New Zealand Ltd. 2013. Fresh Facts New Zealand Horticulture 2013. Corporate publication, Auckland, <http://www.freshfacts.co.nz/file/fresh-facts-2011.pdf> (last accessed in Mar 2015).
- Poyet M, Le Roux V, Gibert P, Meirlan A, Prévost G, Eslin P, Chabrierie O. 2015. The wide potential trophic niche of the Asiatic fruit fly *Drosophila suzukii*: the key of its invasion success in temperate Europe? PLoS One 10: e0142785.
- Steffan SA, Lee JC, Singleton ME, Vilaine A, Walsh DB, Lavigne LS, Patten K. 2013. Susceptibility of cranberries to *Drosophila suzukii* (Diptera: Drosophilidae). Journal of Economic Entomology 106: 2424–2427.
- Stewart TJ, Wang XG, Molinar A, Daane KM. 2014. Factors limiting peach as a potential host for *Drosophila suzukii* (Diptera: Drosophilidae). Journal of Economic Entomology 107: 1771–1779.
- Weston RJ. 2010. Bioactive products from fruit of the feijoa (*Feijoa sellowiana*, Myrtaceae): a review. Food Chemistry 121: 923–926.
- Yu D, Zalom FG, Hamby KA. 2013. Host status and fruit odor response of *Drosophila suzukii* (Diptera: Drosophilidae) to figs and mulberries. Journal of Economic Entomology 106: 1932–1937.