Drosophila suzukii (Diptera: Drosophilidae) Arrives at Minas Gerais State, a Main Strawberry Production Region in Brazil

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Source: Florida Entomologist, 99(4) : 796-798

Published By: Florida Entomological Society

URL: https://doi.org/10.1653/024.099.0439

Drosophila suzukii (Diptera: Drosophilidae) arrives at Minas Gerais State, a main strawberry production region in Brazil

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The spotted wing drosophila, *Drosophila suzukii* (Matsumura) (Diptera: Drosophilidae), has recently invaded many countries and harmed soft-skinned fruit production worldwide (Dreves et al. 2009; Walsh et al. 2011; Burrack et al. 2013; Cini et al. 2014). In Brazil, *D. suzukii* was first recorded by Deprá et al. (2014) in a drosophilid diversity survey carried out in the southern regions of Brazil in 2013. In these regions, many of the preferred hosts are cultivated, but this pest has been found infesting not only the traditional hosts such as strawberry (*Fragaria ananassa* Duch; Rosaceae) (Santos 2014) but also native fruits, such as Cattley guava (*Psidium cattleyanum* Sabine; Myrtaceae) and Surinam cherry (*Eugenia uniflora* L.; Myrtaceae) (Andreazza et al. 2015). Previously, however, heavy damages and economic losses have been reported only in strawberry production in the state of Rio Grande do Sul (Santos 2014).

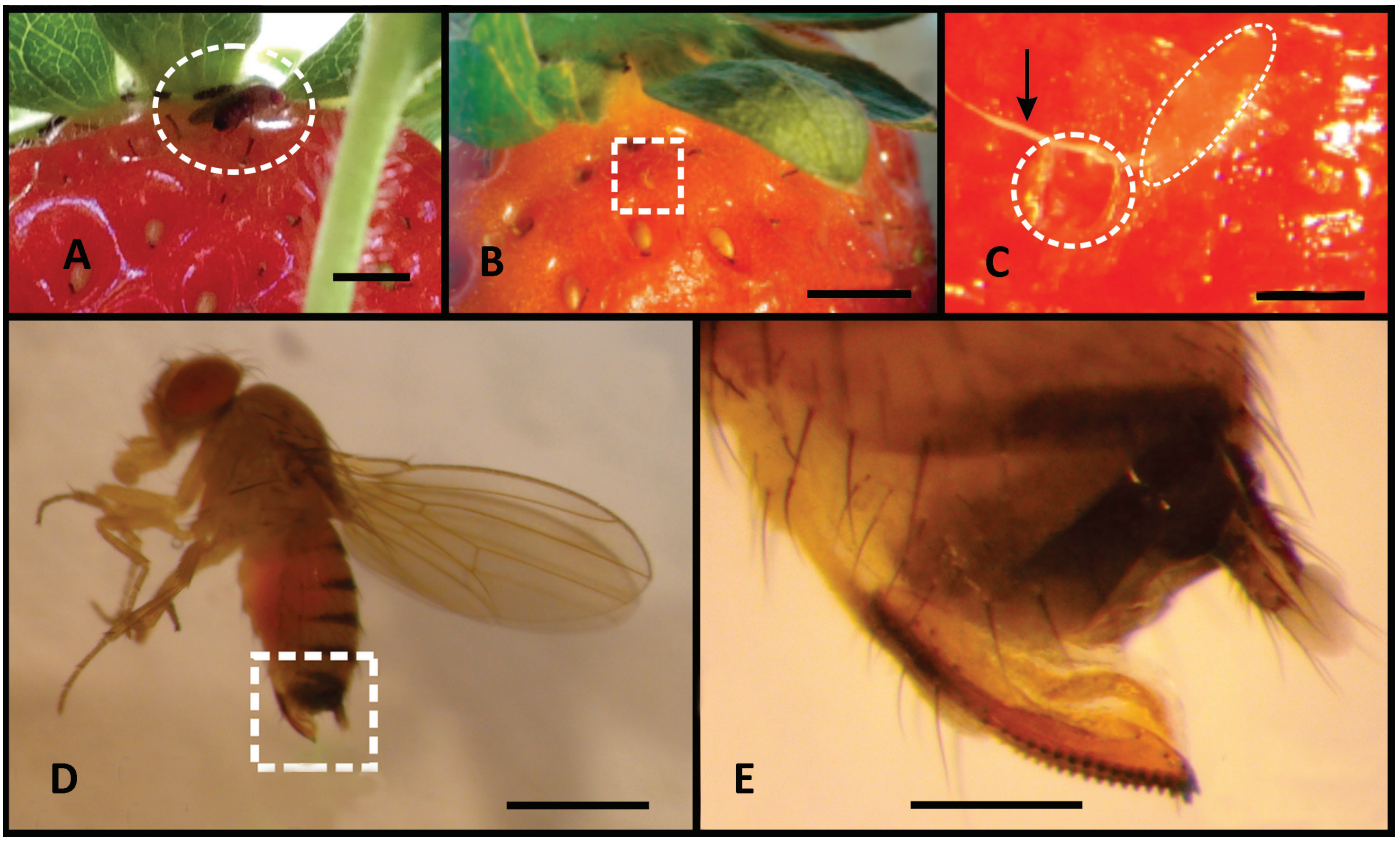

Fig. 1. *Drosophila suzukii* adult female collected at Minas Gerais State, Brazil. (**A**) Female on a strawberry fruit in the field, scale bar = 3 mm; (**B**) *D. suzukii* egg laid inside the fruit (white box), scale bar = 5 mm; (**C**) oviposition hole (white circle) with the egg's spiracles (black arrow) coming out. The egg laid beneath the fruit epidermis is delimited by a white ellipse, scale bar = 500 µm; (**D**) the female from image **A** viewed under microscope, scale bar = 500 µm; and (**E**) the female characteristic, serrated ovipositor, scale bar = 200 µm.

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Minas Gerais is the biggest strawberry producer in Brazil, with around 1,700 ha in cultivation (IBGE 2014). As in Rio Grande do Sul, where *D. suzukii* was first observed causing economic losses in strawberry production (Santos 2014), arrival of this fly in Minas Gerais may cause enormous impact and affect both local growers and the main markets. *Drosophila suzukii* has spread throughout the Brazilian territory since its discovery in the states of São Paulo (Vilela & Mori 2014), Rio de Janeiro (Bitner-Mathé et al. 2014), and Goiás (Paula et al. 2014). Following reports from producers of high rates of unmarketable flaccid-like strawberries, the authors visited strawberry fields during Mar 2016 and surveyed for this pest.

In an organic production field located in the municipality of Ervália (20.8423083°S, 42.6756277°W), Minas Gerais, drosophilid adults were seen flying around both damaged and ripe, undamaged strawberries. Flies were collected using a handheld aspirator. Seven drosophilid flies were collected from damaged fruits and 1 fly was collected from undamaged fruit (Fig. 1A). One *D. suzukii* male was also seen (Fig. 2), but we failed to collect it. Undamaged fruit was collected to evaluate for the presence of *D. suzukii* eggs.

In the same field, 53 strawberry fruits presenting advanced flaccid-like symptoms (damaged) were collected, placed inside a plastic container (1.5 L) with vented openings, and returned to the laboratory in a Styrofoam cooler. Additionally, a guava tree (*Psidium guajava* L.; Myrtaceae) adjacent to the strawberry field showed symptoms of infestations by several pests, and 1 guava fruit was collected and returned to the laboratory.

Flies were examined under a stereomicroscope (at 40×) (SZX-SDO2, Olympus Corporation, Tokyo, Japan). The strawberry and guava fruits were separately placed on a vermiculite layer inside 2 plastic cages containing venting openings sealed with voile cloth. Cages were checked daily, and the emerged flies were examined under the stereomicroscope and species determined using Vlach (2013); characters used in diagnostics, such as ovipositor (Fig. 1E) and wing pattern (Fig. 2) are illustrated.

One of the 7 flies collected from damaged fruit and 1 fly collected from the undamaged fruit were identified as females of *D. suzukii* (Fig. 1D). Furthermore, one *D. suzukii* egg was found inside the field-collected undamaged strawberry (Fig. 1B and C), and an adult *D. suzukii* male emerged 10 d later. From the damaged strawberry fruits, 32 *D. suzukii* adults (18 females and 14 males) emerged. As expected, other species of opportunistic secondary pests emerged from the fruits, primarily *Zaprionus indianus* Gupta (Diptera: Drosophilidae) (94 specimens), also seen in the field (Fig. 2), which is widely distributed in Brazil and Central and North America regions (Joshi et al. 2014; Van Timmeren & Isaacs 2014; Andreazza et al. 2015; Bernardi et al. 2015; Lasa & Tadeo 2015). From the guava fruit, 28 *Z. indianus* and 3 *D. suzukii* adults (2 females and 1 male) emerged, confirming that this native fruit is a suitable host (Andreazza et al. 2015).

The authors highlight here the importance of documenting *D. suzukii* in Minas Gerais, because this region is the main producer of strawberries in Brazil (IBGE 2014; Silveira & Guimarães 2014). Considering the potential of this species to infest other native hosts, additional work should be done to document the geographic and host range in Minas Gerais. As most management strategies for this pest are based on synthetic insecticides (Van Timmeren & Isaacs 2013), it is particularly important to develop and implement control strategies that are compatible with fruit production in this region and that can be a part of integrated pest management systems.

We thank the CAPES Foundation, the National Council of Scientific and Technological Development (CNPq), the Minas Gerais State Foundation for Research Aid (FAPEMIG), and the Arthur Bernardes Foundation (FUNARBE) for grants provided to this work.

Fig. 2. Damaged strawberry in the field with drosophilid flies including a *Drosophila suzukii* male (inlet) with its characteristic wing black dots (arrows) and 2 adults of *Zaprionus indianus* (white circles), scale bar = 5 mm.

Summary

Drosophila suzukii (Matsumura) (Diptera: Drosophilidae) was first collected in Minas Gerais State, Brazil, in Mar 2016, in the municipality of Ervália, from an organic strawberry field. In Brazil, this pest was first recorded in the southernmost region, in Rio Grande do Sul and Santa Catarina states. *Drosophila suzukii*'s arrival to Minas Gerais State, about 1,500 km north from its first record, should alarm the growers, the research community, and the authorities, because this region is the main strawberry production region in Brazil and is now susceptible to large increases in production losses caused by this invasive species. The lack of alternative effective management tools for *D. suzukii*, besides traditional chemical sprays, makes this pest an important area of study. Future research should focus on finding strategies that match with different local growing systems and edaphoclimatic conditions.

Key Words: spotted wing drosophila; first record; invasive pest; crop protection

Sumário

Drosophila suzukii (Matsumura) (Diptera: Drosophilidae) foi primeiramente coletada no estado de Minas Gerais em Março de 2016, no município de Ervália, em uma produção orgânica de morangos. No Brasil, esta praga foi primeiramente encontrada na região do extremo sul, nos estados do Rio Grande do Sul e Santa Catarina. A chegada de *D. suzukii* à Minas Gerais, aproximadamente 1.500 km ao norte do seu primeiro

registro, deve alertar os produtores, a comunidade cientifica e autoridades, já que esta região é a principal região produtora de morangos do Brasil e agora está suscetível à aumentos nas perdas da produção causadas por essa espécie invasiva. A falta de ferramentas de manejo efetivas alternativas para *D. suzukii*, além do controle químico tradicional, torna esta praga um importante objeto de estudo. Pesquisas futuras deverão focar em encontrar ferramentas que combinem com diferentes sistemas de produção e condições edafoclimáticas locais.

Palavras Chave: Drosófila-da-asa-manchada; primeiro relato; praga invasiva; fitossanidade

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