

composition of the parental males. Laborda *et al.* (2009) performed their study using 30 flies from each strain. Therefore, it is expected that if we analyze more samples our number of alleles must increase.

This work was a preliminary study that will be important to generate data to evaluate the number of parental males that contributed to the formation of each isofemale line, which will be critical to understand genetic parameters of sperm competition in *Drosophila mediopunctata*. Sperm competition is one of several aspects that are relevant to understand reproductive characters in this species.

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### **The invasive *Drosophila suzukii* (Diptera: Drosophilidae) uses native plant species of the Brazilian savanna as hosts.**

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## **Introduction**

*Drosophila suzukii* (Matsumura), also known as spotted wing drosophila, is a native species from western Asia, characterized by damaging soft-skinned and unwounded fruits to perform oviposition (Acheampong, 2010). For this reason, this species is considered an important pest, especially in agricultural systems, bringing economic loss to diverse crops (*e.g.*, strawberry, Wollmann *et al.*, 2016). In recent decades, surveys of the occurrence of this species have shown its rapid expansion around the world (*i.e.*, Asia, Europe, South and North America). This wide geographic distribution of *D. suzukii* suggests high potential of colonization of different environments, as well as high thermal tolerance (Cini *et al.*, 2012). Furthermore, its short life cycle and high fecundity capacity (average production of 600 eggs throughout its life cycle) allow an explosive population growth in this species when under favorable conditions (Cini *et al.*, 2012).

In Brazil, records of this species are recent and occurred in the south and center-west of the country. Paula *et al.* (2014) were the first to find individuals of this species in the Cerrado region in 2013, a biome known for its high biodiversity, and threatened by the constant agricultural expansion (Lahsen *et al.*, 2016). However, little is known about the influence of this species on natural environments and its effect as an invasive species and fruit pest of native species. In this study, we document and discuss about *D. suzukii* as a fruit predator of three native species of Cerrado biome.

## **Materials and Methods**

This study was conducted at IBGE Ecological Reserve (15° 56'S, 47° 53'W), a protected area located in the south of Federal District, Brazil, with more than 10,000 ha (Paula *et al.*, 2014). This site is embedded in

the biome Cerrado, a hotspot of biodiversity (Myers *et al.*, 2000). In our study site, vegetation type is cerrado *stricto sensu*, characterized by the presence of continuous ground layer of grasses, and a cover (ranging from 10-60%) of shrubs and wood trees. The climate is tropical (Köppen Aw), characterized by dry (May to September) and wet (October to April) seasons.

The samplings occurred from September to December (2016) in an experimental area consisting of different treatments of soil fertilization with sixteen 15 × 15 m plots separated by at least 10 m from each other. Since 1998, soil nutrients (N, P, N plus P and Ca) are applied in these plots, which are arranged in a randomized design (see Bustamante *et al.*, 2012). For this work, two transects (15 × 1 meters) were established in each plot. In each transect, the number of seed units per plant species was counted, a seed unit typically being a fruit, or head in the case of Asteraceae. Subsequently, for individuals with less than 100 units per transect all seed units were collected, while for plant species with larger number of seed units, a total of 100 seed units per individual were collected. In the laboratory, biweekly checks (five in total for each) were made for each paper bag to the collection of insects (adults) that emerged from the seed units. The insects were stored in eppendorf tubes with 70% alcohol for later identification by taxonomists.



Figure 1. Male of spotted wing drosophila (*D. suzukii*) collected in fruits of native plant species of Cerrado.

## Results

We collected more than 800 insects (Coleoptera, Diptera, Hymenoptera, and Lepidoptera) from 32 plant morphospecies. Of a total of 92 Diptera individuals, *ca.* 68% belonged to the genus *Drosophila*. Males of the exotic *Drosophila suzukii* (Figure 1) were reared from three native plant species: *Miconia albicans* (Sw.), Triana (Melastomataceae), *M. fallax* DC, and *Blepharocalyx salicifolius* (Kunth) O. Berg (Myrtaceae). Considering only these three plant species, we collected in total 2498 seed units, out of which 55.4% were from *M. albicans*, 20.4% from *M. fallax*, and 24.0% from *B. salicifolius*. The incidence rate of *D. suzukii* males was similar in all three species (see Figure 2). Further taxonomic checks are needed to verify the incidence of females.

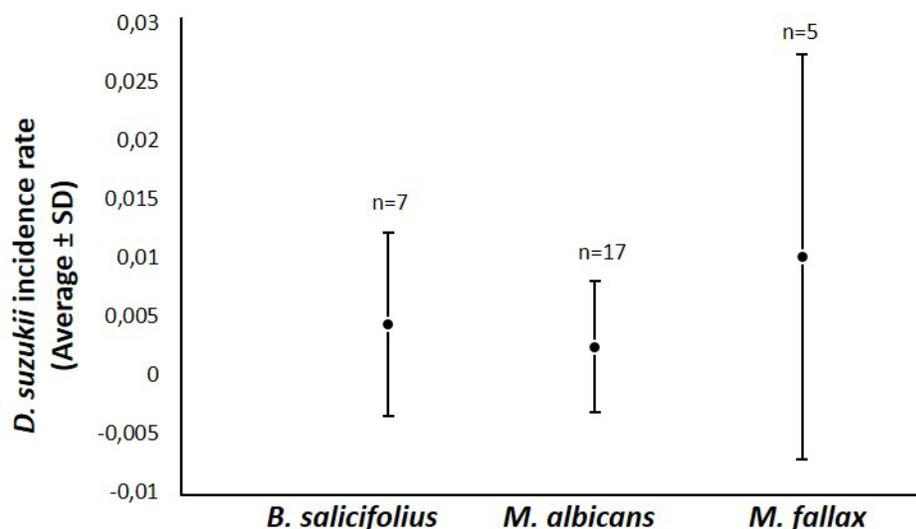


Figure 2. Incidence rate of *D. suzukii* in three plant species of cerrado.

## Discussion

This study shows that the invasive *Drosophila suzukii* is able to use native species of Brazilian savannas as larval resources. As expected, the samplings occurred from the beginning of the rainy season, because it is a season where breeding sites are more available to drosophilid populations (Paula *et al.*, 2014). Annual precipitation is an important abiotic variable for the establishment of populations of *D. suzukii* (dos Santos *et al.*, 2017), and the southern region of Brazil is thought to have more favorable climatic conditions to the establishment success of *D. suzukii* than the study areas (Benito *et al.*, 2016). However, our findings indicate that this species is not occurring occasionally, but already established in the study region. As most crop pests can sustain their populations within agricultural regions, such establishment is likely a spill-over effect from fruit production areas in Cerrado region, and have the potential of threatening native plant populations.

Studies indicate that the greatest losses on fruit production through oviposition of *D. suzukii* occur in species of plants with small fruits (Werts and Green, 2014). Plants of the genus *Miconia* (Melastomataceae), characterized by their wide distribution in the cerrado biome, usually have small and fleshy fruits, which would explain the greater number of flies emerging from their fruits in this work. These results reinforce the need to consider the management of exotic pests not only in agricultural systems but also in natural ecosystems given the potential for invasion of *D. suzukii* and its negative effect on the reproductive success of native species. More surveys of the occurrence of this species in Cerrado biome should be done to better evaluate its current distribution in that region. Finally, the identification of spotted wing drosophila' parasitoids in Cerrado areas would be helpful for the creation of efficient management strategies including these potential biocontrol agents.

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### **Expression of *UAS-lacZ*<sup>4-2-4b</sup> under the control of *elav-Gal4* significantly reduces lifespan in *Drosophila melanogaster*.**

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## Introduction

The *UAS/Gal4* system created by Brand and Perrimon (1993) is used extensively in *Drosophila* for the expression of transgenes under specific conditions. This technique can utilize ribonucleic acid interference (RNAi) to post-transcriptionally silence endogenous genes (Fire *et al.*, 1998), in order to determine the phenotypic consequences of loss of function and deduce their functions and mechanisms (Perrimon *et al.*,