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SHORT COMMUNICATION

First records of the fruit pest *Drosophila suzukii* (Matsumura, 1931) (Diptera: Drosophilidae) in South Africa

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Native to Southeast Asia, the fly *Drosophila suzukii* (Matsumura) (Diptera: Drosophilidae), or Spotted Wing Drosophila, has become a major pest of soft-skinned fruits in several countries globally. However, its distribution in sub-Saharan Africa was limited to Kenya and some Indian Ocean Islands. In 2021, an industry-funded surveillance project was initiated to determine whether the pest was present in the Western Cape and Eastern Cape provinces of South Africa. Trapping was conducted using lures developed for this species in bucket-type traps. The first *D. suzukii* detection was of a single male, trapped on the 25th of April 2022 in the Langkloof region in the Eastern Cape province. This research presents the first report of *D. suzukii* occurring within South Africa. We also present the results of ongoing surveys showing the current spread of the pest in South Africa.

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The Spotted Wing Drosophila (SWD), *Drosophila suzukii* (Matsumura) (Diptera: Drosophilidae) (Afrikaans: 'suzuki-asynvlieg') is a pest of soft fruits that was first detected in Japan in 1916 (Lee et al. 2011). Although very similar in size (2–4 mm long) and overall appearance (red eyes, yellow-brown body) to the cosmopolitan vinegar fly within the same family, *Drosophila melanogaster*, *D. suzukii* males can be differentiated by the presence of a dark spot on the costal margin of the wing, whilst females possess a characteristic, saw-like ovipositor (visible under magnification) (Figure 1). This pest has had an economic impact in all areas of the world where it has invaded (such as Europe and the United States of America) (Lee et al. 2011) due to its unique preference for developing fruit (unlike that of its vinegar fly counterparts, which are considered secondary pests and prefer decomposing fruit). Infestations of *D. suzukii* have been detected in various commercial crops worldwide, for example, Asplen et al. (2015) mentions infestations in stone fruit (primarily cherries), strawberries, raspberries, blackberries and blueberries, but they also attack a wide variety of other ripening fruits (both commercial and non-commercial) as soon as they start to change colour during ripening (Stacconi 2022). Annual costs associated with SWD damage and management have been estimated and vary substantially between production regions, with estimates from US$6.8 million (Yeh et al. 2020) to between US$200–500 million (Wiman et al. 2016; Yeh et al. 2020). Females oviposit eggs in a variety of fruit (that are typically in the early stages of ripening), and larvae then feed on the developing fruit. *Drosophila suzukii* larvae feed on fruit pulp (while fruit ripen) until pupation, often rendering infested fruit unmarketable (Hubhachen et al. 2023), leading to economic losses for growers (Wiman et al. 2016).

The fly has invaded several soft fruit industries in the southern hemisphere, including Peru, Chile, and Argentina (Garcia et al. 2022). The presence of *D. suzukii* has previously been reported in other countries in Africa such as La Réunion during 2013 (EPPO 2014), Morocco during 2017 (Boughdad et al. 2020), in the Comoros Archipelago during 2017 (Hassani et al. 2020), Algeria during 2018 (Aouari et al. 2022) and Kenya during 2019 (Kwadha et al. 2021). The polyphagous nature of the fly (Asplen et al. 2015) and its ability to rapidly disperse, together with South Africa's heterogeneous agricultural landscapes, as well as the perceived potential negative impact through crop damage and related increase in management costs, are likely to complicate the successful management of this pest in South Africa. Given the economic risks associated with the invasion of the fly (as seen in other invaded regions) and its rapid, global invasion, a survey was initiated in 2021 to determine if *D. suzukii* was present in the fruit-growing regions of the Western Cape, South Africa.

Spotted Wing Drosophila PheroLure® (Insect Science (Pty) Ltd., Tzaneen, South Africa) was developed by adapting the four-component blend investigated by Cha et al. (2013). The blend consisted of ethanol, acetic acid, methionol, and acetoin, which was then combined to form a 20 g lure loaded into a plastic pouch, which was used in a dry McPhail trap with a dichlorvos tablet (formulated and supplied by Insect Science (Pty) Ltd., Tzaneen, South Africa). The McPhail trap was painted red on the outside, as red was previously reported to be highly attractive to *D. suzukii* (Lee et al. 2013). Over 70 traps were placed throughout the Western Cape in various fruit-growing regions between 2021 and 2022, with *ad hoc* sampling conducted in the Langkloof area, which extends into the Eastern Cape.

The first detection of *D. suzukii* in South Africa was of a single male, trapped on the 25th of April 2022, near a fruit pack shed in the Misgund area of the Langkloof region in the Eastern Cape province (-33.75702095°; 23.48272621°) (Table 1). Due to high numbers of drosophilids caught in traps (an average of 2 241 caught per trap) during this survey, processing of samples was delayed, and the *D. suzukii* male was only identified and recorded during October 2023. After this first detection, a trapping network with approximately 130 additional traps (not painted red), operated and funded by the pome and stone fruit, berries, table grape and wine grape industries of South Africa, was initiated in February 2024 to include these fruit types and additional locations across the country (Figure 2). It should also be noted that some *D. suzukii* were occasionally trapped in tephritid fruit fly bucket traps loaded with E.G.O. PheroLure® (Insect Science (Pty) Ltd., Tzaneen, South Africa).

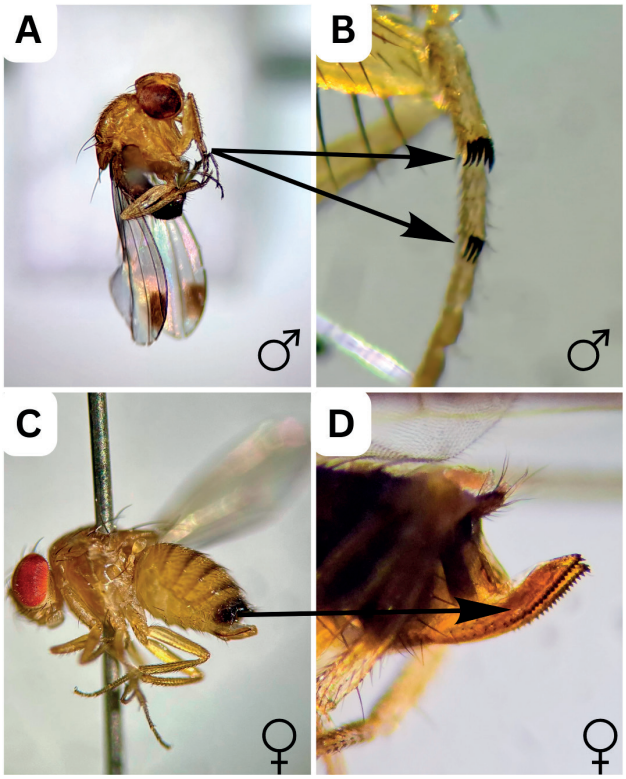

Figure 1: *Drosophila suzukii* characteristics. A – Male showing dark wing spots; B – Close-up of male showing two rows of sex combs on the tarsi; C – Female indicating clear wings and prominent serrated ovipositor; D – Close-up of female showing the prominent serrated ovipositor.

The first and all subsequent *D. suzukii* males were identified morphologically according to Yuzuki and Tidon (2020), based on the location of one dark spot across vein R_{2+3} on each wing (Figure 1A) and two rows of 3–4 setae (sex combs) on the protarsus (Figure 1B). Subsequent catches using SWD PheroLure® attractants in yellow-bucket traps at other locations also included females, which were identified based on their prominent ovipositor (Figure 1C,D); their wings do not show any prominent features like the males. DNA barcoding of the *COI* gene using the universal primers LCO 1490 and HCO 2198 (Folmer et al. 1994) was used to confirm all male and female morphological identifications at new locations (Table 1).

Drosophila suzukii are found in different climatic regions and act as agricultural pests across many different environmental parameters (Asplen et al. 2015; Shearer et al. 2016). According to the Köppen-Geiger system, the area in which it was first detected in South Africa has a warm temperate climate, with high humidity and warm summers (Cfb) (Conradie and Kumirai, 2012). A review of the temperature and humidity effects on population parameters of *D. suzukii* shows high oviposition rates occurring between 19 and 30 °C, with approximately 2–4 eggs being laid per female per day in the wild (Winker et al. 2020). Tochen et al. (2016) showed that areas of higher humidity are more favourable for the reproduction and longevity of *D. suzukii*. Shaded canopies in irrigated orchards can provide favourable microclimates for this species, even in drier regions (Tochen et al. 2016). They adapt quickly to climatic changes and can spread rapidly through flight or via the exportation and trading of fruits (Rota-Stabelli et al. 2013). Since most of the fruit-growing regions of South Africa possess warm temperate climates, it is especially concerning when considering the flies' invasion potential.

Currently, *D. suzukii* is controlled predominantly through synthetic chemicals; however, studies have reported a high risk for the development of reduced sensitivity, for example, to malathion and spinosyns, chemicals commonly used against tephritid fruit flies (see Mishra et al. 2018). There is an absence of knowledge regarding predators and parasitoids that could effectively suppress *D. suzukii* populations in South Africa. Therefore, studies are required to identify possible natural enemies that could act as biological control candidates for controlling *D. suzukii* in South Africa (Kwadha et al. 2021). Monitoring of *D. suzukii* in South Africa will continue as part of a joint-industry surveillance programme to determine the ongoing spread of this species across South Africa and to determine its relative population dynamics across the growing season. This is the first report of *D. suzukii* occurring in South Africa, following the official notification on the detection of *D. suzukii* in the Republic of South Africa on 24th of May 2024 (IPPC 2024).

Table 1: First records of substantiated identification via both morphological and molecular tools (universal primers) of *Drosophila suzukii* in all provinces in South Africa. The date of identification is provided, since the date of trap capture is not available in all instances, and trapping did not commence at the same time. The sex of the first specimens is also indicated, in cases where a male and female specimen were identified, "both" is indicated.

Province	Location	Date of identification	Sex of specimen	Morphological identification	Molecular identification
Eastern Cape	Langkloof	20 October 2023	Male	Yes	Yes
Free State	Fouriesburg	22 April 2025	Male	Yes	Yes
Gauteng	Randfontein	12 February 2025	Both	Yes	Yes
KwaZulu-Natal	Curry's Post	9 February 2024	Both	Yes	Yes
Limpopo	Politsi	3 January 2024	Male	Yes	Yes
Mpumalanga	Marble Hall	1 July 2024	Male	Yes	Yes
North West	Rustenburg	28 February 2025	Both	Yes	Yes
Northern Cape	N/A	N/A	N/A	N/A	N/A
Western Cape	Napier	29 November 2023	Both	Yes	Yes

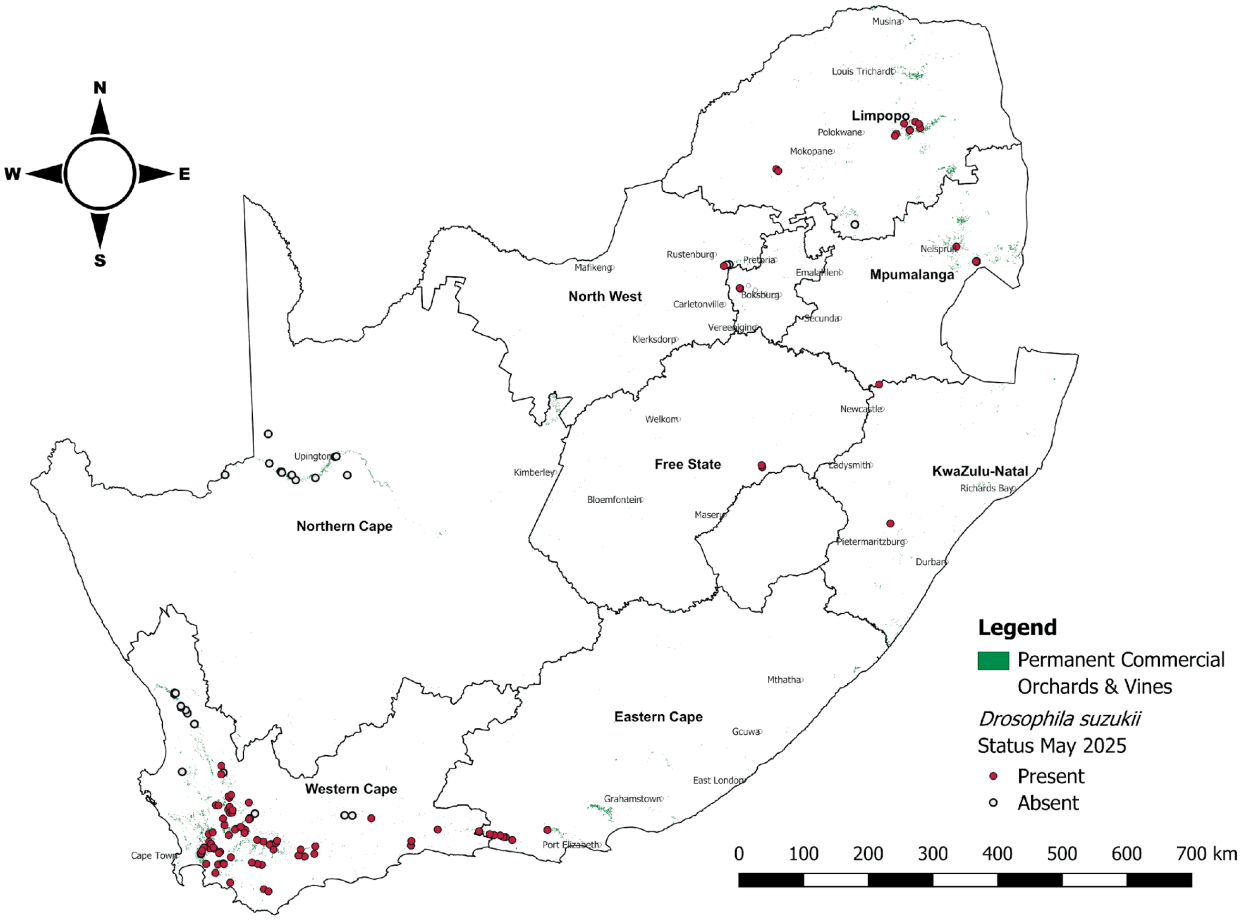

Figure 2: Current distribution of the known fruit pest *Drosophila suzukii* in South Africa as of 09 May 2025, indicating where presences and absences have been recorded in traps. Permanent commercial orchards and vines across South Africa are also indicated.

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