

# *Drosophila suzukii* Matsumura

## Current Status and Perspectives in South Africa

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Technical & Trade Symposium 2024

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# Notification on the detection of *Drosophila suzukii*, the Spotted Wing *Drosophila* (SWD) in the Republic of South Africa

Publication Date	Fri, 24 May 2024, 13:02
Last Updated	May 24, 2024, 1:04 p.m.
Report Number	ZAF-58/2
Country	South Africa
Pest Id	<i>Drosophila suzukii</i> - (DROSSU)
Report Status	Final
Hosts	<i>Drosophila suzukii</i> (SWD) was detected in Blueberry production areas in the notified areas.

**Pest Status (ISPM 8 - 2021)** ■ Present: not widely distributed and under official control

**Geographical Distribution** The NPPOZA was notified about the detection of *D. suzukii* in the Langkloof area in the KouKamma Local Municipality in the Eastern Cape Province on the 26th of October 2023. The NPPOZA in collaboration with different role-players and stakeholders initiated a delimiting survey to determine the spread of the pest in the country, according to the *D. suzukii* national action plan and relevant standards. The



## Spotted Wing Drosophila (SWD)

- Native to Asia
- Polyphagous pest - attacks **undamaged ripening** fruit
- Larvae feed on pulp - causes decay
- **Host:** Blueberries, raspberries, strawberries, cherries, peaches, nectarines, plums and several other wild/cultivated hosts
- Will infest damaged/fallen fruit

# SWD Biology & Life Cycle

- At optimal temperatures life cycle takes **7 - 15 days**
- Several generations per year + rapid increase in population numbers
- SWD can overwinter as adults

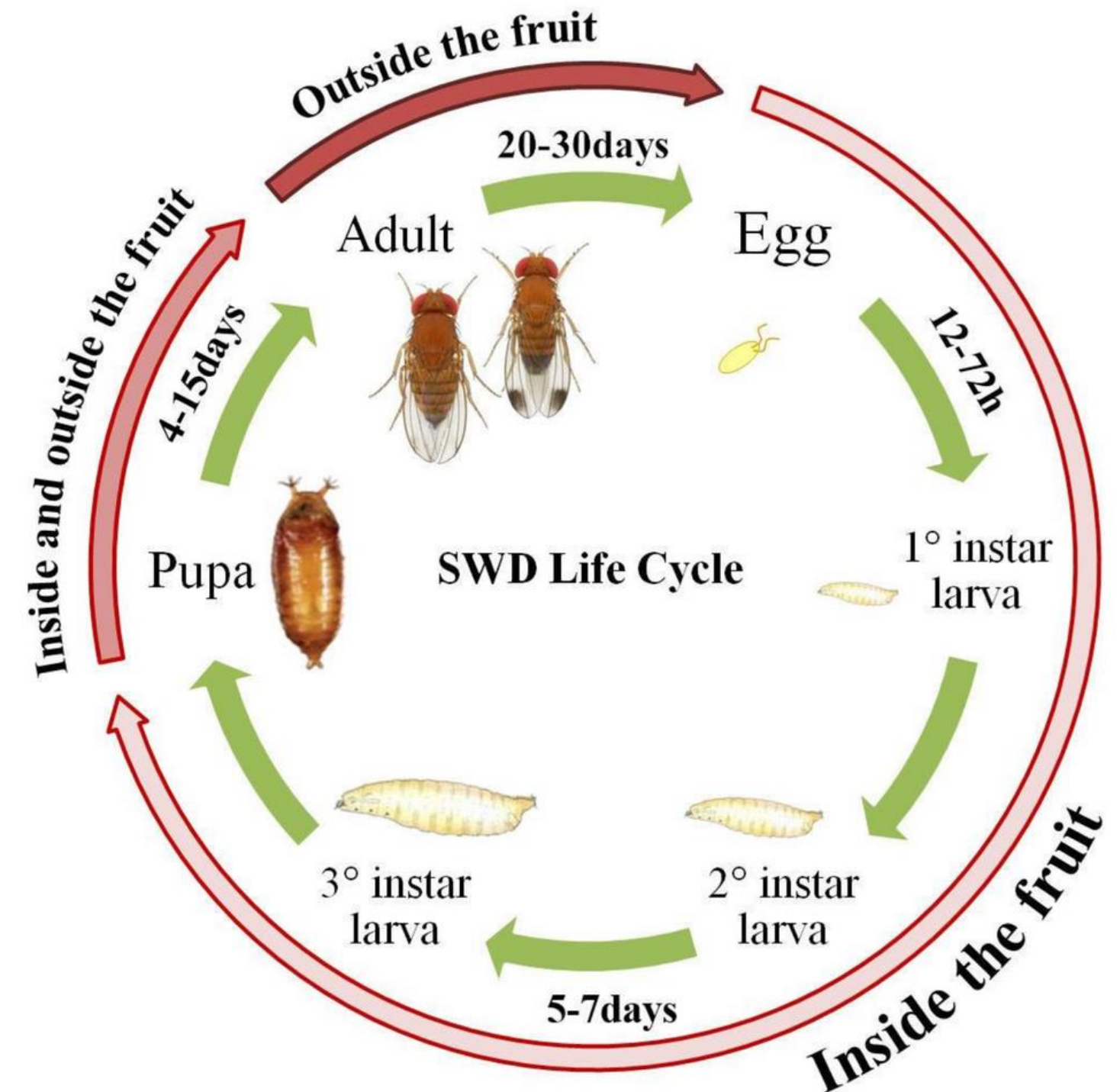


Illustration: Marco Rossi-Stacconi, © Oregon State University

# SWD Identification

Male



Dark Black/Brown Spots



Two Rows of Black Seta



Photo Credits: Zion Jodamus

# SWD Identification

No Spots



Female



Photo Credits: Zion Jodamus

# SWD Identification



SWD EGG

200 μm



MEDFLY EGG

500 μm

dorsal appendage tubes

# SWD Identification

1 mm

Anterior

Anterior

SWD

SWD

SWD

MEDFLY

MEDFLY

MEDFLY

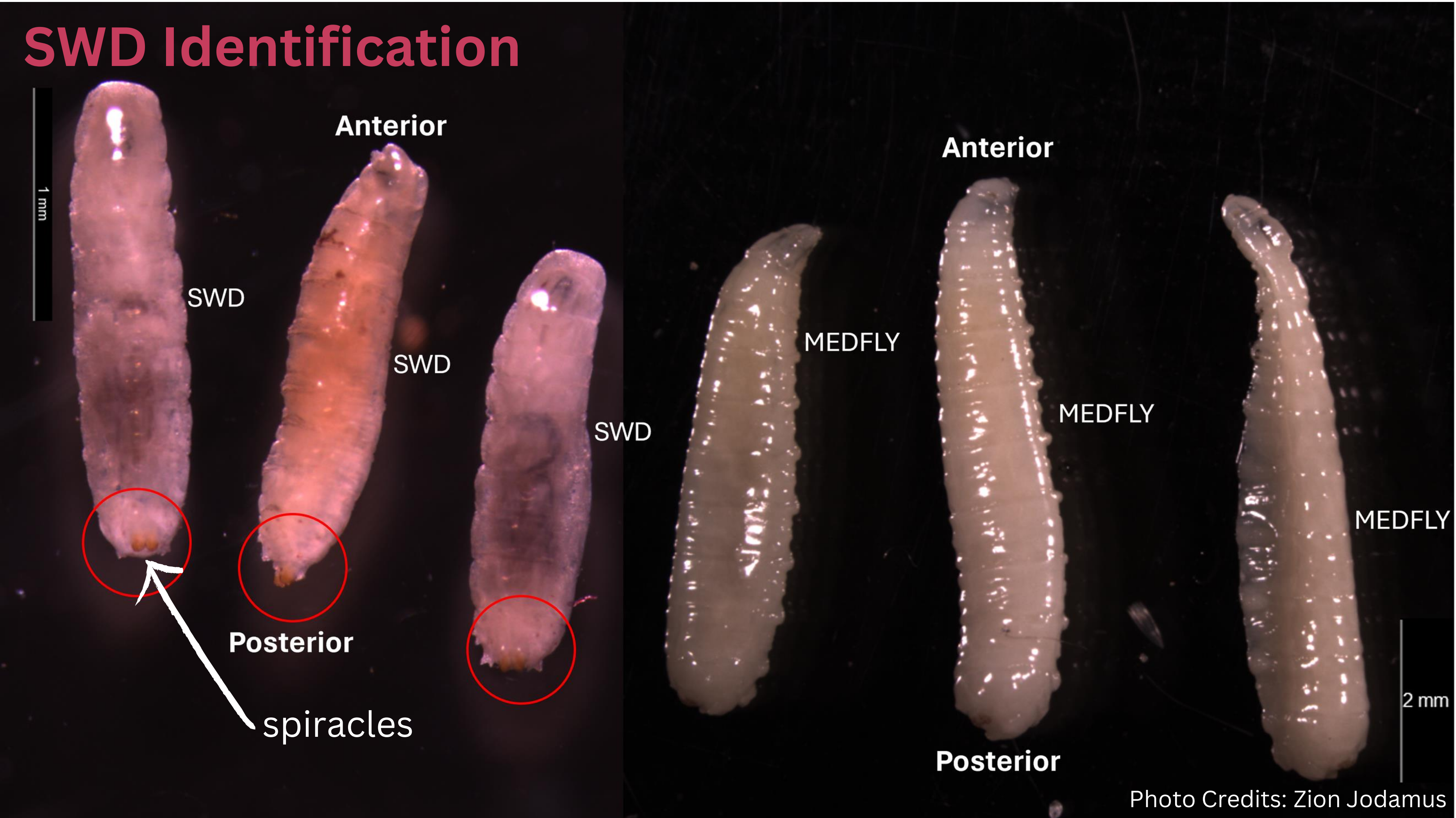
Posterior

Posterior

spiracles

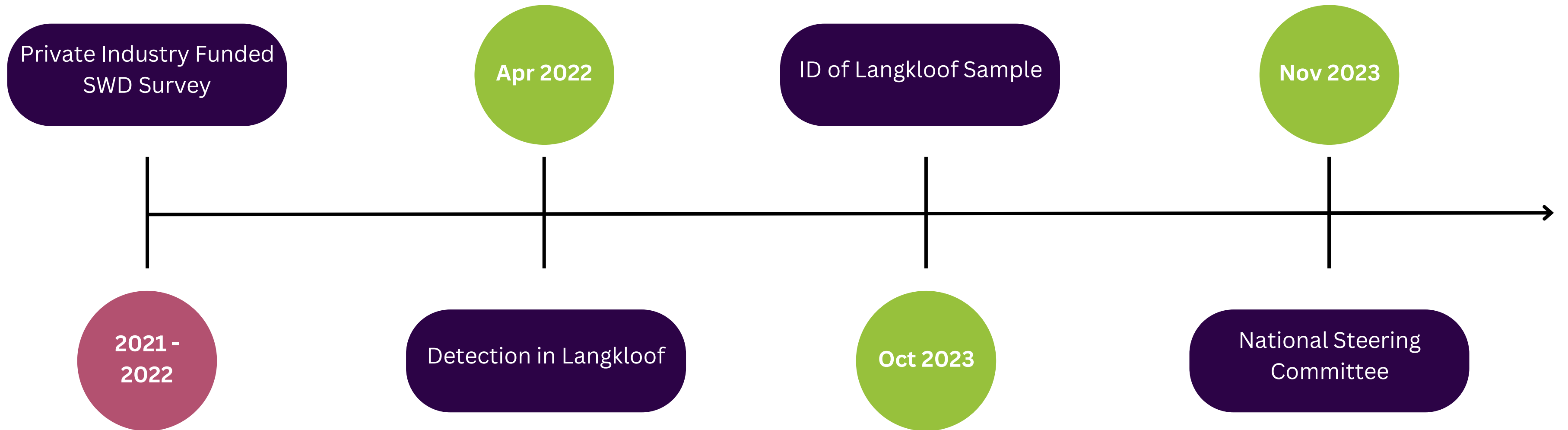
2 mm

Photo Credits: Zion Jodamus

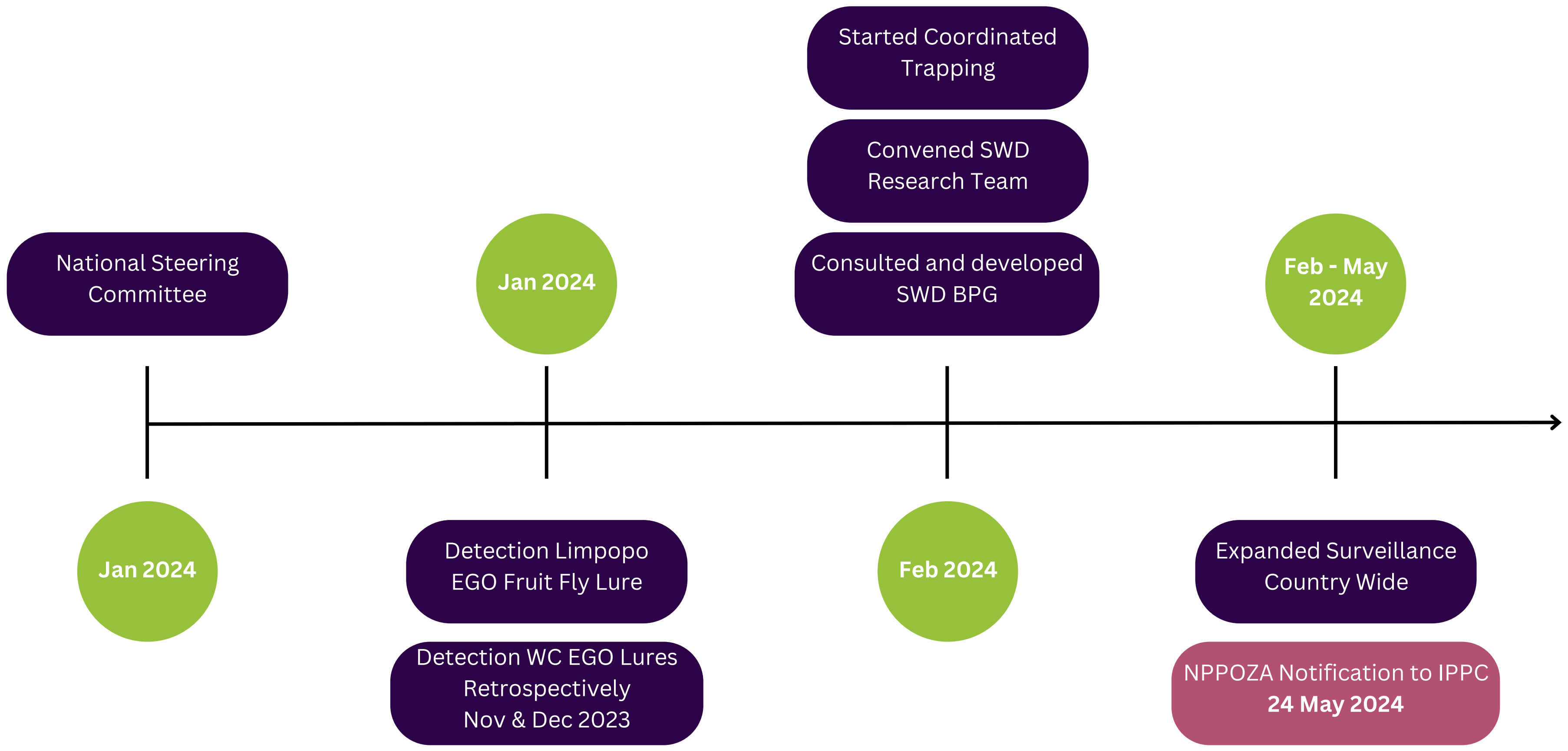




# Timeline of Events



# Timeline of Events



# NPPOZA SWD Notification

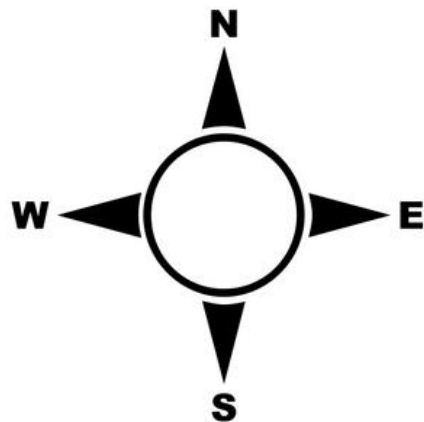
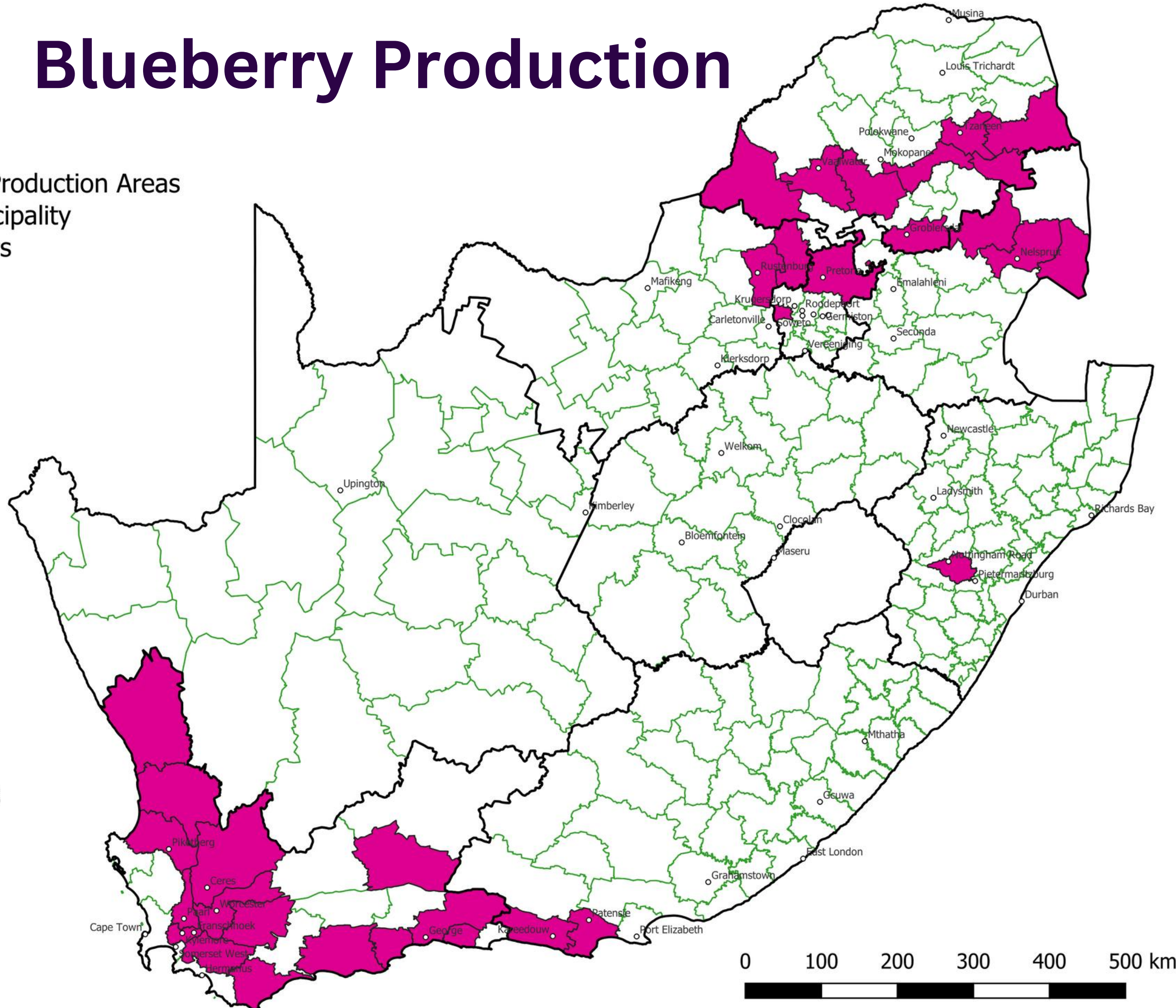
International Plant Protection Convention (IPPC) country report by the National Plant Protection Organization (NPPO) of South Africa: Notification of the detection of *Drosophila suzukii*, the Spotted Wing Drosophila (SWD) in the Republic of South Africa

Pest	Removal and/or Movement of host material from affected areas to unaffected in the rest of the Republic of South Africa is restricted in accordance with the Agricultural Pests Act No. 36 of 1983 (Act No.36 of 1983) and Control Measures R.110 as amended to prevent further spread of this pest to other Provinces.
Status of pest	
Host or articles concerned	
Geographic distribution	
	NPPOZA in collaboration with different role-players and stakeholders initiated a delimiting survey to determine the spread of the pest in the country, according to the <i>D. suzukii</i> national action plan and relevant standards.

# Blueberry Production

## Legend

- Blueberry Production Areas
- Local Municipality
- RSA Borders



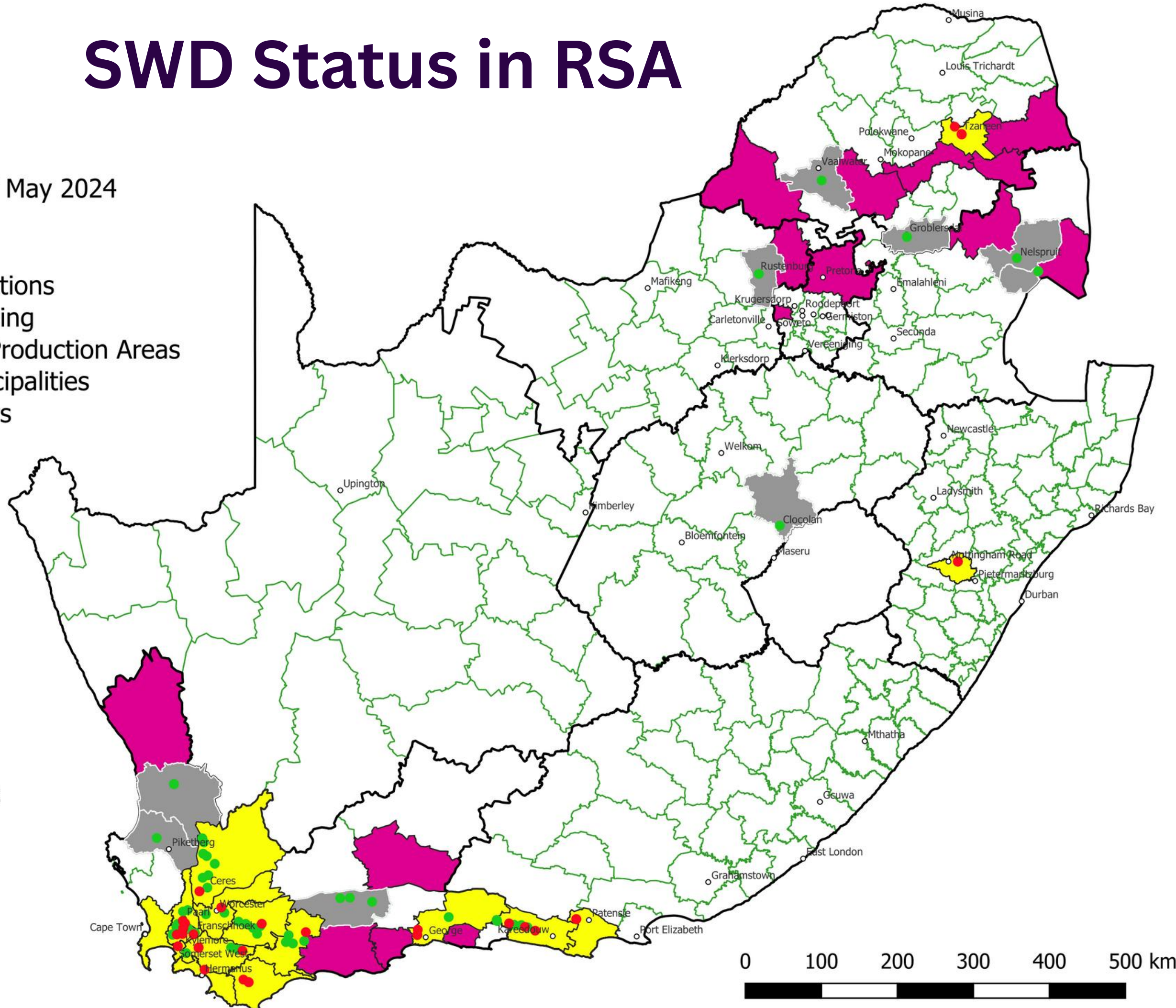
Province	Total Ha
WC	1432
LP	833
NW	242
MP	83
EC	58
GP	29
KZN	25

# SWD Status in RSA

## Legend

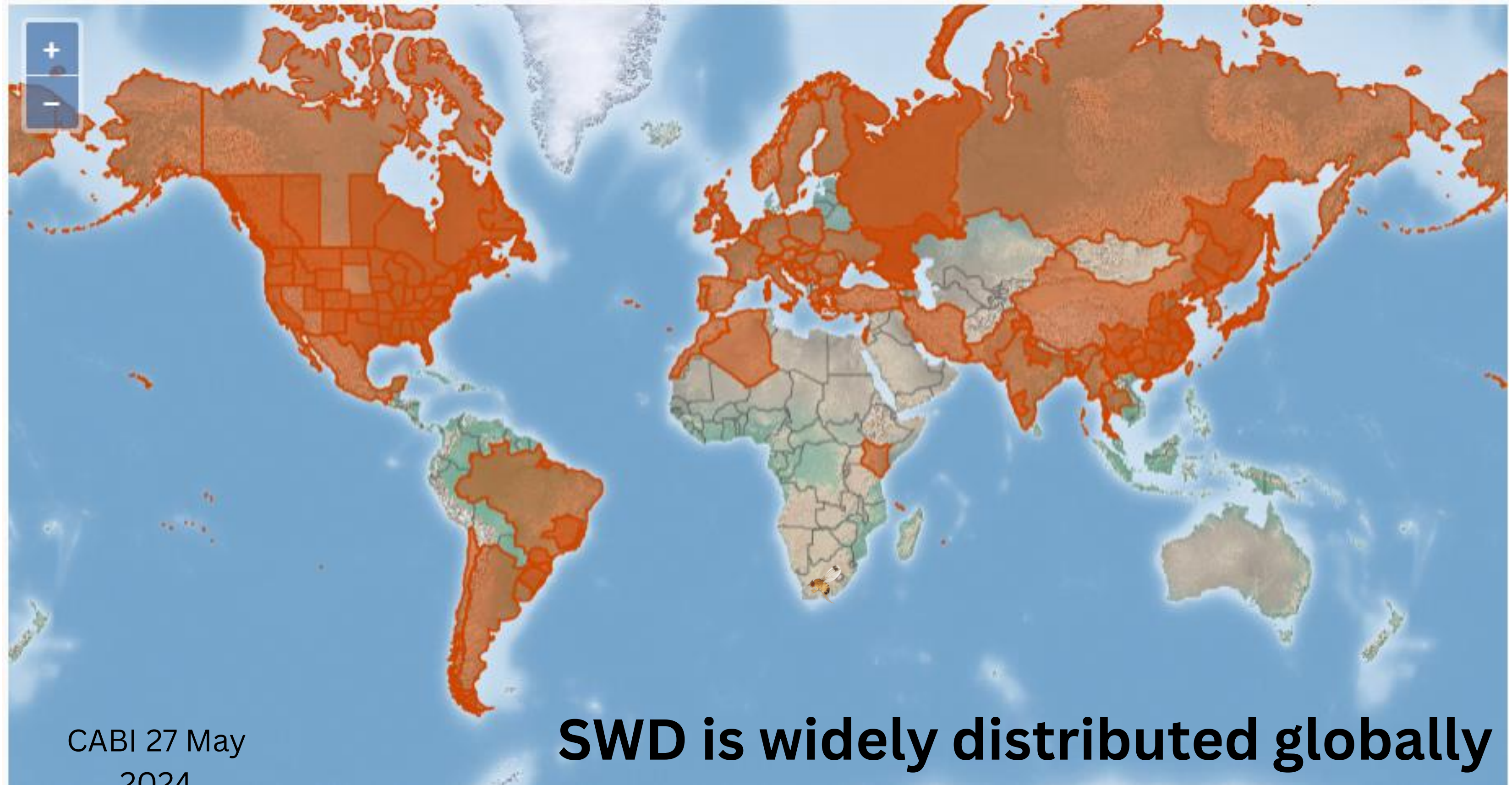
SWD Status 27 May 2024

- Absent
- Present
- SWD Detections
- SWD Trapping
- Blueberry Production Areas
- Local Municipalities
- RSA Borders



Province	Total Ha
WC	1432
LP	833
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# Potential Market Implications



CABI 27 May  
2024

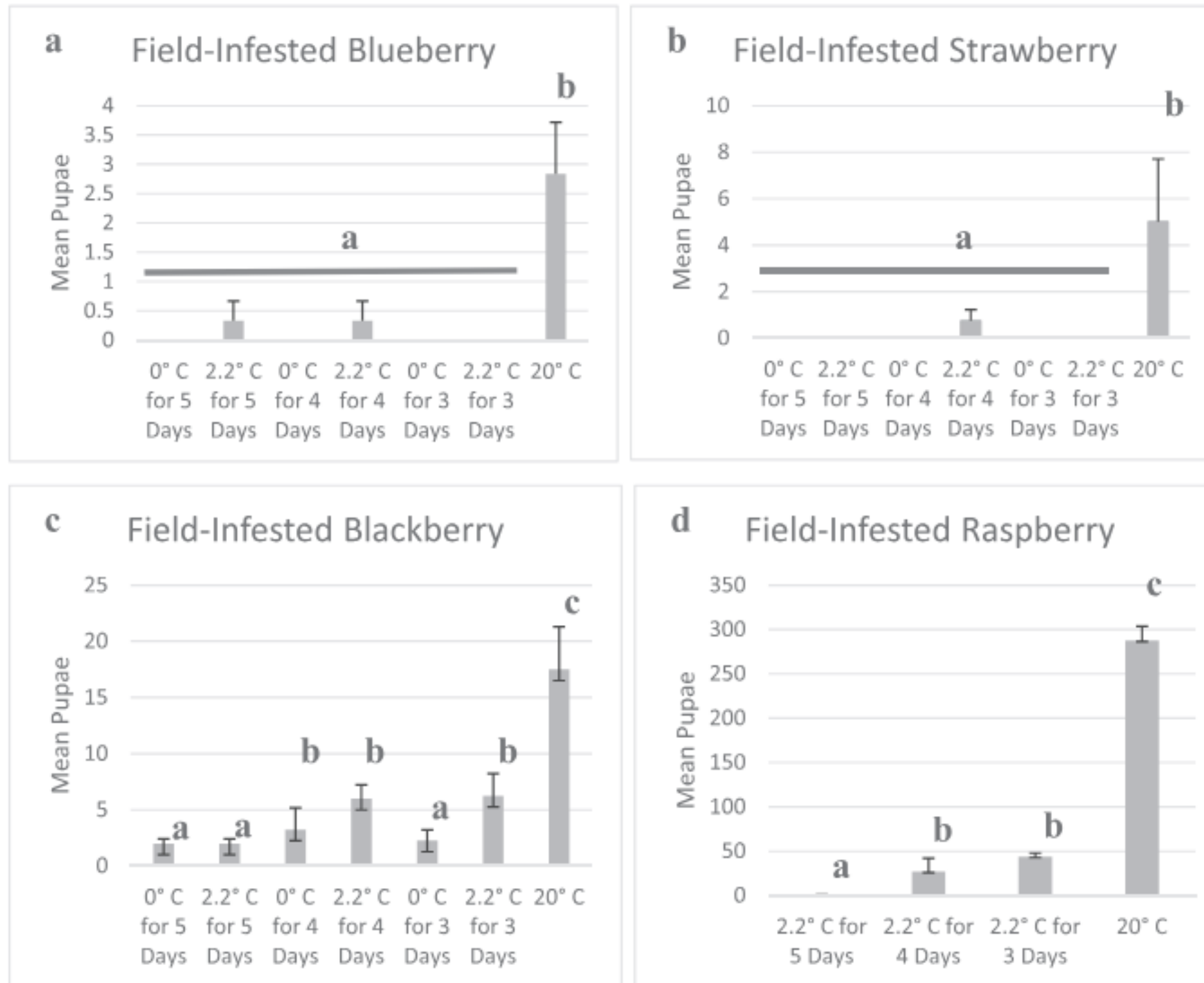
# Potential Market Implications

Localized or restricted distribution in trading partner countries: **pre- and post harvest mitigation may be required**

2023 - 2024

Exporting Country	Rank	SWD Presence
<i>Netherlands</i>	<i>1</i>	<i>Present Localized</i>
United Kingdom	2	Present Few Occurances
United Arab Emirates	3	Unknown/Not Reported
<i>Spain</i>	<i>4</i>	<i>Present Localized</i>
Singapore	5	Unknown/Not Reported
<i>Germany</i>	<i>6</i>	<i>Present Localized</i>
Saudi Arabia	7	Unknown/Not Reported
Malaysia	8	Unknown/Not Reported
Hong Kong	9	Unknown/Not Reported
<i>Belgium</i>	<i>10</i>	<i>Present Localized</i>

# Post Harvest Mitigation



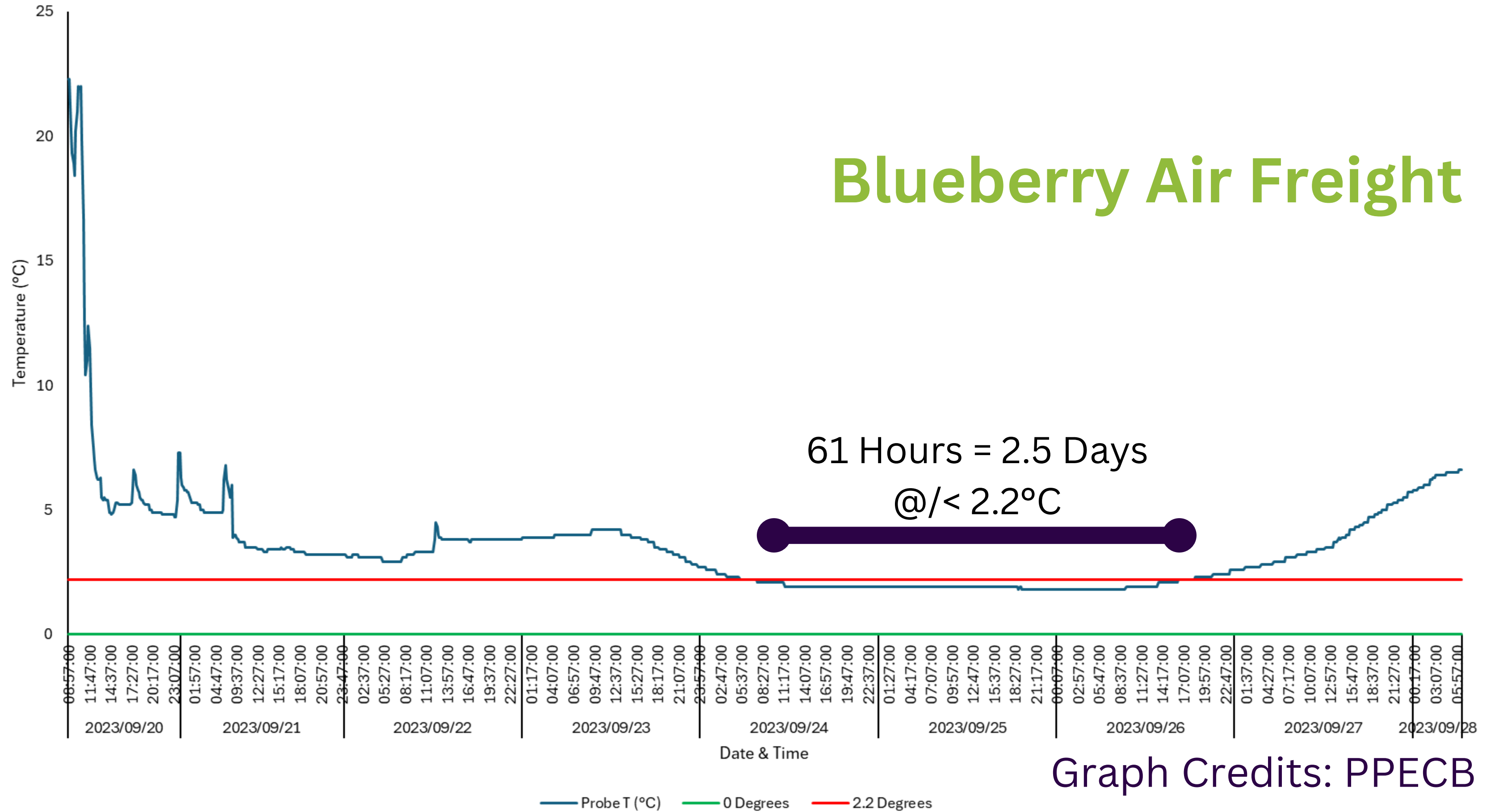
Given cold-sensitive nature: pest **standard shipping** duration and temperatures **can provide degree of mitigation.** (e.g., for EU – 16 to 20 days shipping time)

Fig. 1. Mean  $\pm$  SE *D. suzukii* emergence from field infested fruit held at cold storage temperatures as compared to control fruit held at 20°C. Values for a given fruit type indicated by the same letter are not significantly different via comparison using the Tukey-Kramer adjustment,  $\alpha = 0.05$ .



# Post Harvest Mitigation

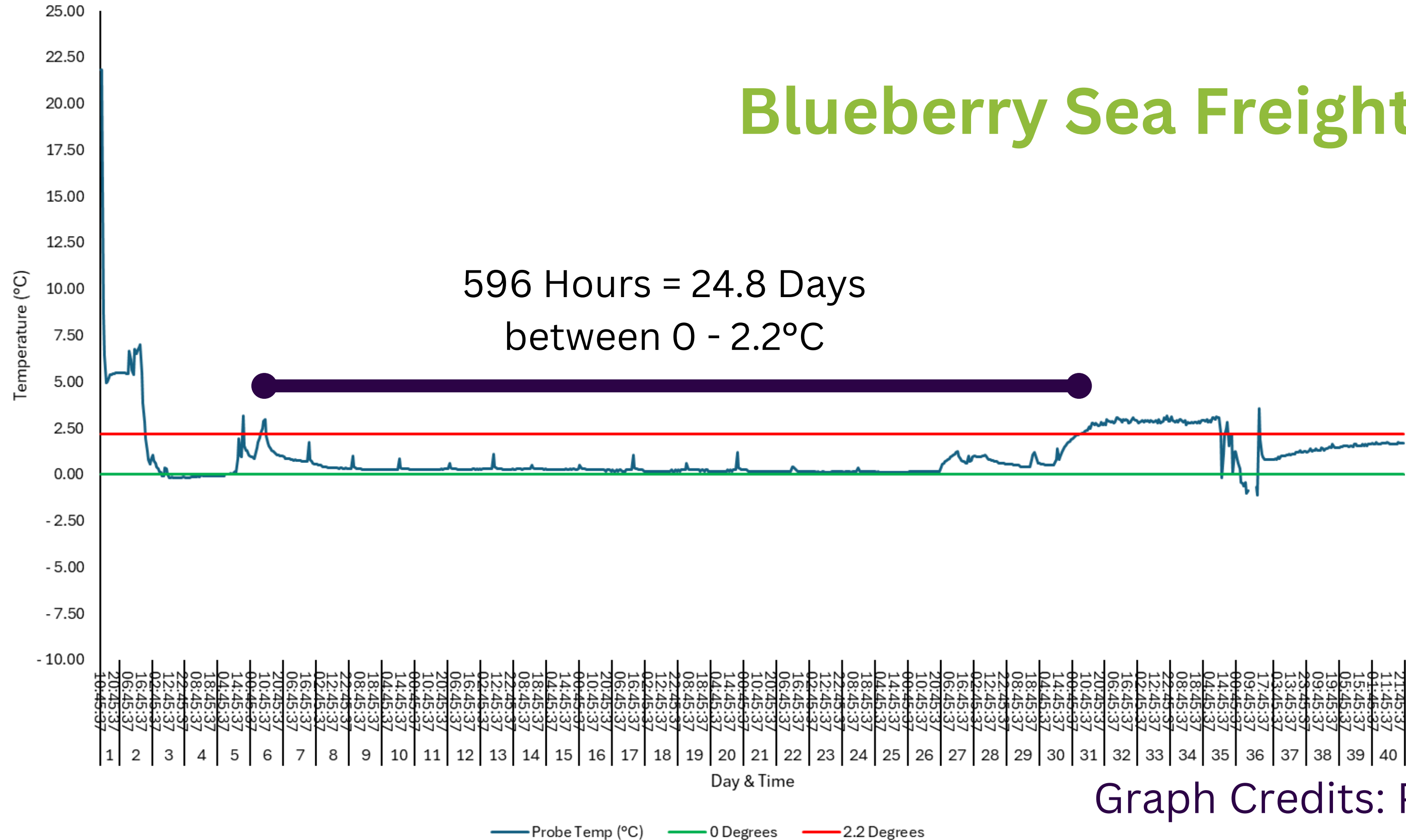
## Blueberry Air Freight



Graph Credits: PPECB

# Post Harvest Mitigation

## Blueberry Sea Freight



# Post Harvest Mitigation

## Kwon *et al.* 2021

- Complete control of *D. suzukii* eggs placed inside and outside of blueberry boxes was achieved using **70 g·m<sup>-3</sup> EF for 4 h @ 5°C** without deleterious impact on blueberry appearance such as soft spot or berry shrivel.
- Stand-alone cold treatment **@ 5 °C for 9 days** was sufficient for complete control of *D. suzukii* eggs and larvae tested, but not pupae

## Hubhachen *et al.* 2023

100% Control of *D. suzukii* with:

- **SO<sub>2</sub> at 500 µL L<sup>-1</sup> for 3 days @ -0.5°C**
- **SO<sub>2</sub> at 10 000 µL L<sup>-1</sup> and 6% CO<sub>2</sub> by volume for 30 min, then for 6 days @ -0.5°C or 12 days @ 2°C**



# Multi-Industry Research

**Prof Pia Addison: Stellenbosch University**

## Exploring integrated pest management practices for *Drosophila suzukii* in South Africa.

Prof Karin Jacobs (SU Microbiology), Dr Urban Spitaler (Laimberg Research Institute - Italy), Prof Vaughn Walton (OSU - USA), Dr Estelle Kempen (SU Agronomy), Dr Aleysia Kleinert (SU Horticulture), Prof Antionette Malan (SU ConsEnt), Dr Minette Karsten (Hortgro), Mr Matthew Addison (Hortgro), Dr Francois Bekker (BZA/SU ConsENT), Dr Nanike Esterhuizen (Hortgo)

**Submitted for funding to BerriesZA, SA Wine, Hortgro & SATI**

# Exploring integrated pest management practices for *Drosophila suzukii* in South Africa.

- Determine the diversity of Drosophilidae **parasitoids**.
- Develop **noval attractants** for use in a SWD management programme in South Africa.
- Evaluate currently available commercial attractants for use in **attract and kill** applications for SWD in South Africa
- Screening of potential **EPNs and EPFs** against SWD in laboratory bioassays



# Multi-Industry Research

**Prof Pia Addison: Stellenbosch University**

## Developing a *Drosophila suzukii* risk management system for South Africa.

Prof Adriaan Van Niekerk (SU Geography), Dr Tara Southey (TerraClim), Dr Urban Spitaler (Laimberg Research Institute - Italy), Prof Vaughn Walton (OSU - USA), Dr Estelle Kempen (SU Agronomy), Dr Aleysia Kleinert (SU Horticulture), Dr Minette Karsten (Hortgro), Mr Matthew Addison (Hortgro), Dr Francois Bekker (BZA/SU ConsENT), Dr Nanike Esterhuizen (Hortgro)

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# Developing a *Drosophila suzukii* risk management system for South Africa.

- Determine SWD **population dynamics**
- Determine the fruit type/cultivar and ripeness stage **susceptibility** to SWD attack.
- Conduct a survey of potential **alternate hosts** in the different fruit-producing regions.
- Integrate various parameters and develop **risk prediction maps**



Thank you  
**BERRY** much!



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