## Sub-theme:

***Pest surveillance and diagnostics in phytosanitary systems***

## Title:

# DROSOPHILA SUZUKII Matsumura (spotted wing drosophila) INCIDENCE AND PREVALENCE SURVEYS IN KENYA

## Presented by:

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# Introduction

- Spotted Wing Drosophila (*Drosophila Suzukii*)
- Name comes from single black spot at the tip of each wing of males
- It is a fly (Diptera) belonging to the Family called Drosophilidae and belongs to the same genus with *D. melanogaster*
- Drosophila flies are fruit-flies **BUT** are not considered pests because the maggots feed on rotten fruits, EXCEPT the *D. suzukii*, and *D. pulchrella* Tan, which infests on healthy fruits

# Introduction cont'

- The pest is native to East and South East Asia, including China, Japan and Korea
- Earliest record in USA is 1980 but not as damaging pest; currently it poses major production and trade challenges there
- Since 2008 it has been spreading rapidly to other parts of the world, EU & now Africa
- Host plants are soft-skinned fruits:
  - Berries and cherries e.g. raspberries, blueberries, strawberries, mulberries, blackberries
  - Plums, grapes, apples, pears, tomatoes, figs, kiwis
  - Wild hosts

# Problem Statement

In Kenya, ***D. suzukii*** **was identified by ICIPE in 2019** based on samples collected from a soft fruit from in Naivasha

In March 2020, ICIPE **reported to PS Agriculture** on presence of *D. Suzukii* in Kenya since June 2019

A team comprising of the different regulatory bodies and research undertook a **visit to the detection site in Naivasha** in May 2020.

# Justification

## Direct damage

- Feeding by maggots reduce quantity of produce
- Damage during egg laying open fruit for infections and entry of diseases
- Damaged and infested fruits have shorter shelf life

## Economic losses

- In 2008 economic losses (based on maximum reported yield losses) for California, Oregon and Washington were estimated at 40% for blueberries, 50% for caneberries, 33% for cherries and 20% for strawberries
- A 20% damage on cherries and berries in Europe resulted to about KES 5.1 billion loss in 2008
- Cost of control and monitoring programs reduce incomes/revenue
- Restrictions of trade reduces markets and thus revenue

# Objectives

- The visit aim:
  - To confirm the detection reports of *D. suzukii* presence in Kenya,
  - to establish the extent of spread and distribution of D. suzukii in Kenya
  - to assess the need to develop immediate and intensive emergency measures in the event that *D. suzukii* has not widely spread beyond the initial detection area.

# Methodology

- Collection of samples of insects from the traps laced with vinegar/cider wine (after 1 week) and some fruits for incubation (preference given to those overripe fruits already fallen on the ground) in **May 2020**
- Multi-stakeholder team: KEPHIS, HCD, KARLO, ICIPE :Further surveys in **June 2020** in all soft fruit and berry production areas to ascertain the distribution of *D. suzukii* (Counties of Nakuru, Nyandarua, Meru, Kiambu, Nyeri, Murang'a and Uasin Gishu.
- Further surveys carried out in **November 2020** targeting soft fruits commercial farms and major supermarkets in Nanyuki, Nyeri, Naivasha, Nakuru and Nairobi all soft fruit and berry production areas to ascertain the distribution of the pest.

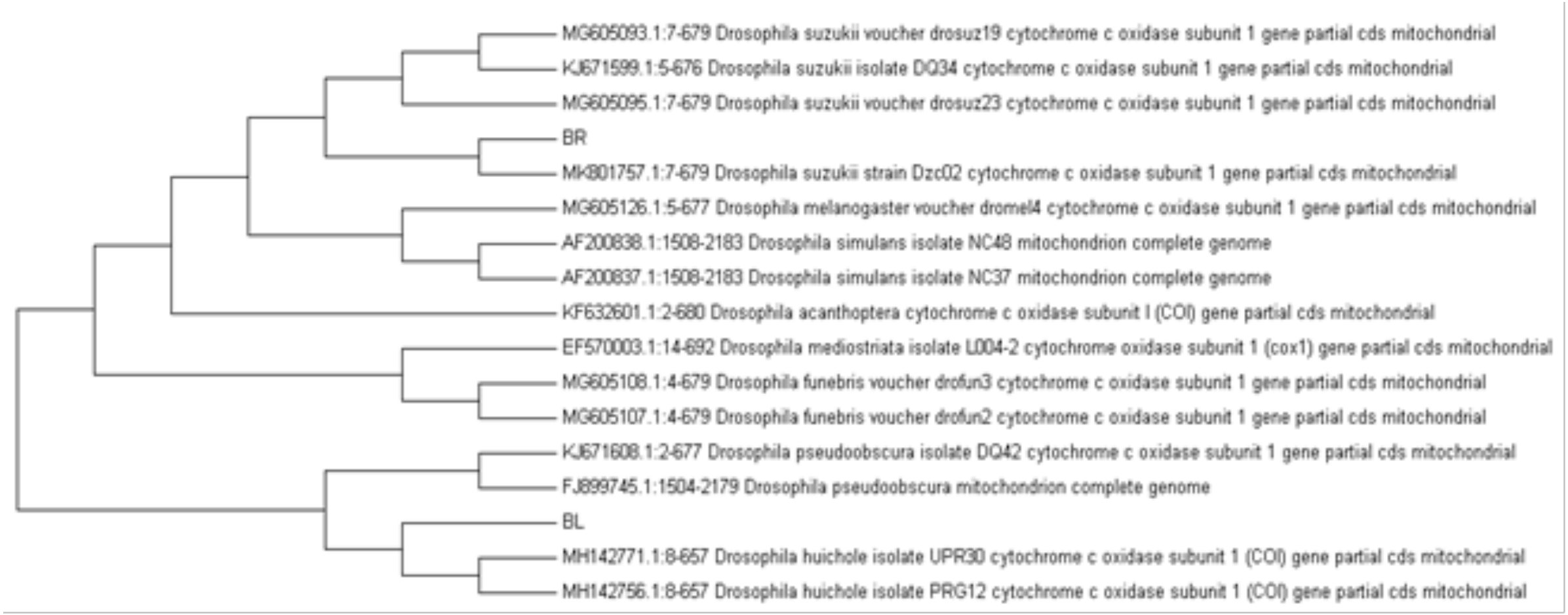
# Methodology cont’

- Recovered insect specimen from both traps and the incubated fruits separated under a stereomicroscope into morphologically similar groups and identified.
- the spotted wings were used to identify males, and the serrated ovipositor was used to identify females from other common drosophila species
- Specimen morphologically identified as *D. suzukii* stored at -40°C in absolute ethanol for molecular identification.
- Quantification of the amplified DNA, purification, and sent for sequencing, blasted on NCBI website.

# Results

- *D. suzukii* presence confirmed in Naivasha both morphologically and by molecular methods
- Molecular: samples were 100% identical with *D. suzukii* upon sequencing
- *D. suzukii* still restricted at Naivasha farm.
- Confirmed hosts: raspberry, the pest also attacks blueberry, strawberry and pomegranate (reported); pepper plant fruits (reported)
- Supermarket surveys: three samples positive (0.625 % of collected samples), which were still traced back to farm in Naivasha though picked in Nanyuki and Nairobi Super markets

# Results: *D. suzukii* phylogeny tree

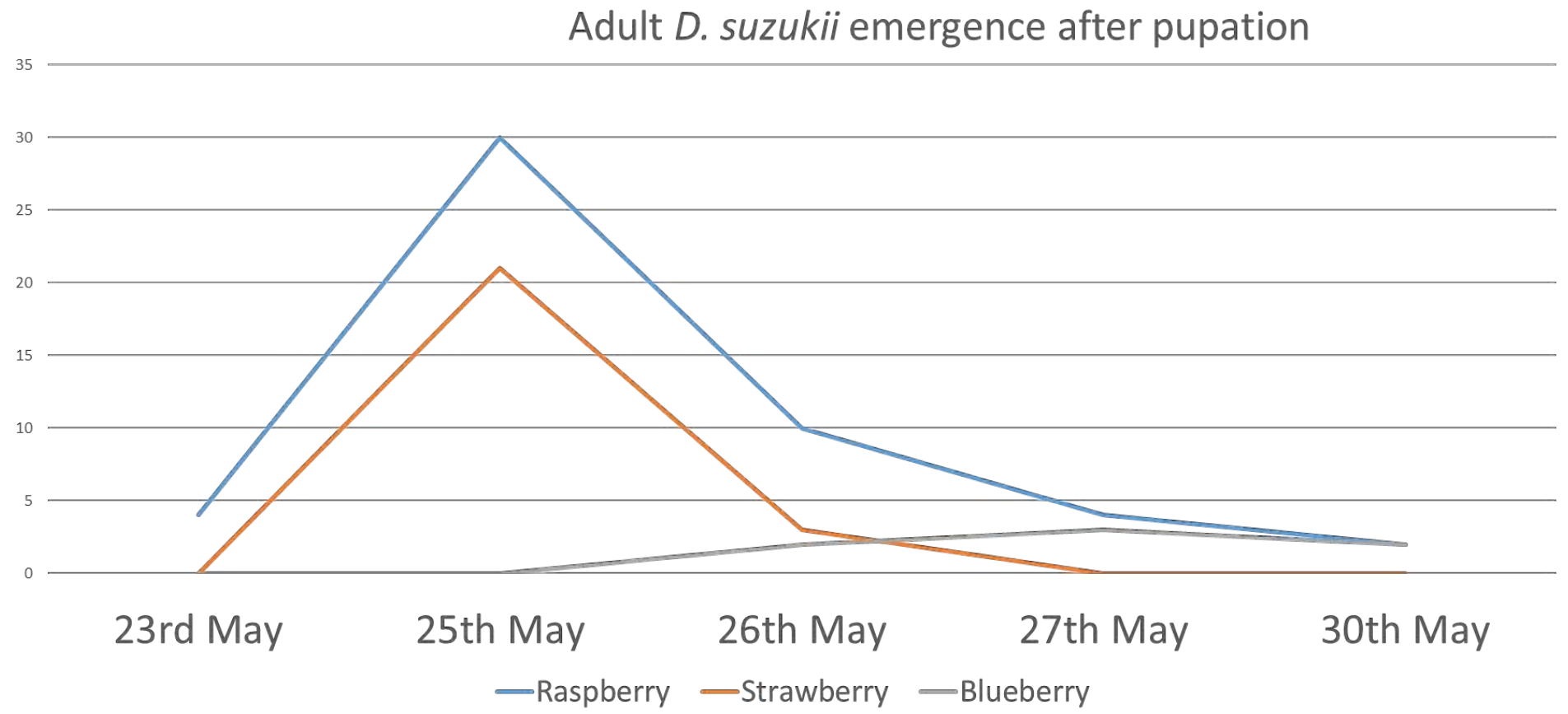


# Results cont'

areas.

| County | Location | Latitude (S) | Longitude (W) | Fruit | No.of flies/Kg of fruit | No. of flies/trap/week |
|---|---|---|---|---|---|---|
| Nakuru | Longonot farm | 0°50'17.8" | 36°23'10.4" | *Rubus idaeus* | 782 | - |
| | | 0°50'17.8" | 36°23'10.4" | *Vaccinium corymbosum* | 14 | - |
| | | 0°50'17.8" | 36°23'10.4" | *Fragaria ananassa* | 3 | - |
| | | 0°50'17.8" | 36°23'10.4" | *R. idaeus*[b] | - | 30 |
| | | 0°50'17.8" | 36°23'10.4" | *R. idaeus*[c] | - | 0 |
| | | 0°50'17.8" | 36°23'10.4" | *R. idaeus*[d] | - | 56 |
| | | 0°50'17.8" | 36°23'10.4" | *V. corymbosum*[d] | - | 63 |
| | | 0°50'17.8" | 36°23'10.4" | *F. ananassa*[d] | - | 38 |
| | | 0°50'17.8" | 36°23'10.4" | *R. idaeus*[d] | - | 171 |

# Results cont’



# Conclusion

- Surveys results confirm the presence of *D. suzukii*, in Kenya
- Pest restricted in Naivasha
- Positive *D. suzukii* samples from Supermarkets: local sales a key pathway of possible spread of the pest

# Recommendations

- Deployment of  measures to prevent further spread of the pest
  - **Sanitation measures** shall include the removal and destruction of all fruits and bloom (flowers/premature/mature/ripe/overripe/fruits fallen on the ground) from the crop site that could serve as a host.
  - **encourage a closed season**
  - **Bury fruit rejects** to a depth of more than 30 cm or **solarize/no composting**.
  - Restrict local sales from infested farms
  - Registration of effective pesticide products
  - Monitoring plans
  - Use of a fly-screen with 0.98-1.0 mm mesh shall be installed around the tunnels
- Create awareness to the stakeholders about the pest
- Urgently carryout host range studies

# Acknowledgements

**Theme**: *"Enhancing Phytosanitary Systems for Healthy Plants, Safe & Sustainable Trade"*
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