Pest Diagnostics in Phytosanitary

SCALE INSECTS: DISTRIBUTION AND THREAT TO FOOD SECURITY IN KENYA

Presented by:

Wanja Kinuthia

wanja.wacau@gmail.com

Day-3: on 15th Sept 2021 @ 12.15 am

Co-author: Achieng J, Mathenge M & Mwangi EW

Introduction

- Scale insects are cryptic insects and suck plant sap reducing the plant vigour.
- This group of insects, mealybugs, armoured scales, soft & waxy scales, belong to to the (Hemiptera: Sternorrhyncha: Coccomorpha).
- In Kenya, not much research on scales insects other than on cassava mealybug (*Paracoccus marginatus*).
- The scale project: "*Biodiversity and agriculture: Addressing scale insect threats in Kenya",* a two & half years' project funded by **Darwin Initiative** was formulated to address these gaps.

Introduction cont': Scale Insects

- Changes in farming practices and prolonged dry conditions contributed to scale proliferation on most plant species (food crops, fruits, trees, weeds, ornamentals).
- They are known to cause serious yield loss during heavy infestation e.g. Papaya mealybug (*Paracoccus marginatus*).
- Scale pest impact food and nutritional security at household and national level.
- A study indicated $1 Billon economic impact of five invasive species in 5 countries (Et, Ke, Ma, Tz, Ug) in 2017. (CABI).

Introduction cont': Scale Insects

Scales on ornamental plant

Problem Statement

- Minimal knowledge of scale insect recognition, sampling and taxonomic techniques.
- Minimal information on distribution, biological, ecology & host range.
- Needed for distribution map of scale insect in the study area.
- A repeat exercise will show the rate of dispersal and plan for management.

Justification

- No scale insect distribution maps in Kenya.
- Survey of scale insects, mealybugs & associated arthropods species in farms to highlight the need for research.
- Need for a centralized data base for scale insects, mealybugs & associated arthropods species.

Objectives

- To map scale insects at the coast as follows: -
  - Survey scale insects, mealybugs & associated arthropods species in small scale farms.
  - Identify and data base to show distribution.
  - Create a map for species collected in this study sites.

Methodology

- Field samples were collected in three coastal & two in eastern counties in Kenya.
- Specimens were georeferenced during field collection.
- They were identified at Natural History Museum-UK and National Museums of Kenya.
- A distribution map was created using Google earth.

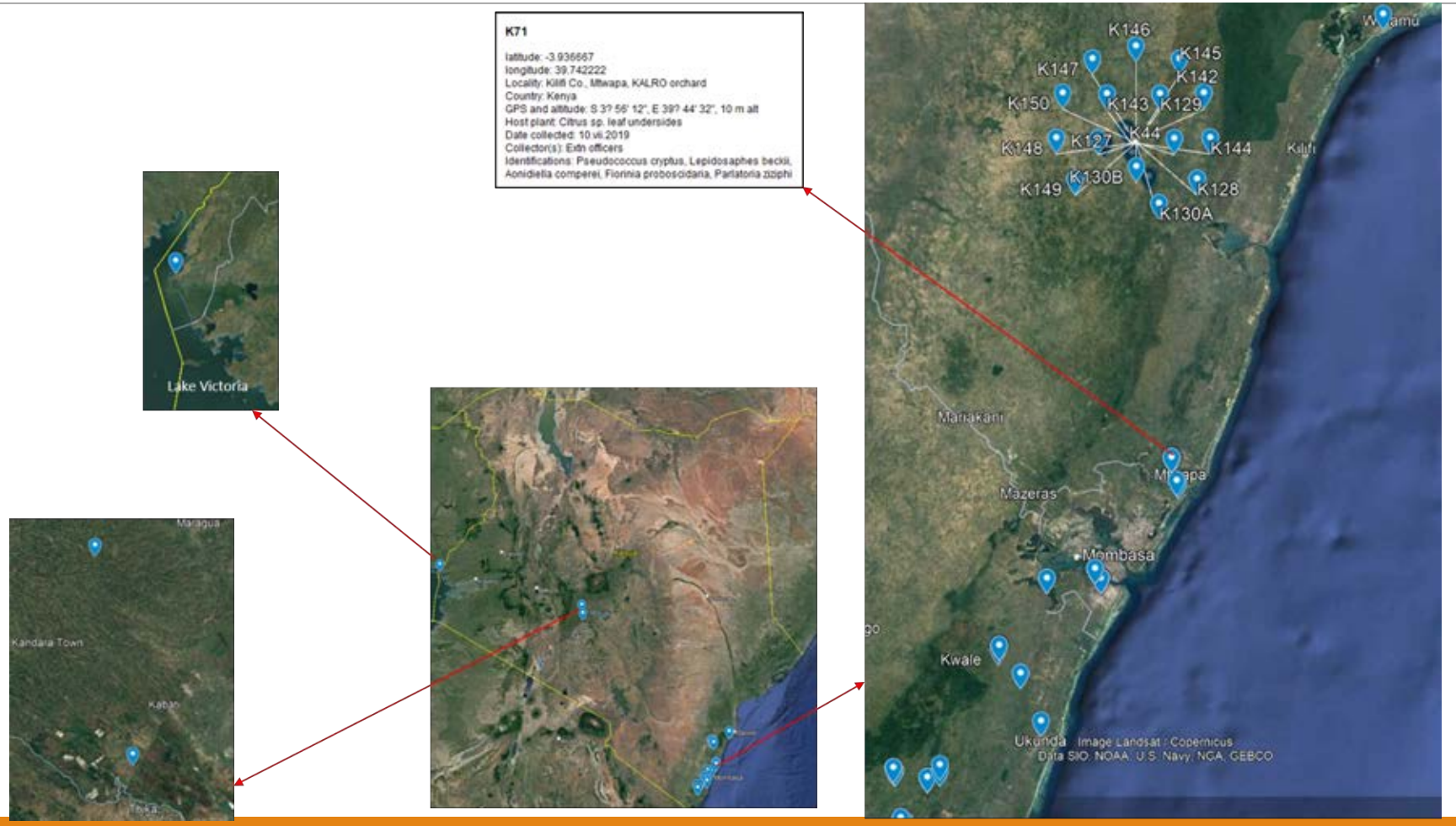
Results

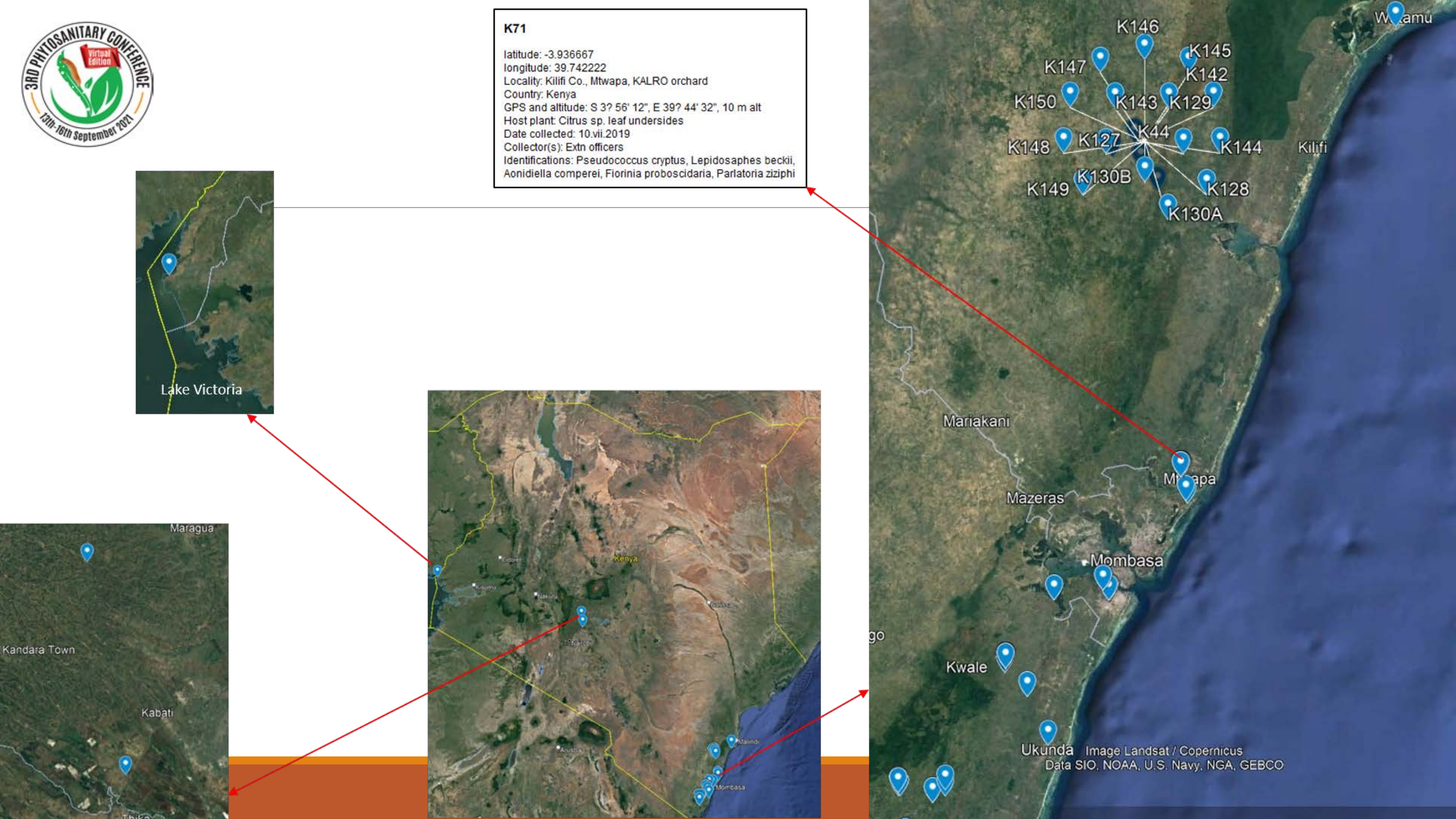
- 100 identified specimens were used in creating the distribution map.
- The main host plants were: - (detailed species list, see G. Watson this conference)

Host Plant	Host Plant	Host Plant
Citrus*s	Bamboo*	Tamarid
Mango*	Guava	Baobab
Cassava	Bananas*	Eucalyptus
Cocoa	Sugar cane*	Hibiscus
Cashew	Pineapple*	Capsicum
African Oil palm	Sour sop* + Custard apple	Okra
Coconut	Pigeon pea	Java plum

* Look out for scale & mealybug pests incidences

Results


K71
latitude: -3.936667
longitude: 39.742222
Locality: Kilifi Co., Mtwapa, KALRO orchard
Country: Kenya
GPS and altitude: S 3? 56' 12", E 39? 44' 32", 10 m alt
Host plant: Citrus sp. leaf undersides
Date collected: 10.vii.2019
Collector(s): Extn officers
Identifications: Pseudococcus cryptus, Lepidosaphes beckii, Aonidiella comperei, Florinia proboscidaria, Parlatoria ziziphi
Lake Victoria
Kandara Town
K146
K145
K147
K142
K150
K143
K129
K148
K127
K44
K144
K149
K130B
K128
K130A
Mtwapa
Mazeras
Mombasa
Kwale
Ukunda
Image Landsat / Copernicus
Data SIO, NOAA, U.S. Navy, NGA, GEBCO


3RD PHYTOSANITARY CONFERENCE
Virtual Edition
13th-16th September 2021
K71
latitude: -3.936667
longitude: 39.742222
Locality: Kilifi Co., Mtwapa, KALRO orchard
Country: Kenya
GPS and altitude: S 3? 56' 12", E 39? 44' 32", 10 m alt
Host plant: Citrus sp. leaf undersides
Date collected: 10.vii.2019
Collector(s): Extn officers
Identifications: Pseudococcus cryptus, Lepidosaphes beckii, Aonidiella comperei, Fiorinia proboscidaria, Parlatoria ziziphi
Lake Victoria
Maragua
Kandara Town
Kabati
Kenya
K146
K145
K147
K142
K150
K143
K129
K148
K127
K44
K144
K149
K130B
K128
K130A
Kilifi
Mariakani
Mazeras
Mombasa
Kwale
Ukunda
Image Landsat / Copernicus
Data SIO, NOAA, U.S. Navy, NGA, GEBCO

Results cont’

- Citrus trees had a wide range of scale insects in the sampling sites.
- Note, at least one specimen was collected in most cultivated crops.
- Mango mealybugs need to be monitored and managed to reduce spread.
- Bamboo had scale insects and is being introduced all over Kenya.*
- The pests were found on bananas & pineapple, common fruits for all.
- Weeds, ornamentals & other non-food plants had scale insects.

Conclusion

- The data and distribution maps highlights the scale insects problem and the need for continuous country wide surveys.
- Special emphasis on counties with border towns
- Monitoring of scale insects in open-air food markets to reduce spread to local farms.

Recommendations

- A data base & distribution maps for scale insects, mealybugs and associated arthropods in Kenya.
- Expand research & capacity in identification, tools for scale insects, mealybug species, their predators, parasitoids, associated ants, micro-organisms.
- Public awareness on environmentally friendly IPM systems on-farms for scale insects.
- A long-term plan for IPM innovations from local communities to enhance biocontrol agents.
- Public awareness on scale insects spread through planting material, ornamental and farm produce in markets.

Acknowledgements

Darwin Initiative project collaborating institutions:

NATIONAL MUSEUMS OF KENYA
WHERE HERITAGE LIVES ON

KENYA PLANT HEALTH INSPECTORATE SERVICE
KEPHIS

KALRO
Kenya Agricultural & Livestock Research Organization

DARWIN INITIATIVE

KENYA FORESTRY RESEARCH INSTITUTE
KEFRI

University of Nairobi

CABI

NATURAL HISTORY MUSEUM

Acknowledgements

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

www.africa-cope.org

Armoured scales

Waxy scales

Mealybugs

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

www.africa-cope.org