EMERGING INNOVATION IN PHYTOSANITARY SYSTEMS FOR CONTROL OF INVASIVE PAPAYA MEALYBUG, *PARACOCCUS MARGINATUS*, IN KENYA COAST REGION

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Field Team

- The research was a two and half years funded Project by **Darwin Initiative**, "*Biodiversity and agriculture: Addressing scale insect threats in Kenya"*
- The project partners were: -
  - **Kenya**: KEPHIS, CABI, National Museum of Kenya, KEFRI, KALRO, UoN
  - **Coast team:** Agriculture Extension Officers and farmers among others.
  - **UK**: National History Museum

Papaya mealybug infestation

Introduction

- Papaya mealybug (*Paracoccus marginatus*) is a serious invasive pest from S. America.
- The pest is a native of Mexico & Central America.
- **1994:** First report outside country of origin in the Caribbean.
- In **Africa**: **2009**-Ghana, **2015**-Tanzania & Mozambique.
- **2016:** First report in Kenya in Kwale, Mombasa & Kilifi Counties of Coast region.

References: Macharia, I., *et al.,* (2017); Heya H. M. *et al*., (2020);

Kansiime M. K *et al*., (2020, Finch E. A., *et al*., (2020)

Introduction cont'

- Papaya mealybug (*P. marginatus*) infest all green parts of pawpaw *(carica papaya).*
- A serious pest of horticultural crops with a wide host range including weeds.

Common Name	Scientific Name
Cassava	*Manihot esculenta*
Chili pepper	*Capsicum annuum*
Guava	*Psidium guajava*
Mango	*Mangifera indica*
Eggplant	*Solanum melongena*
Many wild plants/ weeds	Assorted names

Problem Statement

- The economic impacts associated with papaya mealybug is immense (*95% farm infestation resulting in USD 3,009 loss per ha*) and required immediate management.
- Farmers resulted to use of pesticides but the protective woolly material covering mealybugs prevented adequate control.
- In the absence of ready solution, farmers experimented with diverse home remedies to save their crops and family income.

Justification

- With no ready solution, it was imperative to study & understand the pest problem at farm-level in order to device effective management strategy.
- There was need to safe-guard: -
  - farmers' income and
  - national economic benefits emanating from local & international pawpaw market.
- The farmers needed local solution within reach to reduce the mealybug incidence.

Objectives

- To survey the papaya mealybug in Kwale, Mombasa & Kilifi Counties of Coast region.
- To identify and establish the distribution, host range and management of the invasive mealybug in coast region.
- To document the innovative solution and observed benefits.

Methodology

- Field surveillance were conducted in the affected farms and farmers experiences were recorded.
- Pest specimen were collected & identified
- Practical farmer solutions were documented and effectiveness recorded.

Results

The following are documented communities' innovative measures for managing papaya mealybug at farm level: -

- Pressure water jet to wash out the mealybugs
- Increase repellants plants in the farm e.g. Mexican marigold (*Tagetes manuta*)
- Use of neem extract to spray mealybugs on the pawpaw plant
- Use of **"Afya Duara",** an extract (mixture of African bird-eye chilies, aloe vera, garlic and ginger)

Results cont'

- Wider spacing of crops, increasing soil nutrients, crop rotation and diversification to reduces papaya mealybug incidences.
- An "Integrated Pest Management" approach utilizing cultural, mechanical, biological and minimal chemical control to ensure the mealybug does not spread further.
- The integrated approach improved papaya fruit yields in the study farms by 75%.

Farmer Innovation

Conclusion

- Farmer innovations can be the first stop shop to reduce farm losses with some invasive pests.
- Need to research and document effective farmer practices for scaling up.
- Document the best practices in an “Integrated Pest Management” approach for papaya mealybug control.

Recommendations

- Need for research and documentation of effective farmer practices for scaling up.
- Mainstream best practices of an "Integrated Pest Management" approach for papaya mealybug control.
- Further research on tackling invasive pest species based on lessons from the papaya mealybug.
- Enhance mealybugs/scale insects research in relation to climate change and food security for Africa.

Acknowledgements

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

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