Sub theme:

Pest Surveillance in phytosanitary systems

Title:

Surveillance of Papaya Mealybug (*Paracoccus marginatus*) (Hemiptera: Pseudococidae) in the coastal counties of Kenya

Presented by:

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Introduction

- First reported in Kenya in 2016
- PMB is a serious pest of papaya among other crops
- Highly invasive, dispersive and polyphagous
- Common Hosts: Pepper, cassava, guava, eggplant and mango
- Symptoms:
  - ✓leaves turn yellow and eventually dry up
  - ✓Tender leaves become bunched and distorted
  - ✓Heavy infestations produce honey dew, which causes black sooty molds on the infested fruits and vegetation.

Problem Statement

- PMB has continued to be a serious pest of papaya since reported in Kenya in 2016
- Causes yield loss of 90% or more on papaya
- Spreading to other crops: Pepper, cassava, guava, eggplant & mango
- Renders infested fruits unsellable resulting to huge loses to the farmers

Justification

Why the focus on PMB?

- PMB is highly invasive and dispersive
- Due to huge losses, timely management is critical to contain the spread in Kenya
- Regular surveillances are necessary for rapid response measures
- Awareness amongst all key stakeholders are critical for management

Objectives

Why the surveillance?

- To determine the incidence and infestation intensity of PMB in the farmers' fields
- To determine the host range in the coastal region of Kenya
- To raise awareness to farmers about PMB & management methods

Methodology

- Carried in Nov. & Dec 2020, 67 farms sampled across 6 counties
- ODK generated questionnaire used in data collection
- Data collected: Name of farm, location, GPS coordinates, farm acreage, host crop, age of the crop, symptoms of PMB expressed, pest incidence, Infestation intensity and the management applied for PMB.

Determination of (%) incidence

5 spots were selected in each field sampled and in each spot, 20 plants were selected at random. A Total of 100 plants per field were examined.

Incidence (%) = Number of plants affected / Total number of plants observed X 100

Source: © Kennedy et al. (2017);

Methodology cont'

Determination of Infestation Intensity:

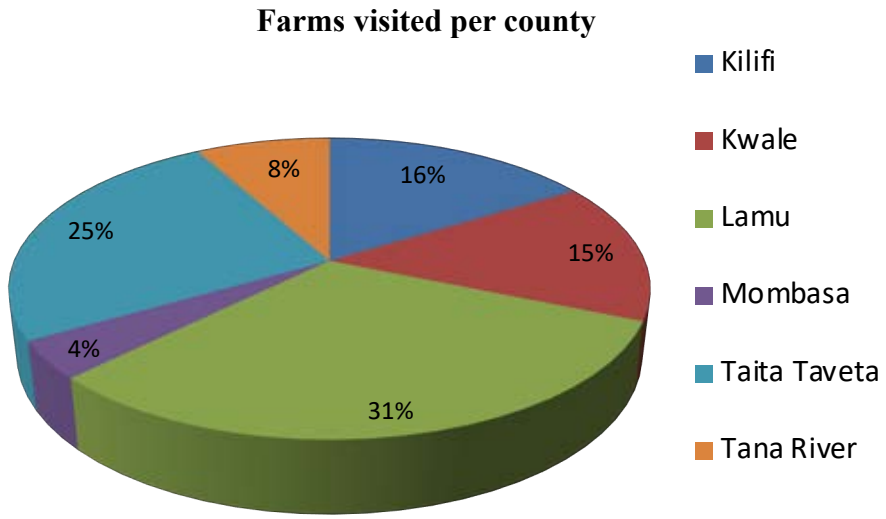
Based on visual parameters based on the grades below:

- ✓**Very low (1):** Few individuals of PMB found casually
- ✓**Low (2):** PMB found in low numbers & no adverse symptoms on affected plants
- ✓**Medium (3):** 75-100% coverage of leaves /fruits/ inflorescence, Yellowing of leaves & shedding of infested leaves and fruits
- ✓**High (4):** Almost all plant parts covered with PMB showing white appearance & covered covered with honey dew excretion and sooty mould
- ✓**Very High (5):** All plant parts covered with PMB showing white appearance, Honey dew rain under the tree, Crinkling of leaves & Drying and death of plants

Source: © Regupathy and Ayyasamy (2010), scale used on Tapioca.

Results

- Distribution of farms as sampled across the counties



- ✓PMB had spread to all the six counties
- ✓ All farmer fields sampled were infested with PMB

Results cont'

Infestation Intensity across the 6 counties:

County	Infestation Intensity
Kilifi	3
Mombasa	3
Kwale	2
Lamu	2
Taita taveta	2
Tana river	1

- ✓ Infestation Intensity ranged between very low to medium across the 6 counties (guided by the scale applied on tapioca (Regupathy & Ayyasamy, 2010)

Results cont'

- Incidence (%) and infestation intensity of PMB on papaya per sub-county

County	Sub County	PMB Incidence (%)	PMB Intensity
Kilifi	Kilifi North	80%	3
	Magarini	75%	3
	Kilifi South	67.50%	3
	Malindi	50%	3
	Ganze	64%	2
	Kaloleni	10%	2
Kwale	Msambweni	90%	3
	Kinango	95%	2
	Kwale	95%	2
	Lungalunga	68%	2
	Matuga	55%	2
	Kubo	40%	2
Lamu	Lamu East	70%	2
	Lamu West	41%	2
	Mpeketoni	32.50%	2
Mombasa	Changamwe	92%	3
Tana river	Tana River Delta	60%	2
	Chewani	20%	1
Taita Taveta	Mwatate	100%	2
	Taveta	100%	2
	Voi	26%	2

- ✓ Incidence the sub-counties ranged from 10% to 100%.
- ✓ Kaloleni – Lowest incidence
- ✓ Mwatate and Taveta- Highest incidences

Results cont'

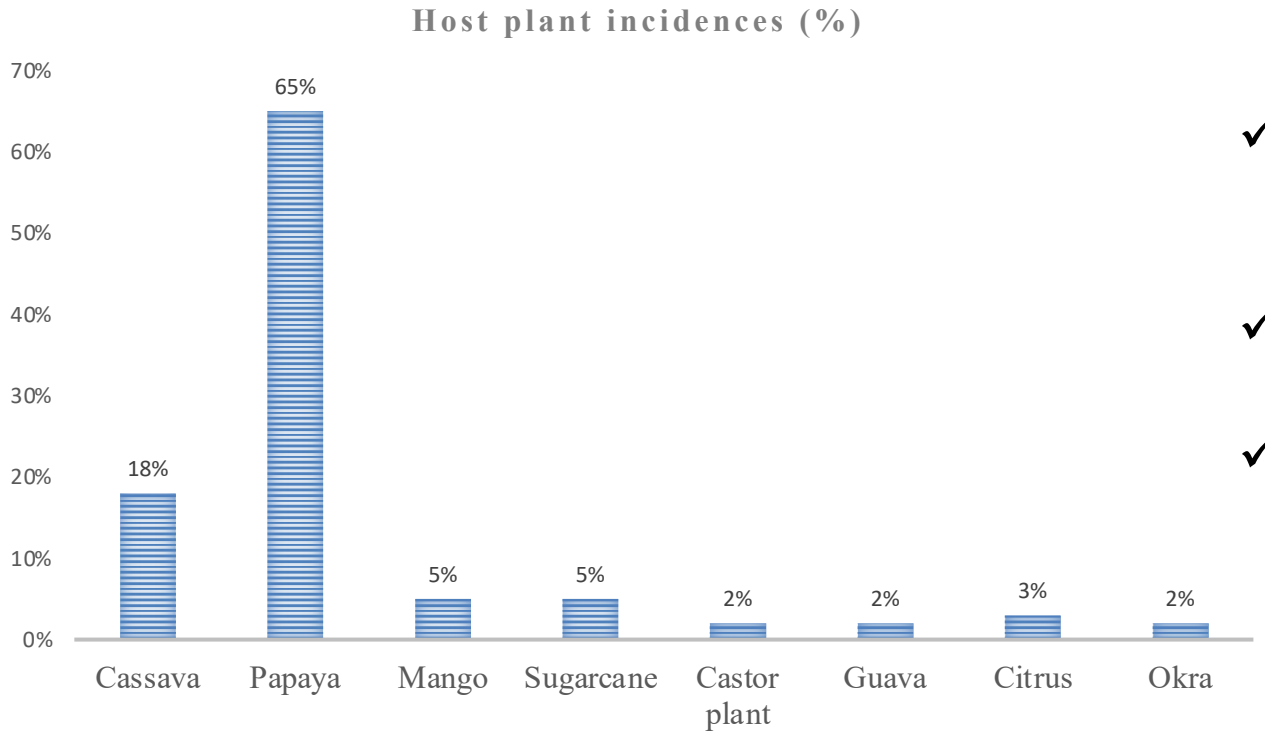
- Infestation Intensity on plant parts

Part of the plant	Intensity infestation by PMB	No. of counts	Percentage
Leaves	Low	45	68%
	Medium	20	30%
	High	1	2%
Stem	Low	58	89%
	Medium	5	8%
	High	2	3%
Flowers	Low	53	85%
	Medium	8	13%
	High	1	2%
Fruits	Low	28	43%
	Medium	28	43%
	High	9	14%

- ✓ The intensity of infestation was high on the fruits compared to other parts of papaya plant

Results cont'

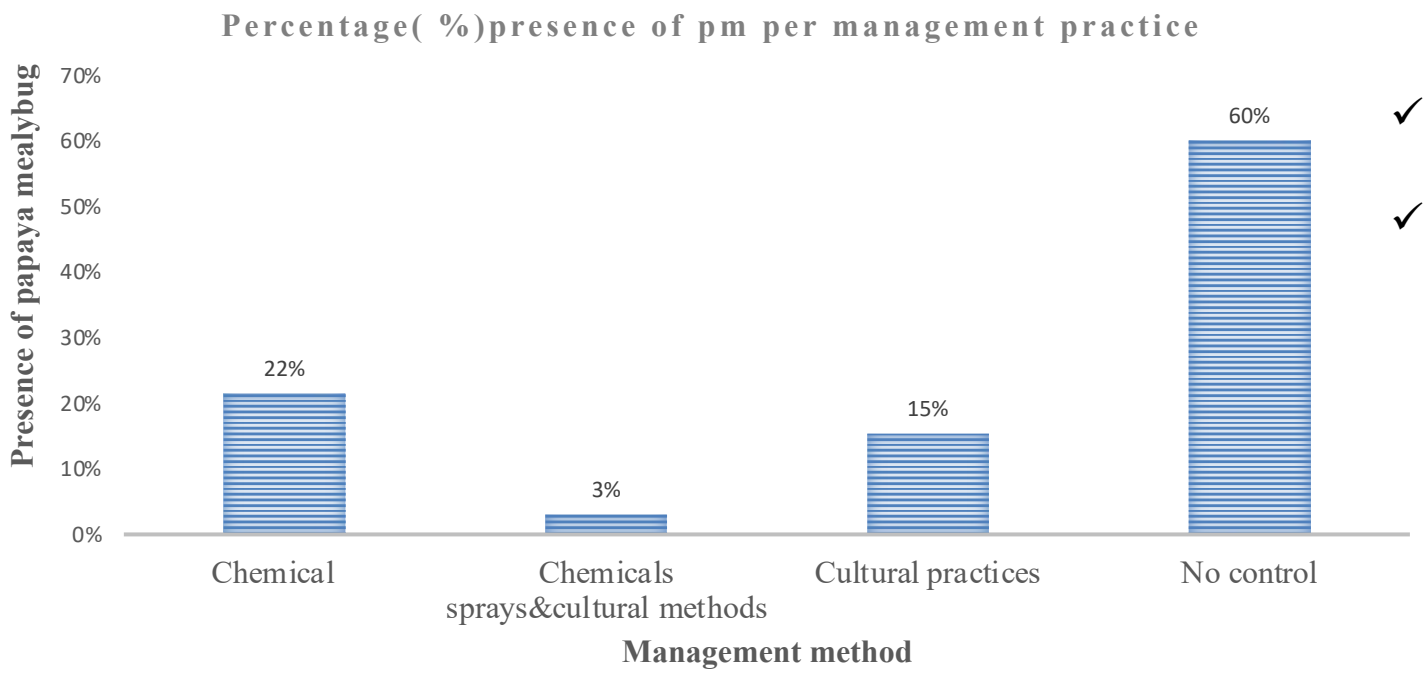
- Infestation of PMB on various hosts plants



- ✓**Hosts:** Papaya, cassava, mango, sugarcane, castor plant, guava, citrus and okra
- ✓Papaya most preferred host
- ✓additional hosts: citrus, sugarcane, okra and custard apple

Results cont'

- Presence of PMB in contrast with management practice applied



- ✓ PMB was highest in farms where no management was applied
- ✓ lowest populations in fields where farmers combined chemical and cultural methods of control.

Conclusion

- PMB occurred in all the 6 counties with incidences of 10-100%.
- Infestation intensity ranged from very low to medium
- Infestation intensity was highest on fruits compared to other parts of the papaya plant.
- Hosts of PMB: Papaya, cassava, mango, sugarcane, castor plant, guava, citrus and okra
- Papaya most preferred host
- Majority of the farmers (65%) surveyed were knowledgeable on PMB
- The lowest population of PMB occurred in fields where farmers combined chemical and cultural methods for management
- PMB was more dominant in intercropped farms than in monocrops.
- PMB was more dominant in farms where no scouting was undertaken

Recommendations

- Increased awarenesses: farmers, agricultural extension workers and other stakeholders
- Management methods e.g. Classical biological control

Acknowledgements

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