Sub-theme:

Integrated Pest and Pollinators Management

Title:

Integrated Pest Management of fruit flies in Machakos County in Kenya improves overall yield of pumpkin

Presented by:

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Introduction

Pumpkins (*Cucurbita maxima)* are warm- seasoned crops that are affordable to produce

They are rich in nutrients such as zinc, phosphorous, sodium and iron (Habib *et al.,* 2015)

Their leaves are consumable as leafy vegetables. Fruits and seeds are also edible

Such crops are therefore important in;

- Curbing issues of malnutrition
- Enhancing food security
- Providing cash income to households

Problem Statement

Tephritid flies (de Meyer *et al.,* 2012) are devastating pests of cucurbits

They cause damages of up to 40–75% to fruits (Goergen *et al.,* 2011); lowering yield and quality of fruits

In the past, chemical pesticides use was found to be the most effective in management of such pests

However, over reliance on chemical pesticides have resulted to pollution, destruction of natural enemies and development of resistance (Nobre *et al.,* 2019)

This study therefore aimed at investigating efficacy of various control strategies that can successfully be used as an IPM program for effective management of fruit flies

Justification

Pumpkins have a long shelf life of up to one year

Yatta and Masinga Sub- counties greatly display the Low and Medium NDVI

High temperatures of 18ºC to 29ºC within the County promotes faster development of fruit flies; necessitating pest management

IPM practices combines methods such as biological, cultural and physical; sustainable alternatives to pesticide use

Moreover, use of 2- 3 management components as IPM package results to 22.4% yield increase in mangoes

Objectives

General objective

To determine the effectiveness of Integrated Pest Management (IPM) strategies in the control of fruit flies (Tephritidae) infesting pumpkins in Machakos County, Kenya

Specific Objective

- To assess the farmers' knowledge, perception and control strategies of fruit flies infesting cucurbits in Machakos County
- To determine the presence and onset of fruit flies on pumpkin farms in Machakos County
- To evaluate the effect of Integrated Pest Management (IPM) strategies on the fruit flies density and overall yield of pumpkin

Methodology

Study site

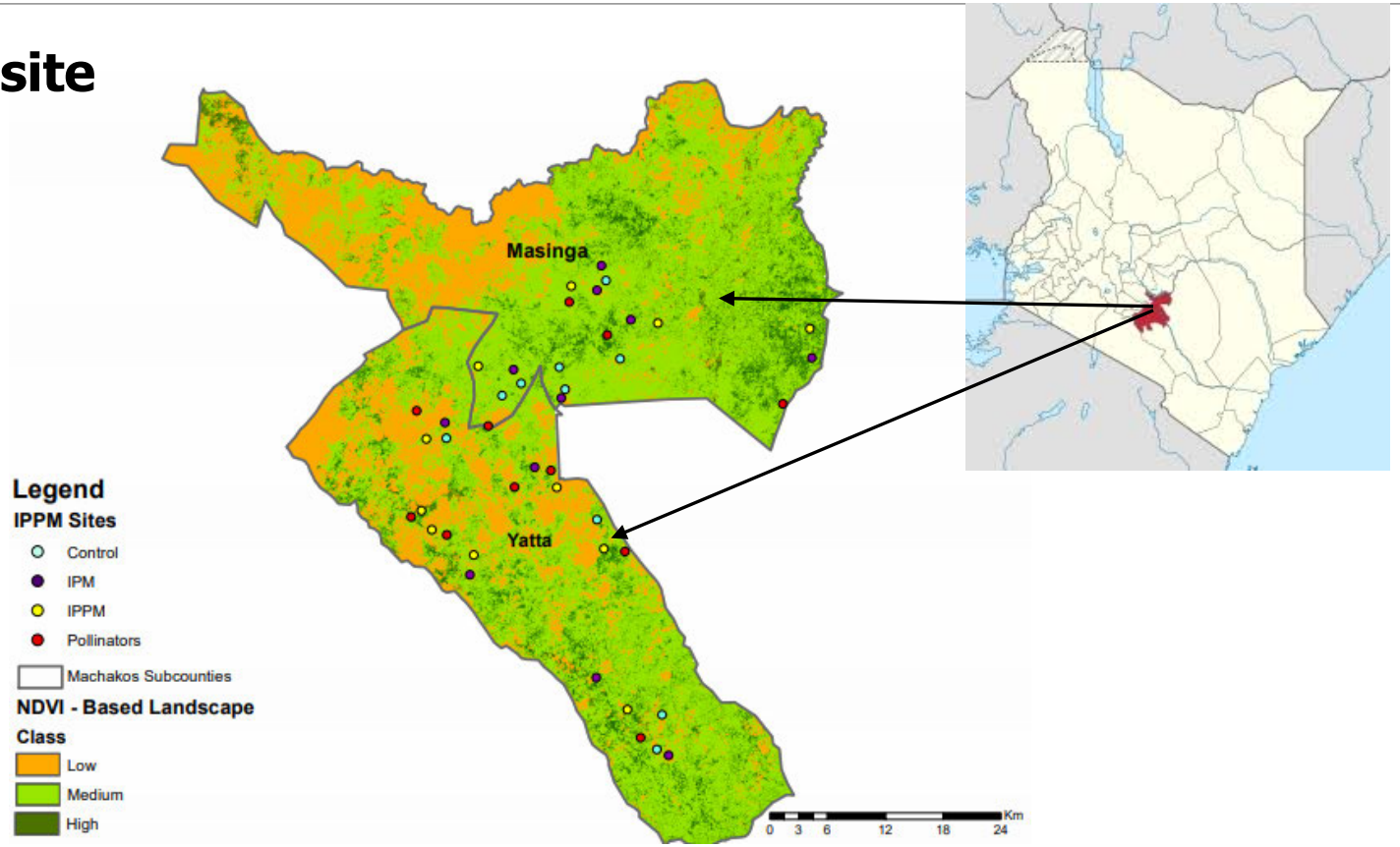


Figure 1: Map showing study sites at Masinga and Yatta Sub Counties, Machakos

Methodology cont'

Research design
Completely Randomized Design

Treatments
IPM and Control Treatment
Replicates; 4 in each NDVI class

Treatment allocation
IPM: Mazao CAMPAIGN® , Fruit fly Mania™, Tracer® insecticide, two pheromone traps
Control: One pheromone traps

Monitoring of traps and collection of infested fruits took place weekly

Data collection
Data was collected on:
- Fruit fly trap counts per species
- Emerged fruit fly adult counts per species
- Number of harvested fruits

Methodology cont'

Data analysis

Catches of *Zeugodacus cucurbitae* from traps were expressed as the daily capture per trap and analyzed using the linear model

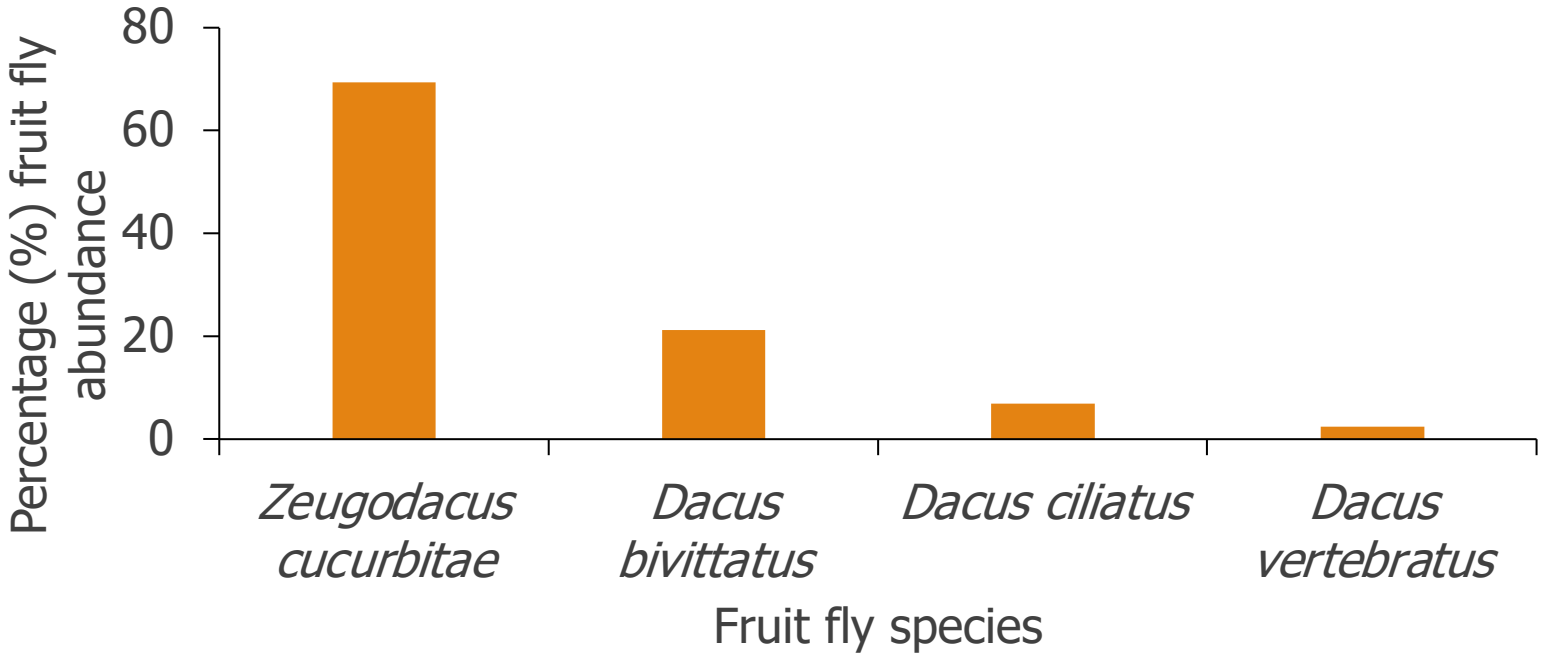
The number of fruits per plant (yield) was analyzed using linear mixed model; included farm as a random effect

For post hoc analysis; pair wise comparison was implemented using Tukey's test

Statistical analyses were performed in R software version 3.6.3

Significance was observed at P = 0.05

Results



Zeugodacus cucurbitae

Figure 2: Percentage abundance of fruit fly species that emerged from incubated pumpkin fruits collected from plots in Machakos County, Kenya.

Results cont'

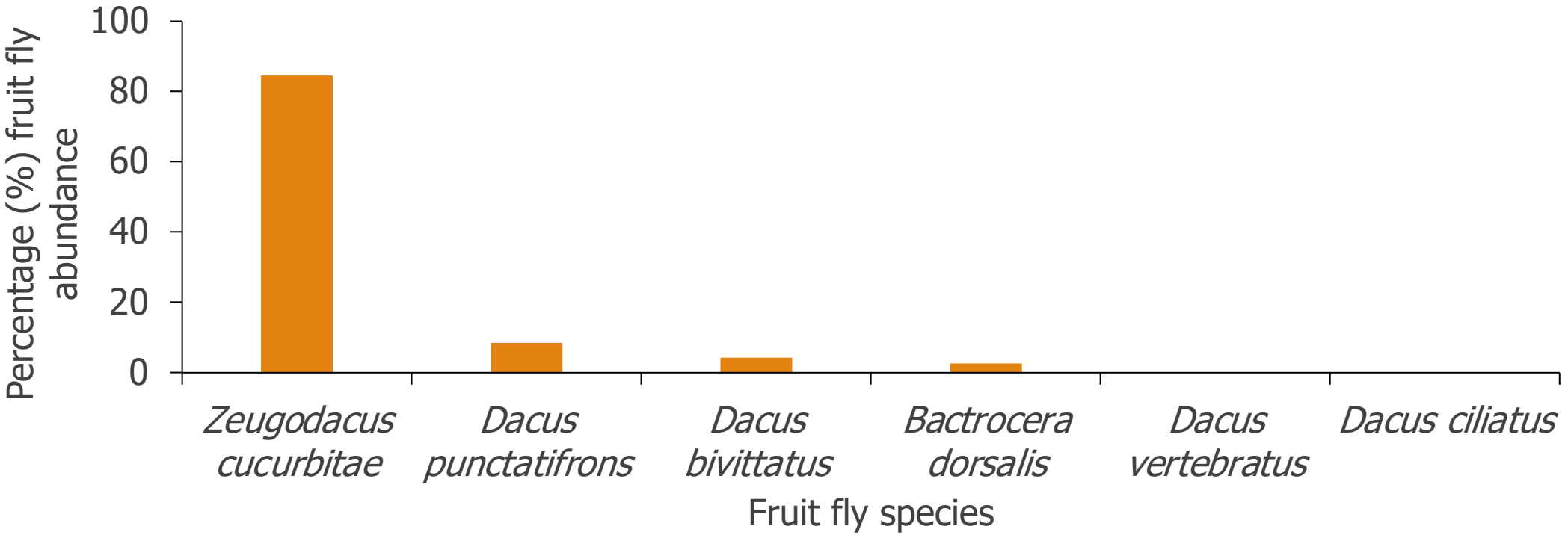


Figure 3: Percentage abundance of fruit fly species captured by the pheromone traps installed in pumpkin plots at Machakos County, Kenya.

Results cont…

Table 1: Mean (± SE) number of *Zeugodacus cucurbitae* per trap per day captured across the treatments and NDVI classes during the first and second cropping seasons

	Season one			Season two		
NDVI classes	N	IPM treated	IPM untreated	N	IPM treated	IPM untreated
Low NDVI	128	4.37±0.48	7.73±1.14	128	12.37± 1.28b	13.62± 1.97b
Medium NDVI	128	6.30±0.92	4.62±0.63	128	5.99± 0.73a	11.55± 1.40b

(P= 0.01, F= 6.42)

Results cont'

(P= 0.02, F= 5.32)

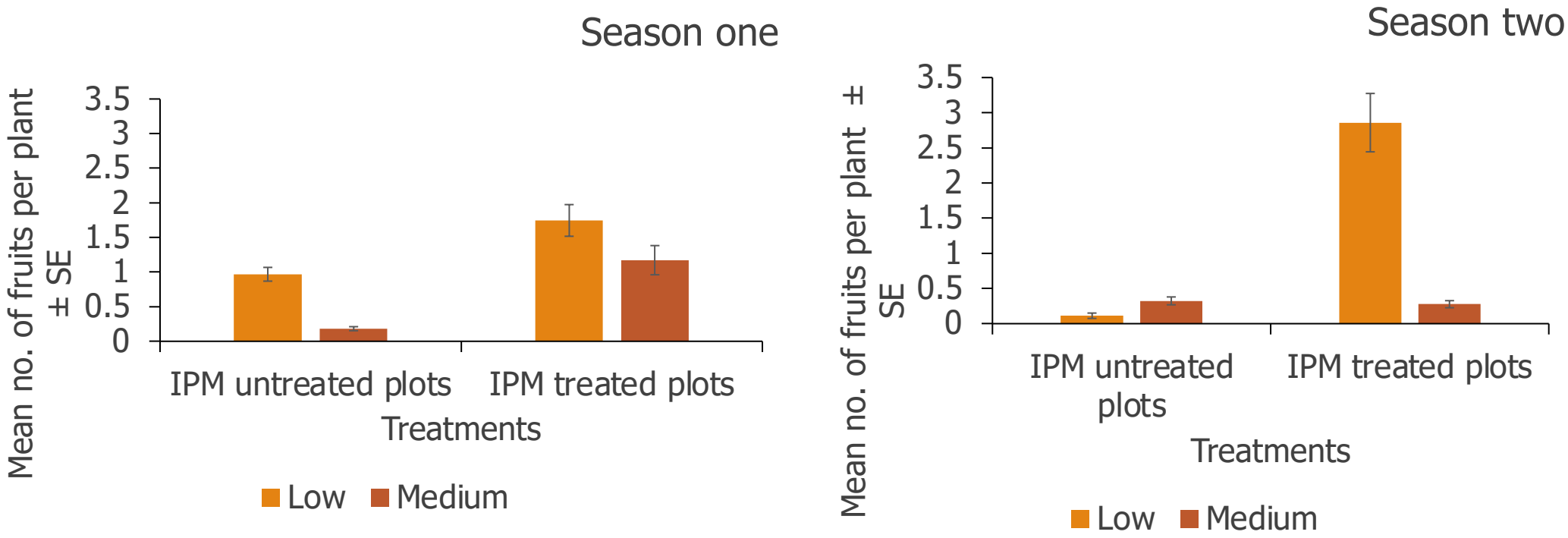


Figure 3: Mean (± SE) number of pumpkin fruits harvested per plant during the first and second cropping seasons

Conclusion

- The study concludes that farmers should deploy the IPM plan for fruit flies management to guarantee best yields

Recommendations

- It is recommended that awareness about efficiency of the plan be initiated targeting pumpkin farmers to enhance use of intelligent based IPM system for horticultural crops in order to reduce incidences of quarantine pests and pesticide residue.

Acknowledgements

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

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