The Impact of the Sweetpotato Leaf Beetle *Typophorus nigritus viridicyaneus* (Coleoptera: Chrysomelidae) on Sweet Potato Production



Caribbean Agricultural Research and Development Institute
Rasheeda A. Hall-Hanson, Janet L. Lawrence and Desmond A. Jones

OUTLINE

- Introduction (pest)
- Objective
- Methodology
- Results
- Conclusion

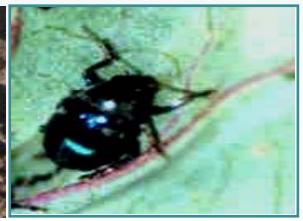
INTRODUCTION

- Sweet potato (*Ipomoea batatas (*Convolvulaceae) popular root crops in the region.

- Importance of sweet potato for the attainment of food and nutrition security for the Region has lead to the need to improve the production and productivity of the crop.

INTRODUCTION

- Production is constrained by a complex of pests
- Up to 60-100% losses of the marketable yields reported by farmers
- An emerging pest impacting sweetpotato production is the Sweetpotato Leaf Beetle


Sweet Potato Leaf Beetle
Typophorus nigritus viridicyaneus
(Coleoptera: Chrysomelidae)

Life Stages

- ✓ Blue-green metallic adult (~6 - 7.5 mm long), body is sub-cylindrical to oval shaped
- ✓ Distinct larval and pupal stages

LIFE CYCLE

- Eggs are laid near the root of the sweet potato plant
- Larval instars feed on the root and does not leave until mature
- Mature larvae pupates in the soil.
- Adults emerge and make their way to the foliage and begin to feed.

DAMAGE

- Adults feed mainly on the foliage leaving large holes in the lamina of the leaf
- Damage to the sweet potato roots is caused mainly by larval stage that create shallow tunnels on the surface of the roots.
- Farmers report losses between 70-90%

GOAL

- To improve the quantity and quality of marketable yields by developing an IPM strategy for the sweet potato leaf beetle.

OBJECTIVE

- Assess the efficacy of four insecticides and two popular local sweet potato varieties on the sweet potato leaf beetle populations and marketable yield.

METHODOLOGY

Experiment Design:

- Factorial 4 (pesticides) x 2 (popular varieties)
- Randomized Complete Block
- Four Replicates
- Conducted in major producing areas

METHODOLOGY

Experimental Plot

- Plot size:1x3 M
- 25 plants per plot, 25 cm spacing
- Guard row between each plot
- Crop managed with typical production guidelines.

PESTICIDES

		APPLICATION RATE
Chemical Name	***Common Name***	
Lambda Cyhalothrin	Karate®	0.11kg/ha - 28 days after planting and every 28 days.
Thiamethoxam	Actara®	0.11L/ha - 42 days after planting
Imidaclopid	Admire®	0.57kg/ha - 42 days after planting
Azadiractin	Neem-X®	3ml/L - 28 days after planting & every 14 days

POPULAR LOCAL VARIETIES

Fire-On-Land

Quarter Million

CARDI- "Improving Lives Through Agricultural Research"

METHODLOGY

Experiment Design:

- Factorial 4 (pesticides) x 2 (tolerant varieties)
- Randomized Complete Block
- Four Replicates
- Conducted in major producing areas

STUDY SITES

DESCRIPTION	CLAREMONT ST. ANN	DEVON MANCHESTER
Altitude	457.2m	750m
Soil type	St. Ann (78) Clay Loam	Chudleigh Clay Loam
Average Annual Rainfall	2664mm	1072mm

METHODOLOGY

Parameters measured

- Beetle population (2 weeks)
- Yield quality (at harvest)
  - % roots clean
  - Severity of damage (using damage rating scale based on the length of feeding channels)

RESULTS

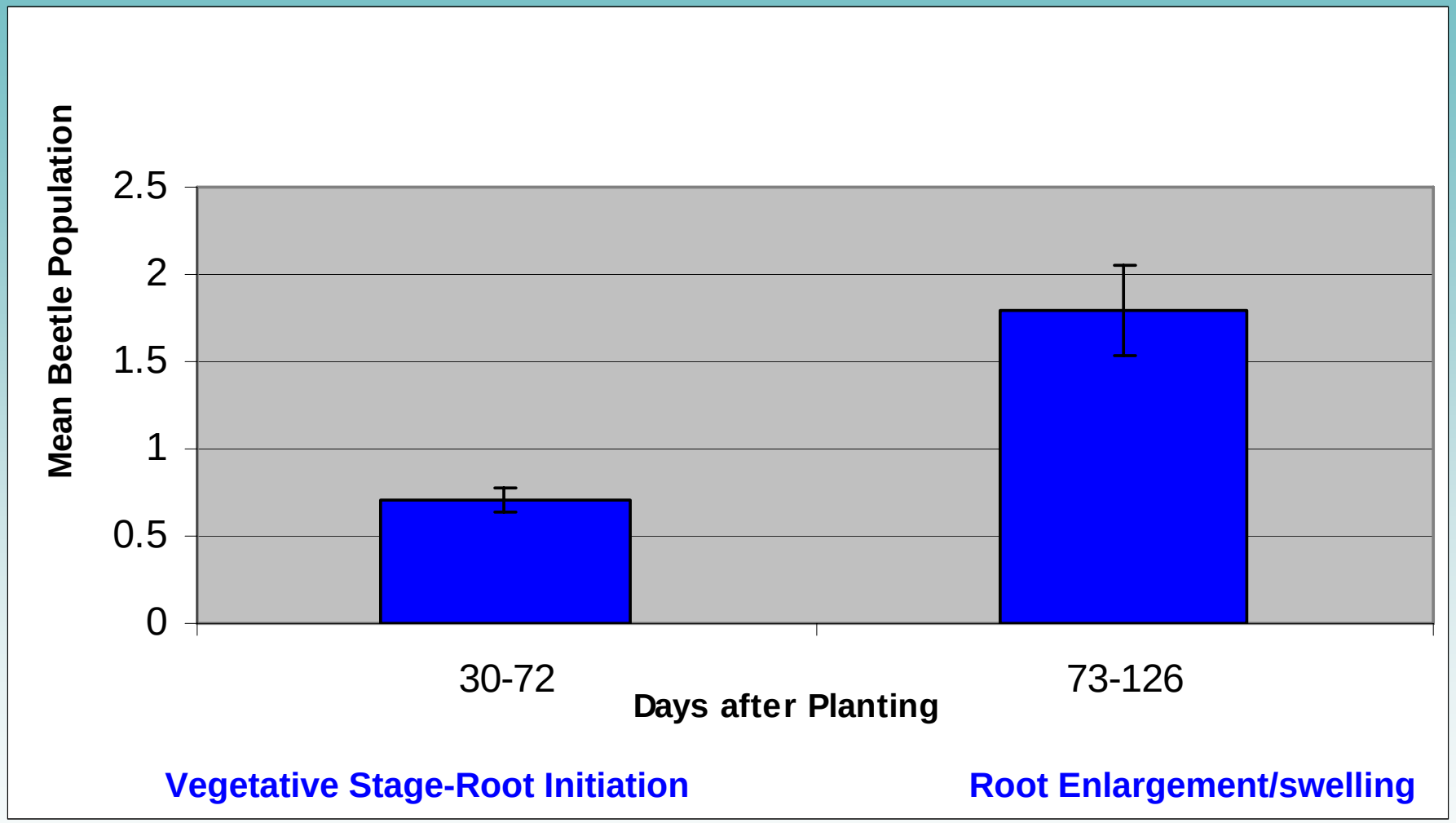


Figure 1: Sweet Potato Leaf Beetle Population at different growth stages of sweetpotato crop

TOTAL CLEAN ROOTS (%)

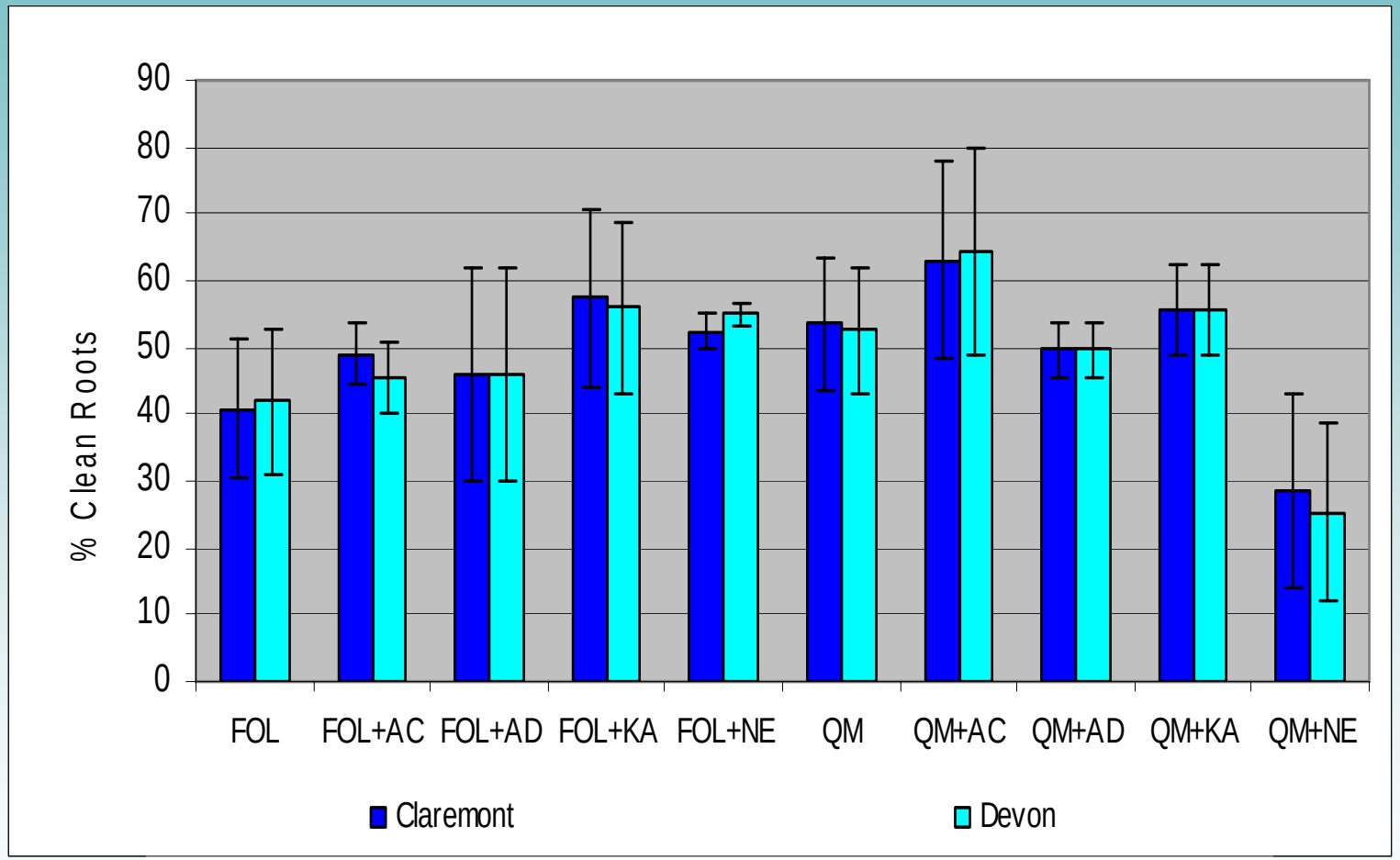


Figure 2: The effect of variety and insecticide on the production of clean sweetpotato roots in Claremont, St. Ann and Devon, Manchester

SEVERITY INDEX

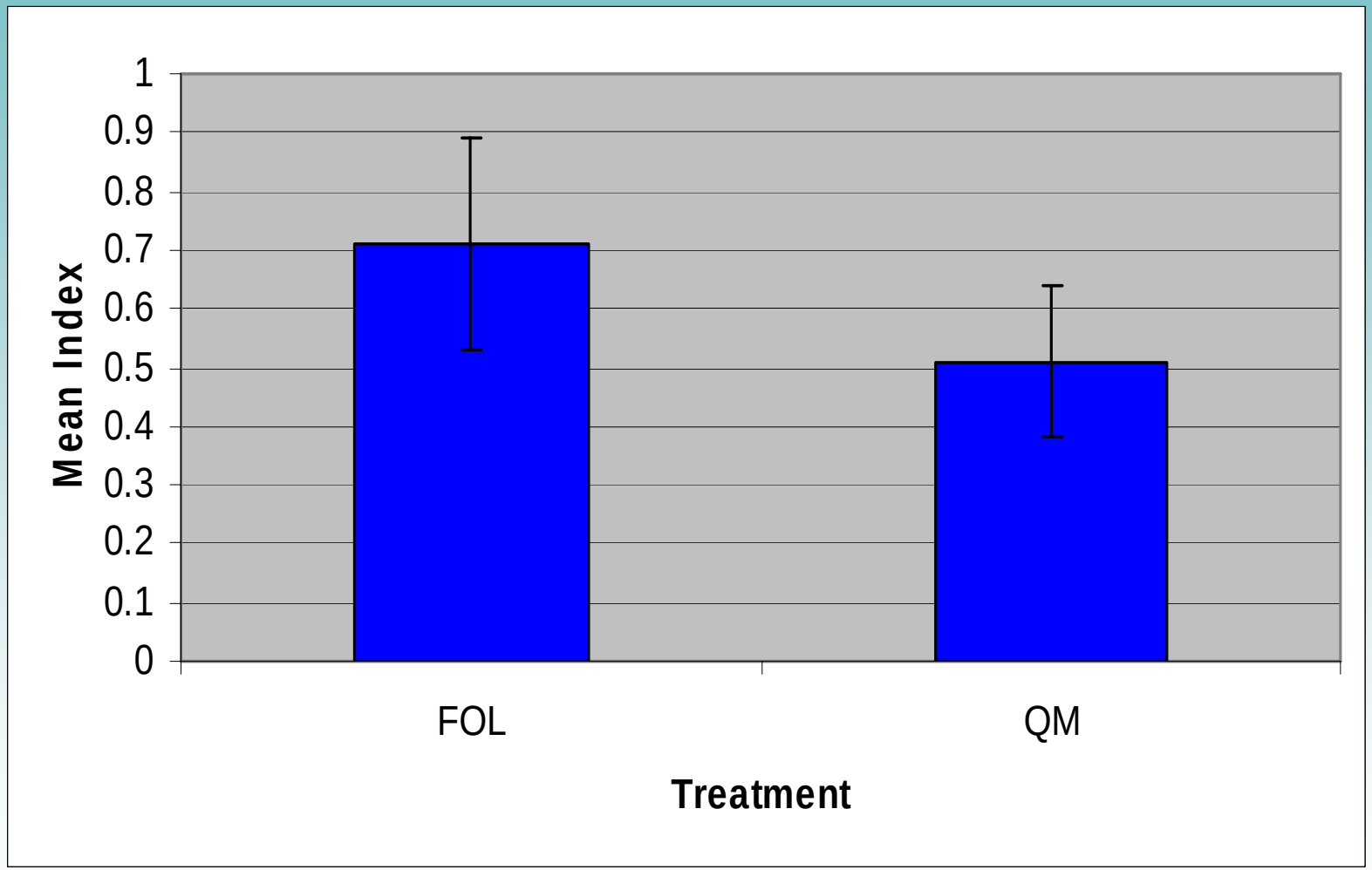


Figure 3: The effect of variety on the severity of damage of the sweet potato leaf beetle.

CONCLUSIONS

- Pesticides evaluated had limited impact on the quantity and quality of marketable yields.
- Low efficacy of the pesticides could be attributed to:
  - Rate and timing of application
  - Time of harvest
- Tolerant varieties gave promising results
- Differential tolerance between the varieties consistent with previous studies could be linked to chemical profile between the varieties. These beetles are known to use olfactory cues in host plant finding

CONCLUSIONS

Critical considerations for developing an IPM strategy for the SPLB.

- ✓At low populations significant yield losses occur.
- ✓Action threshold for the leaf beetle appears to be less than one beetle per 25 plants
- ✓Beetle population increases with storage root development
- ✓There is an extended larval and pupal stage in the soil
- ✓Continuous cropping of sweet potato within major producing areas
- ✓Limited tolerance to damage within markets

CONCLUSIONS

IPM *tactics that will be investigated:*

- Monitoring system to determine critical threshold for action
- Determine more appropriate rates and timing of applications of pesticides evaluated in the study
- Entomopathogens and other soil treatments targeting larval and pupal life stages.
- Explore the use of early maturing and deep rooted varieties

CONCLUSIONS

The SPLB is a major economic pest of sweet potato in Jamaica impacting the livelihoods of low resource farmers. An IPM strategy based on the use of tolerant varieties and other selected tactics may be a potential approach to alleviate the impact of the pest on marketable yields.

ACKNOWLEDGEMENT

- Governments of the Region (Funding)
- Christiana Potato Growers Cooperative Association
- Green Produce Farms

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