Protecting Your Plants Using Plant-Mediated IPM Systems

Cheryl E. Frank Sullivan, Margaret Skinner, Bruce L. Parker, & Svetlana Gouli

University of Vermont, Entomology Research Laboratory

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Plant-Mediated IPM Systems

Plants used in combination with IPM tactics

For Example:

- Scouting aid (pest &/or nat. enemy attractant)
- Site for nat. enemy releases &/or production
- Management decision aid (action thresholds)

Plant-Mediated IPM Systems

Fundamental Concepts

Plants that are more attractive to pests &/or nat. enemies than the crop

Plants that provide prime real estate for nat. enemies & the pest

- Food (pests/hosts)
- Shelter & climate
- Big bedrooms (reproduction sites)
- Cheap rent (production costs)

Plant-Mediated IPM Systems

Examples

Indicator/Sentinel Plants

Detects pests early

Marigold Trap Plant for Thrips

Trap Plants

Attract pests out of crop then managed with nat. enemies, chemical insecticides or removal & disposal

Bean Indicator Plant for Spider Mites

Plant Mediated IPM Systems

Ornamental Pepper, Alyssum & Marigold Combination Habitat & Guardian Plants for Predatory Bugs of Thrips

Barley Aphid Banker Plant for Parasitic Wasps

Examples cont..

Banker Plants

Supplies non-pest species or alternative foods to support nat. enemy production

Habitat/Insectary Plants

Provide habitat, food & shelter to attract & sustain biological control agents

Guardian Plants

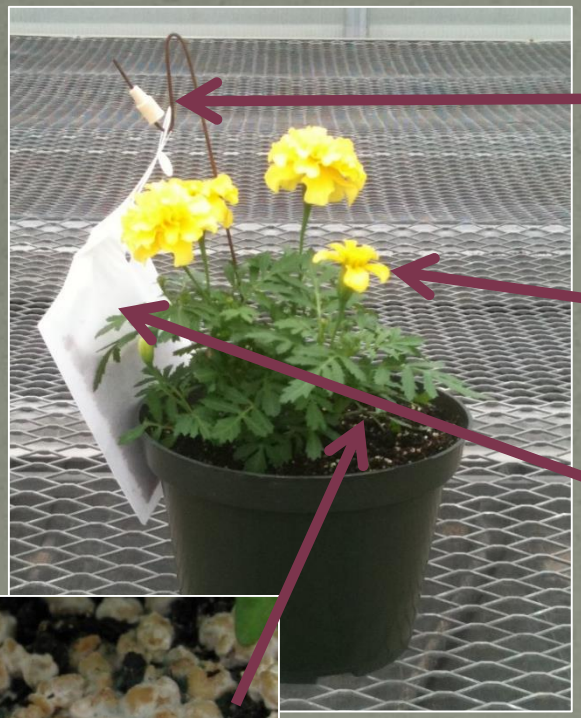
Provides multiple functions simultaneously (attracts pests from crop & supports nat. enemies while managing pests)

UVM RESEARCH

A Plant-Mediated IPM System for Thrips in Commercial Greenhouses

The Grand Vision

ATTRACT – SUSTAIN – KILL



Marigolds with lures attract thrips out of crop

Predatory mites (*N. cucumeris*) released to feed on thrips & reproduce on marigolds

Granular fungus (*B. bassiana*) applied to potting mix infect pupating thrips

Why Marigolds, Fungi & Mites?

- Marigolds cheap, easy to produce, have abundant flowers & thrips love them!
- Fungi & mites easy to release/incorporate
- Potential for persistence
  - Growth in soil (fungi)
  - On pollen in absence of thrips (mites)
- Low impact on environment & human health
- Compatible with most other parasites & predators

Research Objectives

1. Evaluate effectiveness of marigold GPS to manage thrips in greenhouse-grown bedding plants
2. Observe attractiveness of pheromone lure to thrips on sticky cards
3. Assess persistence of predatory mites & fungi over time to determine reapplication rates

Methods

Assessed # of thrips & mites, thrips foliar damage damage & fungal and mite persistence for 12 wks

6 Treatments x 3 Reps/Greenhouse

1) Mg with EXP strain of *B. bassiana*, thrips lure & pred. mites
2) Mg with GHA strain of *B. bassiana*, thrips lure & pred. mites
3) Mg with thrips lure only
4) Mg CONTROL without thrips lure, fungi, or mites
5) Yellow sticky card with thrips lure
6) Yellow sticky card without lure

Damage Evaluation

0

1
<10%

2
10-25%

3
26-50%

4
51-75%

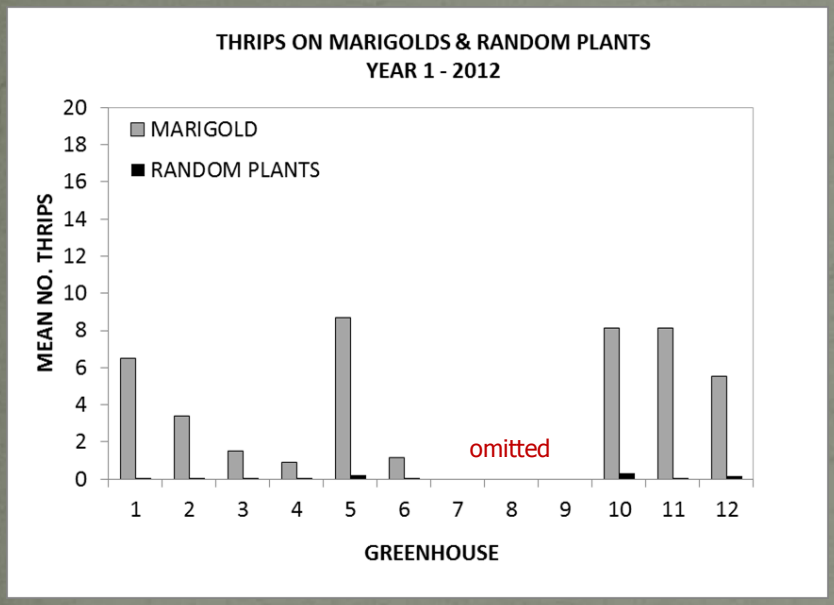
5
76-100%

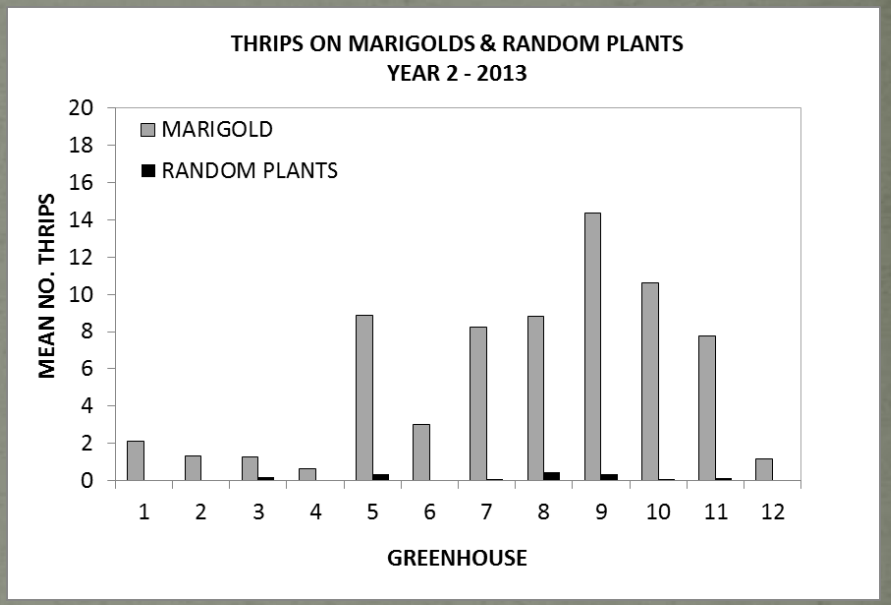
Results – Objective 1

Marigold GPS effectiveness against thrips

Part 1

Thrips on Marigolds vs. Randomly Inspected Plants





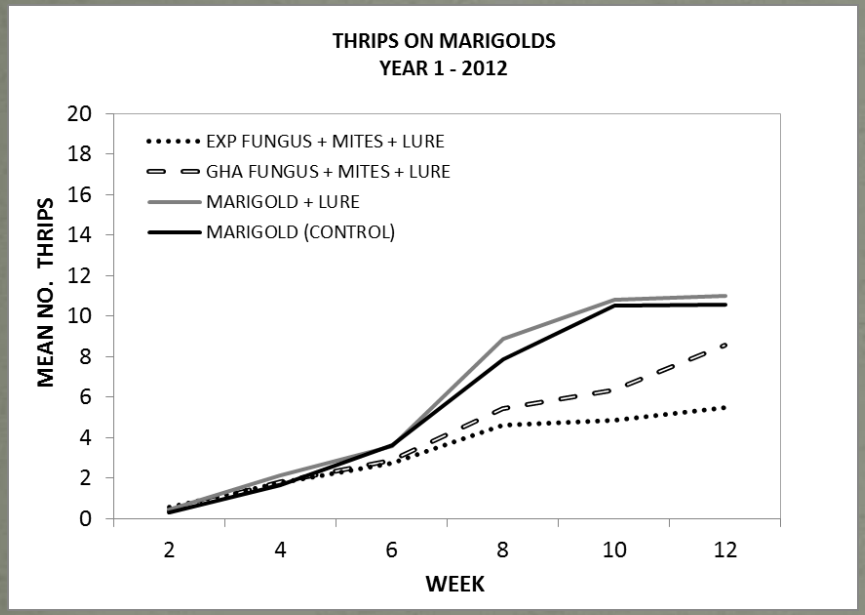
- GPS was effective at attracting thrips from the crop
- Over 95% of observed thrips found on marigolds!

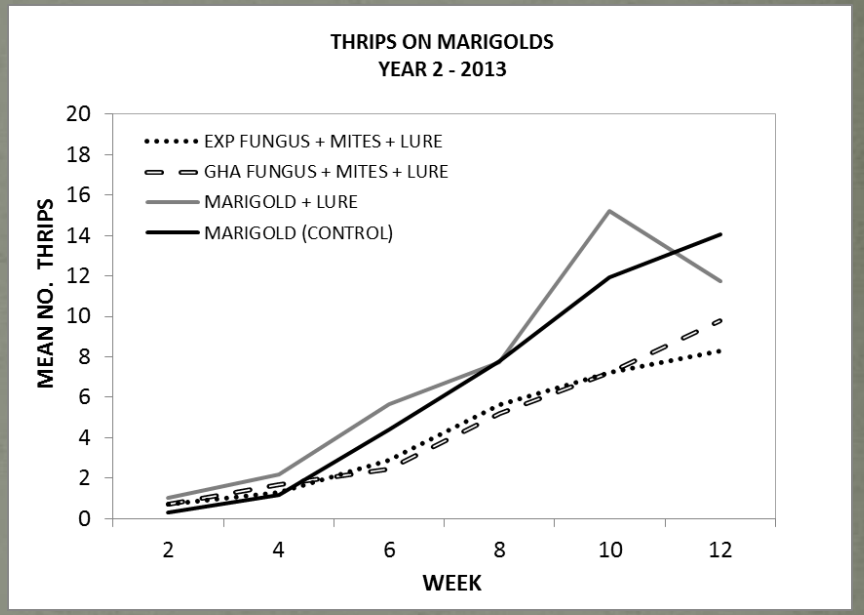
Results – Objective 1

Marigold GPS effectiveness against thrips

Part 2

Thrips Management on GPS

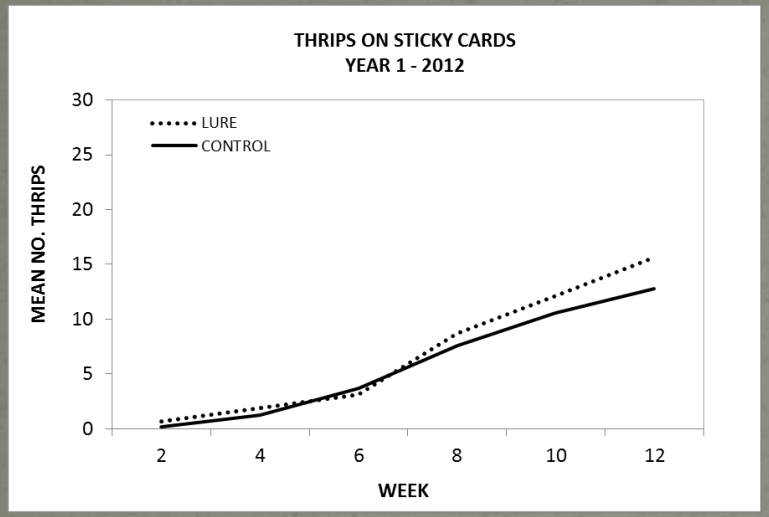


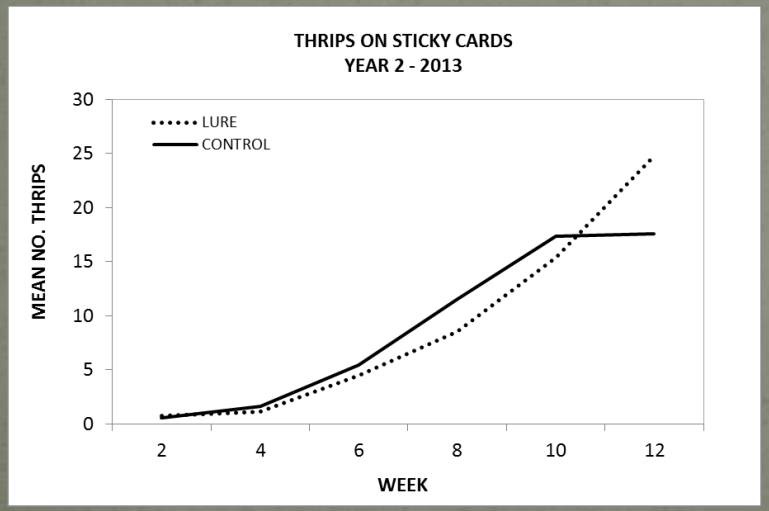


- GPS with lures, fungi & mites had fewer thrips than those without
- Marigolds with the lures were just as attractive as those without

Results – Objective 2

Attractiveness of pheromone lure to thrips on sticky cards

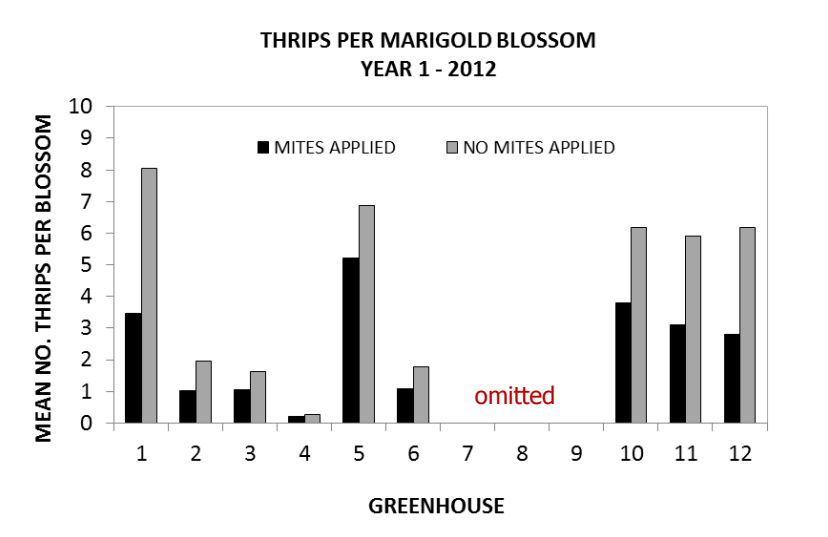


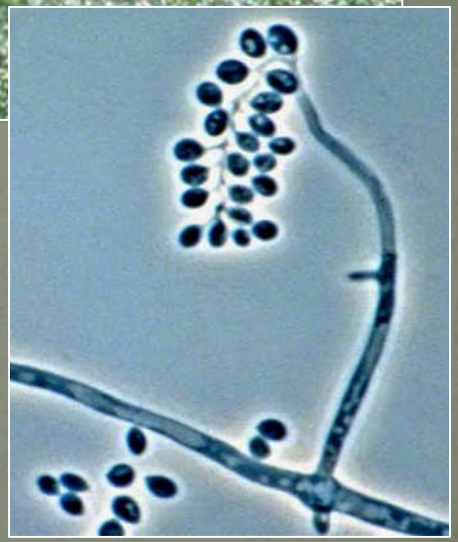


There were no differences in attractiveness

Results – Objective 3

Predatory Mite & Fungal Persistence





- Predatory mites and fungi persisted for 12 wks
- Fewer thrips were observed in marigold blossoms that had mite treatments applied

General Conclusions

The PROOF is in the plants!

- Marigold GPS is a useful IPM tool
  - Fewer thrips on marigold GPS over time than controls
  - Fewer thrips on crop plants surrounding marigolds
  - Mites & fungus persisted saving time applying controls and $$

- Foliar damage less on marigold GPS than the controls
  - Several untreated marigolds were removed prior to 12 wks

Questions?

THANK YOU!!!

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