vineland

RESEARCH & INNOVATION CENTRE

vineland
RESEARCH & INNOVATION CENTRE

When bios go bad…or do they?
Ways to make it all work better

Michael Brownbridge

The bios are @#&%$!!!

Are your expectations too high?

- Preventative approach needed
- Bios can't perform miracles
- Patience is a virtue, results are not immediate

Do you think I should apply some (more) bios?

The bios are @#&%$!!!

Are your expectations too high?

Are your identification skills up-to-date?

- Wrong pest ID
- Wrong bio for the pest

The bios are @#&%$!!!

Are your expectations too high?

Are your identification skills up-to-date?

How did you release the bios?

- Right timing
- Right application methods
- Set bios up for success

The bios are @#&%$!!!

Are your expectations too high?

Are your identification skills up to date?

How did you release the bios?

Are you sure the bios are bad?

- Many points where bios can suffer:
  - Cold storage, shipping, kept too warm
- If you suspect a problem, do QA tests to prove it
  - On receipt
  - After release

QA guide for growers

- Open package at receipt
- Simple protocols for most common biocontrol agents

http://www.vinelandresearch.com/sites/default/files/grower_guide_final_version.pdf


Grower Guide:
Quality Assurance of Biocontrol Products
Compiled by Rose Buitenhuis, PhD, Research Scientist, Biological Control, Vineland Research and Innovation Centre, 2014
Purpose of Guide
Successful biocontrol programs are dependent on a number of factors, but good quality natural enemies are fundamental. However, as living organisms, biocontrol products are subject to variability caused by various factors, starting at the insectary where they are reared through to the crop where they are released. Production of biocontrol agents is a self-regulated industry and quality assessments by the end-users are important to provide producers with feedback and to maintain high quality products.
Biocontrol suppliers are facing the challenge of producing a constant and reliable supply of high quality natural enemies. Therefore, quality control (QC) checks are done at the supplier level to make sure the products meet certain standards before they are shipped to the customer. However, it often takes several days before the products arrive at the grower and are released into the greenhouse. During this time, uncontrolled packaging, transport and storage conditions may affect the quality of the product and therefore the performance in pest control. Shipping is probably the most critical period. Temperature extremes, condensation from ice packs, restricted oxygen supply, unnatural high population densities and long shipping and storage times are some of the factors that can adversely affect quality. Therefore, growers should open packages upon arrival to provide a better environment for the biocontrol agents and to detect any potential problems related to shipping conditions (too warm, too cold, wet, bad smell).
In an ideal situation, growers would perform quality checks on every biocontrol product they receive as quality will directly impact efficacy; a shipment of poor-quality can result in failure to control the target pest. If a quality issue is detected the grower can react proactively, adjusting release rates accordingly.
vineland

FLOWERS CANADA GROWERS

Association of Natural Biocontrol Producers

USDA
United States Department of Agriculture
National Institute of Food and Agriculture

IPM Integrated Pest Management Florida

Greenhouseipm.org

The bios ARE @#&%$!!!

1. Are your expectations too high?
2. Are your identification skills up to date?
3. How did you release the bios?
4. Are you sure the bios are bad?

If a problem is detected – contact supplier, adjust release rates

How to keep your bios happy

Greenhouseipm.org

Banker plants

Provide a **food source** and/or an alternative **reproduction site** for natural enemies

Ensure a **constant presence** of natural enemies in the crop

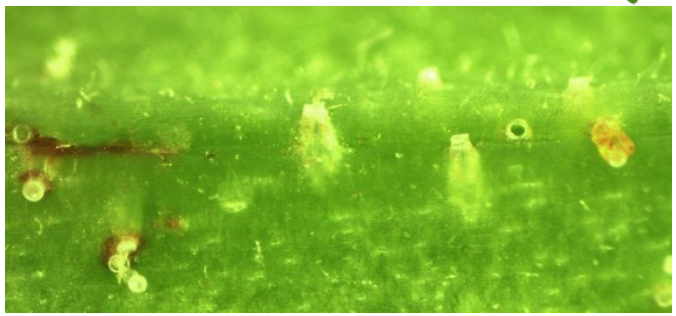
- Castor beans
  - predatory mites
- Ornamental peppers
  - predatory mites
  - *Orius*

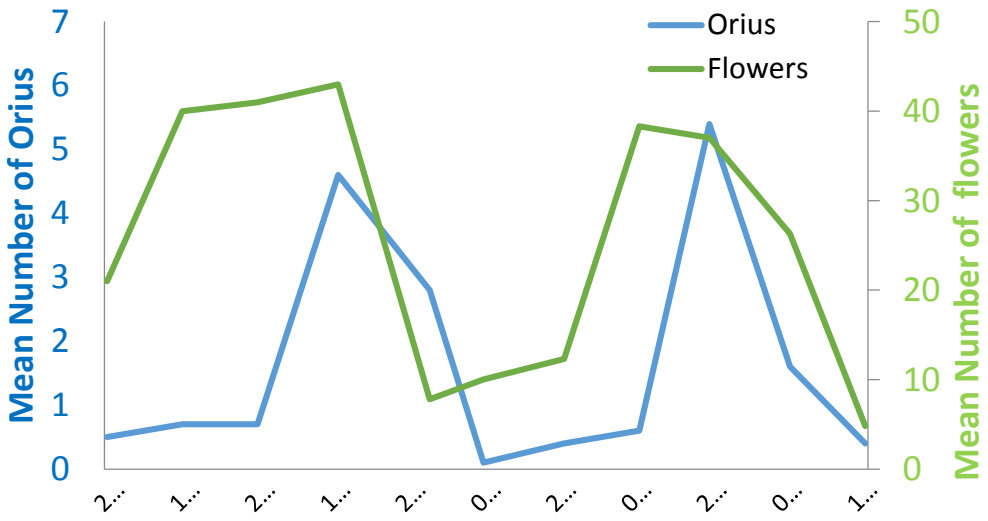
Greenhouseipm.org

Orius banker plants

Flowering ornamental peppers:

- Black Pearl, Purple Flash
- *Orius* eat pollen in the flowers, lay eggs in the stems/leaves





Greenhouseipm.org

Supplemental food

	Predatory mites	*Orius*
Cattail pollen	x	
Ephestia eggs	x	x
Artemia cycts	x	x

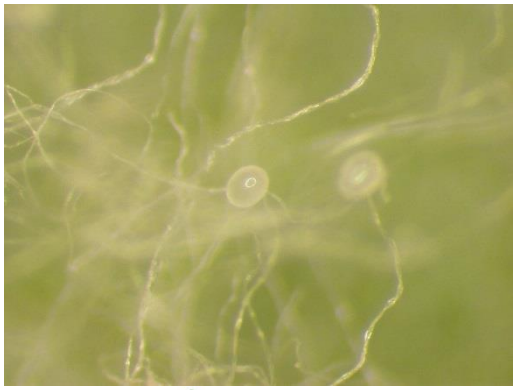
Thrips are omnivores!!

	Predatory mites	*Orius*	Thrips
Cattail pollen	x		x
Ephestia eggs	x	x	x
Artemia cycts	x	x	x

Long term: predators benefit more through increased populations

Other strategies

- Other pests – benefits of mixed diets (e.g. thrips and whiteflies)
- Mulch layer with astigmatid (food) mites (the 'standing army')
- Artificial fibres provide oviposition sites for predatory mites
- Pollen on-twine (food and oviposition sites)
- Plant volatiles, lures



Supporting technologies

Mass trapping and sticky cards

- Sticky cards, tape, trap plants
- Easy to implement
- Inexpensive
- Most effective for dispersing thrips
- Every thrips caught = big impact on future population

Mass trapping and sticky cards

- Small cards excellent monitoring tool
- Larger cards & tape for mass trapping
- Can be left up for several weeks

Mass trapping

New patterned sticky roll "Optiroll Super"

- Developed by BioPol Natural (Netherlands) & Russel IPM (UK)
- Blue Optiroll substantially increased thrips captures
- Already used in Ontario

Trap Plants

Complement control by 'capturing' thrips

- Flowering chrysanthemum 'islands'
- Attractive varieties: Vyron, Chesapeake
  - Especially effective when crop in vegetative stage
- Trap plants replaced every 2 weeks and destroyed
- Efficacy declines once crop plants flower

Trap Plants

Trap placement

- Interspersed pattern better than barrier pattern
- Increase concentration of trap plants near entry points

Interspersed

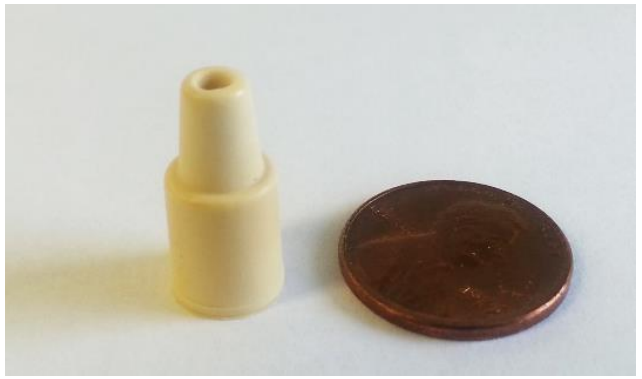
>

Barrier

Thrips lures

neryl-S-2-methylbutanoate
(Thripline ams, Syngenta Bioline)

- Thrips aggregation pheromone
- Marketed as a monitoring tool
- Improve mass trapping?
- Improve biocontrol?
  - Agitating thrips (more contact)
  - Attracting predators

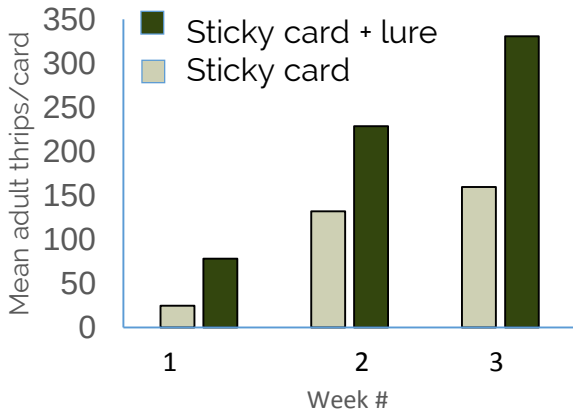


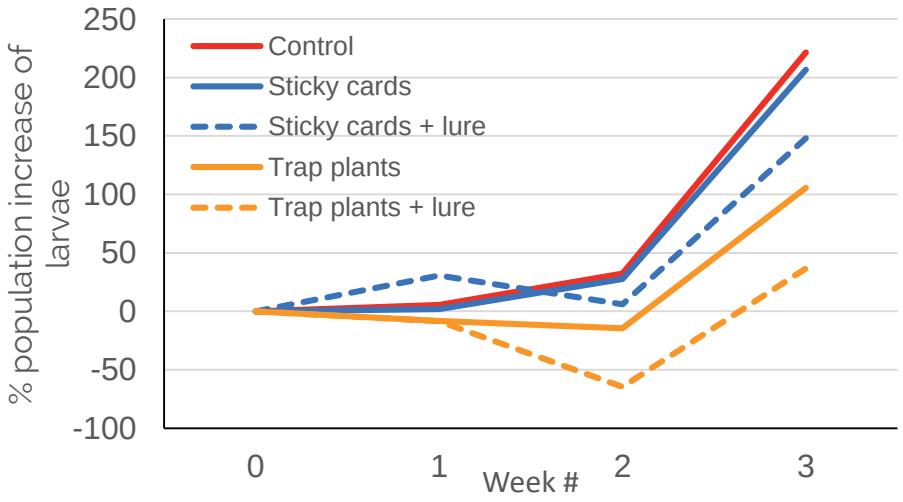
Thrips lures:
Research at Vineland

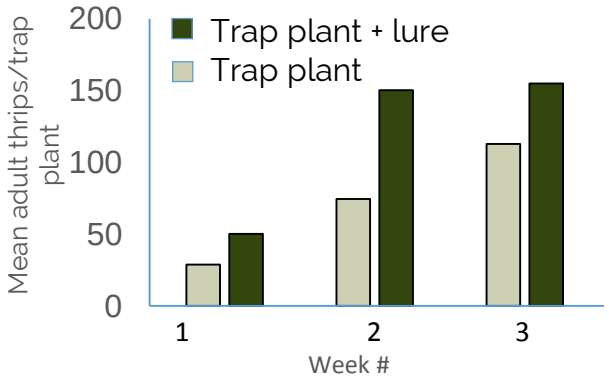
Does the use of thrips lures improve efficacy of mass trapping by sticky cards and trap plants?

Thrips lures

- More thrips on trap plants with lures
- More thrips on sticky cards with lures
- Trap plants more effective than sticky cards







Greenhouseipm.org

Conclusions

Mass trapping a useful tool in thrips IPM toolkit

- Sticky cards/tape
  - low maintenance, versatile, useful for multiple pests
  - may also catch flying beneficials

- Trap plants
  - more attractive to thrips, will not kill flying bios, may be used as banker
  - higher maintenance than cards

Optimize both methods with proper placement & use of lures

Website

Welcome to Greenhouseipm.org

This site presents up-to-date information on Integrated Pest Management (IPM) and biological control (biocontrol) in greenhouses. It is a compilation of the most current information, written in plain language as far as possible. It provides detailed descriptions of pests, biocontrol agents (BCA's) and how to use them within an IPM program.

In its initial format it focuses on two key pests – whiteflies and thrips – and how

NEWS & EVENTS

OCTOBER 13, 2015

Workshop: Thrips IPM Systems

November 23 and 30, 2015 8:30 am - 1 pm Rittenhouse Hall, Vineland Station Free, lunch incl **> Read More**

SEPTEMBER 14, 2015

Greenhouseipm.org

Thank You

Michael Brownbridge

michael.brownbridge@vinelandresearch.com

Acknowledgements
Rose Buitenhuis
Graeme Murphy
Ashley Summerfield

vinelandresearch.com @vinelandrsrch VinelandResearch

Growing Forward 2
A federal-provincial-territorial initiative

Ontario

Canada

AAC agricultural adaptation council

FUNDING AGRI-IDEAS.

Flowers Canada Growers
Fleurs Canada

ONTARIO GREENHOUSE VEGETABLE GROWERS