

Thrips Galore, And We Don't Want More!

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February 2016

THRIPS: To Know Them is to Love Them

Thrips (Order: Thysanoptera)

In General:

- Long & slender
- Tiny, less than 1/20th inch long
- Yellow, tan, brown or black
- Dark or reddish eyes
- Short, straight antennae
- Fast moving
- 2 pairs of fringed wings



THRIPS: To Know Them is to Love Them

At high magnification,
look for fringed wings.

Not strong fliers, but
are carried by wind/air
currents.

Found 2 miles up.



THRIPS:

To Know Them is to Love Them



Thrips-prone crops: A lot... Anything with flowers in bloom and produce nectar and pollen, but they have favorites.

Ornamentals: petunias, orchids, mums, marigolds...

Weeds: dandelion...

Small fruits: raspberries, strawberries, blueberries...

Tree fruits: peaches, plums, apples...

Trees: maples, linden...

Vegetables: cucumber, squash, eggplant, onions, garlic...

THRIPS: Damage

- Mouth cone with stylets like aphids
- Punch outer plant layer and suck out the cell contents
- Feed on foliage and flowers
- Causes stippling, discolored flecking, or silvering of the leaf surface, distorts leaves
- Deposits black flecks of frass (excrement)



THRIPS: Damage on flowers and leaves

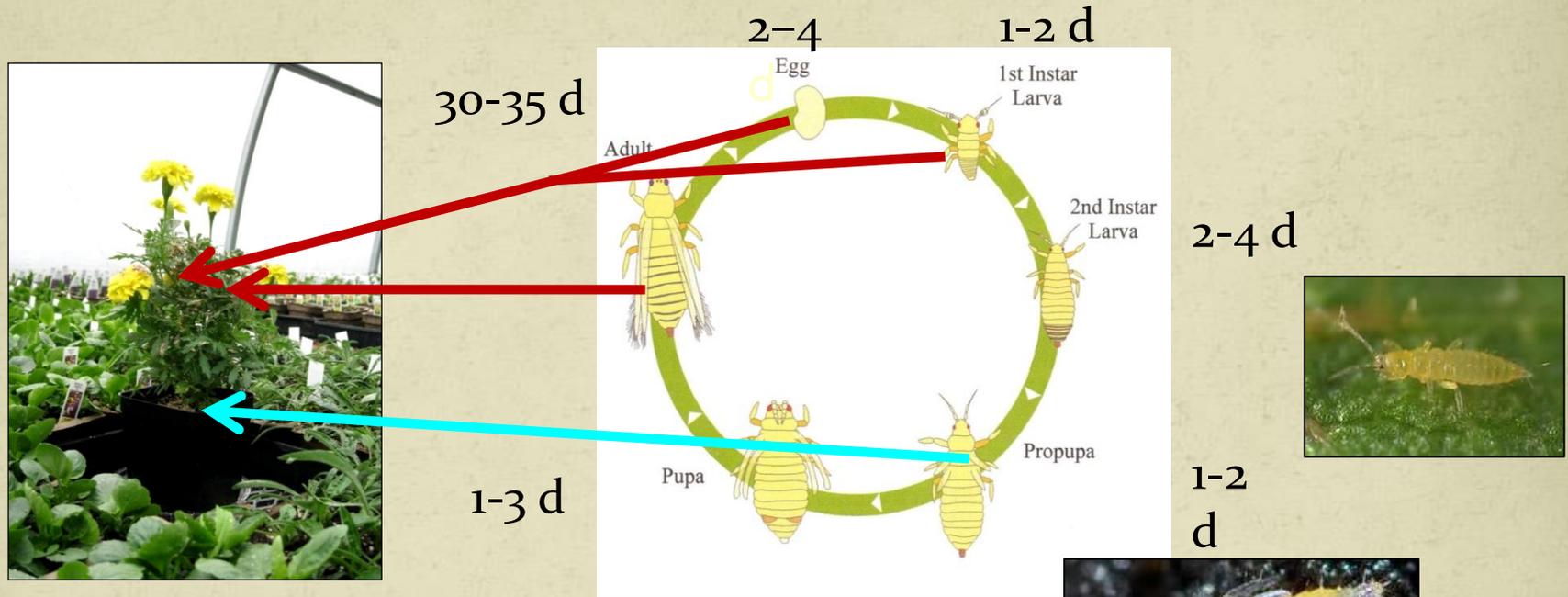


THRIPS: Damage on fruit and vegetables

- Feed on fruit
- Discolor and scar fruit surfaces, and distort plant parts
- Flower drop
- Transmit plant pathogens



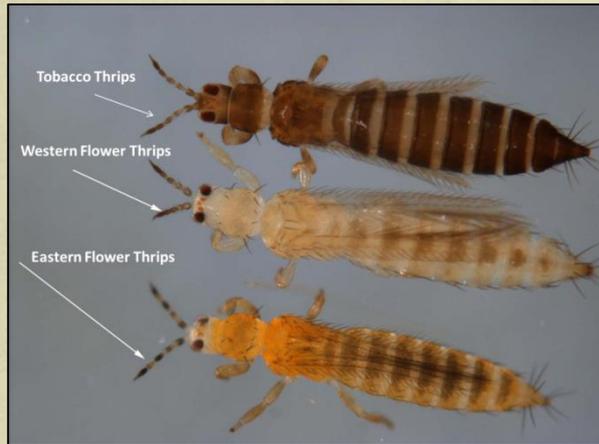
Know Your Enemy: Thrips Biology



- Can complete 1 generation in 2 weeks or less
- Most thrips are female, no reproduction needed
- 1 female can lay up to 300 eggs
- Multiple generations/year depending on temperature
- Adults live for 1 month, feeding continually
- Survive cold temperatures in high tunnels

Know Your Enemy: Which one is it?

Plant Feeding Pests



Onion thrips

Predators



Leptothrips mali



Chilli thrips



Greenhouse thrips



Banded greenhouse thrips



Banded-winged thrips

Management: IPM is the Only Way

Why are Thrips so tough to manage?

1. Reproduce quickly
2. Hide deep in plant crevices
 - Hard to detect
 - Hard to reach with pesticides
3. Some pupate in the soil
4. Wide host range
5. Resistant to many chemical pesticides

| | 14 days | 28 days | 42 days | Total @ 42 days |
|-----------------------------------|----------------------|------------------------|------------------------------|-----------------|
| 2 thrips | 200 (2 x 100) | 20,000 (200 x 100) | 2 million (20,000 x 100) | Over 2 million |
| 2 <i>Orius</i> (predatory bug) | 28 (1 x 28) | 392 (14 x 28) | 5,488 (196 x 28) | 5,908 |
| Thrips Predation | 12,600 (28 x 450) | 176,400 (392 x 450) | 2.5 million (5,488 x 450) | 2.7 million |

Sanitation: The first line of Defense

Start Clean to Stay Clean.

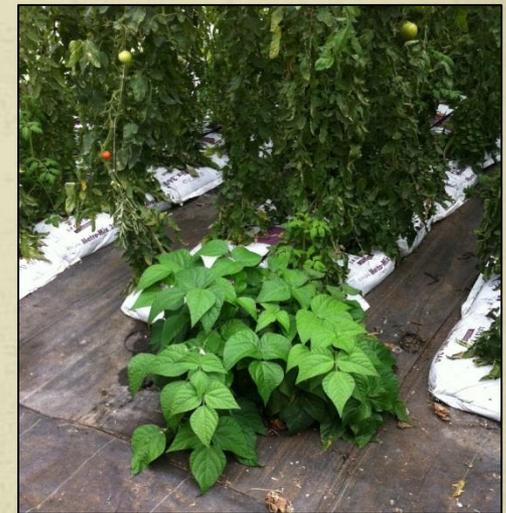
- ✓ Don't bring in pet plants from outside
- ✓ Remove weeds and debris in and around tunnel
- ✓ Plant trap plants to attract thrips and other pests from the crop



Marigolds for Thrips



Eggplant for Whiteflies



Beans for Spider Mites

SCOUTING: The Second line of Defense

Early Detection allows a Proactive response.

- ✓ Look for the foliage damage (crop plants, trap plants & weeds)
- ✓ Plant indicator/trap plants to attract thrips from the crop (**remove them if they get too infested!**)
- ✓ Blow your hot breath on the open flower to drive out “embedded” thrips
- ✓ Put up sticky cards and check them
- ✓ Keep records



Biological Control: The Third line of Defense

Think Ahead to Be Ready!

✓ **Predators**

- Mites on the foliage – *Neoseiulus cucumeris*
- Mites in the soil – *Hypoaspis miles*
- *Orius* on the foliage – *Orius insidiosus*

✓ **Nematodes in the soil:** *Steinernema feltiae*

✓ **Fungi in the soil** – *Beauveria bassiana*, *Metarhizium anisopliae*



Neoseiulus



Hypoaspis



Orius



Steinernema



Beauveria

Locate biocontrol suppliers you trust.

Plant-Mediated IPM Systems

Plant them and they will stay.

Plants used as a foundation, with other IPM tactics, to manage pests

- Banker Plants
- Habitat/Guardian Plants



Banker Plants

Plants that produce pollen and nectar to provide an ongoing supply of natural enemies

- Habitat for reproduction and survival of beneficials
- Site for releasing natural enemies



Ornamental Pepper



Habitat/Guardian Plants

Plants that provide food & shelter to attract & sustain naturally occurring &/or released natural enemies for a complex of pests

- Habitat for reproduction and survival of beneficials
- Site for scouting pests and natural enemies
- Target location for other management actions



Nature is One Big Family!

**Plant-Mediated IPM Systems encourage
Diversity and promote Balance.**

Syrphids/Hoverflies



Lady Beetles



Spiders



Lacewings



Orius



\$\$ Free Bios!! \$\$

Plant Mediated IPM Systems

Why Bother?

- ✓ Saves time detecting pests & beneficials
- ✓ Ensures higher quality beneficials
- ✓ Provides sustained source of beneficials
- ✓ Promotes establishment of naturally-occurring beneficials
- ✓ Reduces chemical insecticide use
- ✓ Increases customer awareness of IPM
- ✓ SAVES MONEY



Why NOT Bother?

- Takes time and labor
- Could harbor pests
- Needs careful timing & scheduling
- Predation or guarding by other species
- Compatibility with other crops

A Recipe for Success

- ✓ Get to know the pests and beneficials
- ✓ Make a plan and timeline before the season begins
- ✓ Locate a biocontrol supplier you can rely on
- ✓ Scout regularly
- ✓ Keep records or take notes
- ✓ Recognize that they aren't going away
- ✓ Become a happy zoo keeper
- ✓ **Figure out what works for you**



Questions?



THANK YOU!!!

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This material is based upon work that is supported by the National Institute of Food and Agriculture, U.S. Department of Agriculture (NIFA), Crop Protection & Pest Management Program under Award no. VT-0067CG, Accession No. 1004273; NIFA Extension IPM Program, Award no. 2014-70006-22577, CRIS no. 1004998 and USDA SARE LNE15-343. Any opinions, findings, conclusions, or recommendations expressed in this presentation are those of the author and do not necessarily reflect the view of the U.S. Department of Agriculture.

What is working for you?