Onion Insect Management: Seed Maggots and Onion Thrips

Wisconsin Fertilizer, Aglime and Pest Management Conference

Vegetable Crop Management

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I. Problem and associated pest(s)…

Maggot Damage

Seed (corn) maggot, Host range


Infested snap bean

- Wide host range
- Can develop on organic matter

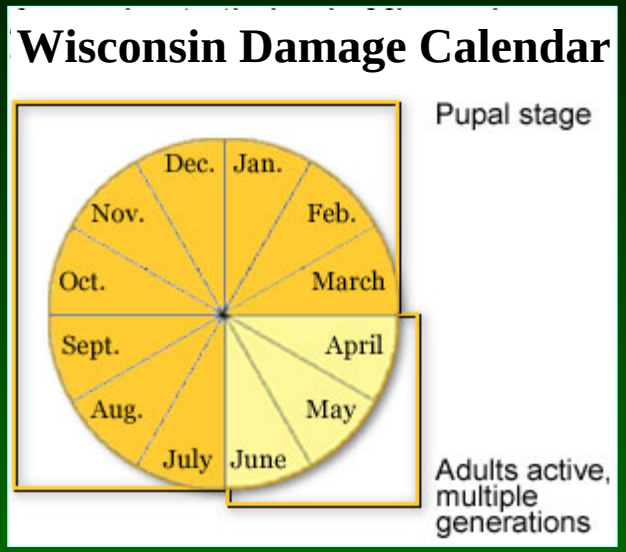
Crop Susceptibility

High	Moderate	Low
Cucurbits (squash, cucumber, melon)	Peas	Corn
Beans (lima, snap)	Beans (soy, kidney)	
Brassica roots (radish)	Brassica (broccoli, cauliflower)	
Onions (dry bulb)		

Seed maggots: Seedling damage

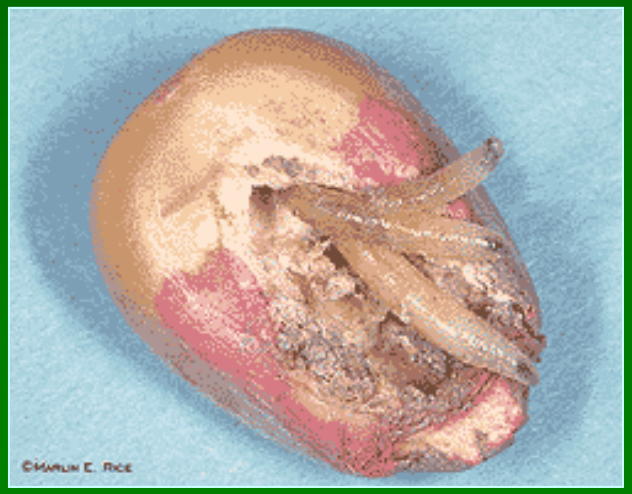
Occurrence

- Overwinter in soil as pupa
- Adults emerge in spring
- 4-5 generations/year. 2nd adult peak in May/June is usually most serious



Damage

- Tunnel germinating seeds
- Severely distort plant.
- Cool weather, delays plant emergence increases severity



Seed maggot: Management

Cultural

- Prevent egg laying with row cover
- Speed up germination:

  pre-sprout, mulch, warm soil
- Avoid green manure

Biological

- Predacious soil beetles
- Fungal epidemics

Chemical

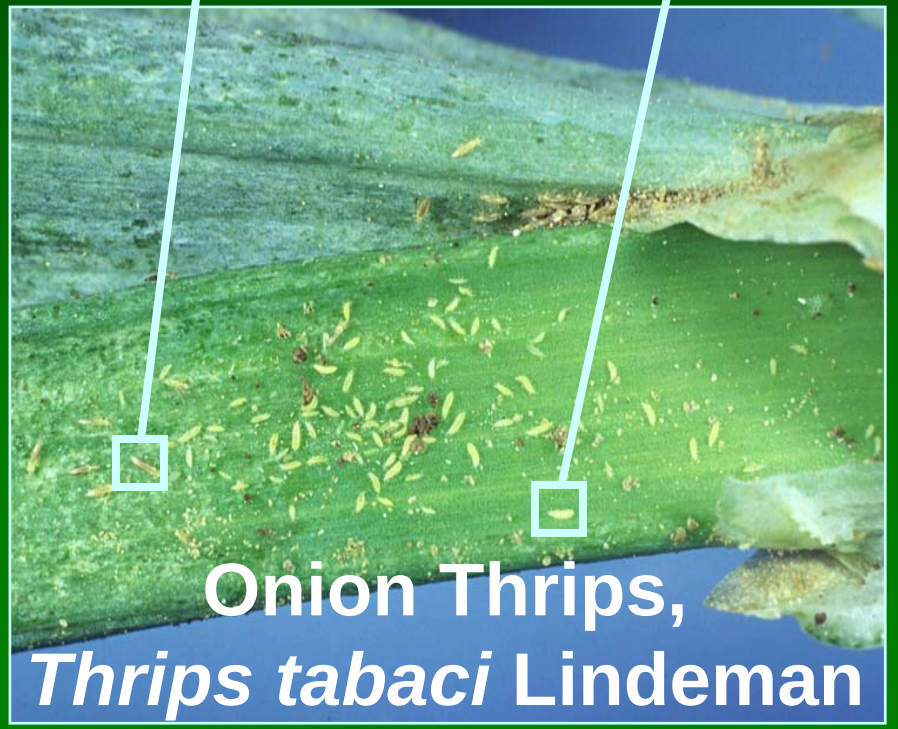
- In-furrow, insecticides (Lorsban)
- Commercial seed treatments (Poncho)

II. Second problem and pest…

Onion Thrips Damage

Adult

Larva



Biological attributes that make onion thrips a pest

- Short developmental time
- Highly mobile
- Wide host range
- Overwinter adjacent to onion
- Capability of developing resistance to insecticides

Onion thrips: Management

Cultural

- Crop rotation
- Overhead irrigation
- Sanitation (culls & field borders)

Biological

- Predacious thrips
- Minute pirate bugs

Chemical

- Foliar sprays
- Commercial seed treatments

Leptothrips

Minute pirate bug

2007 Insecticide Seed Treatment Evaluations[1,2]

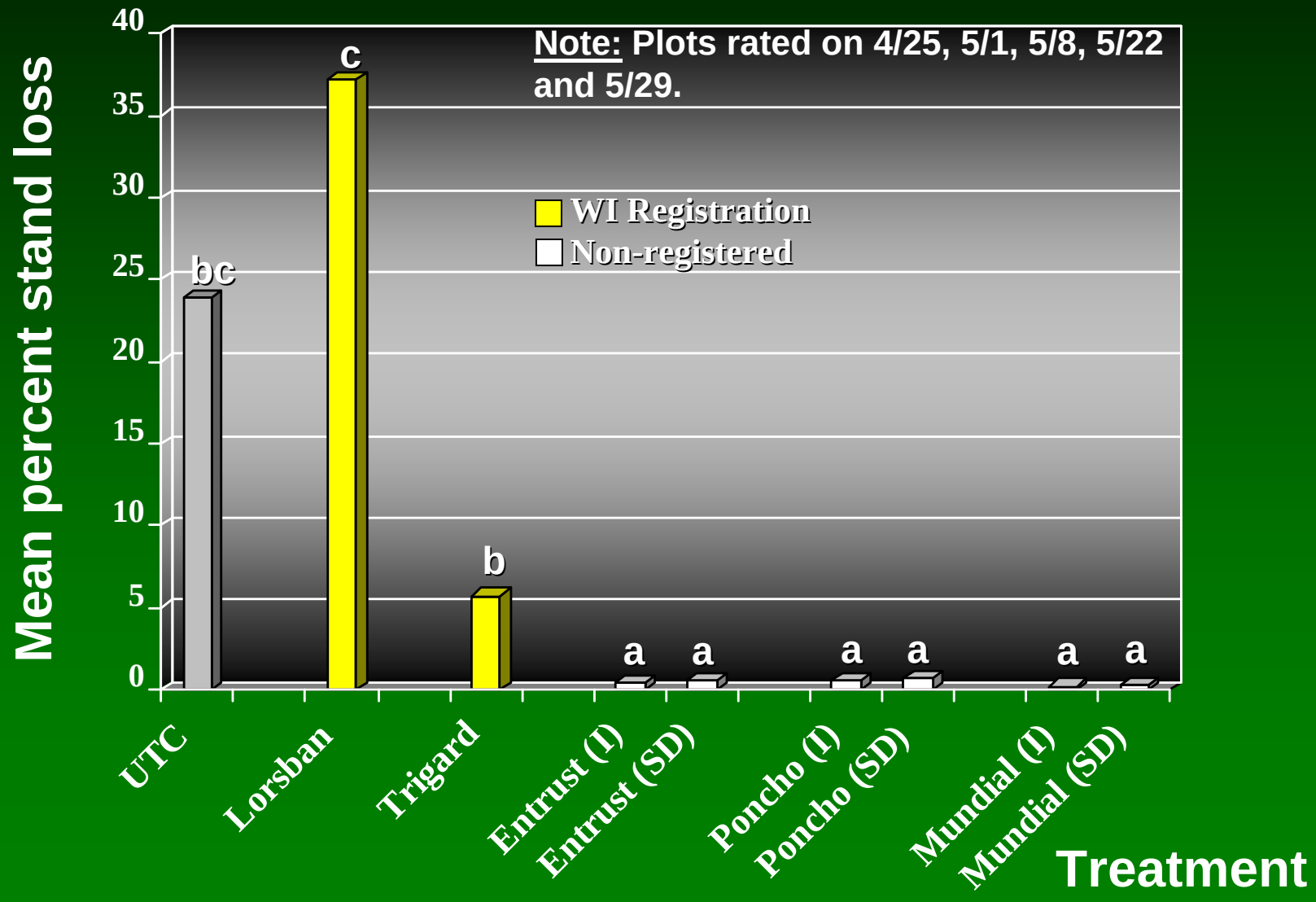
Product	Active Ingredient	Rate (amnt/unit)
Trigard	cyromazine	5.0 g [a.i.] / 100 g
Lorsban 15G	chlorpyrifos	476 g [a.i.] / 1,000
Entrust	spinosad	0.3 mg [a.i.] / seed
Mundial 500	fipronil	2.5 g [a.i.] / 100
Poncho 600	clothianadin	0.2 mg [a.i.] / seed
UTC	--	--

Note: Products highlighted in yellow were labeled on onion in WI in 2007

[1]Experiment arranged as RCBD with 5 replicates.
[2]Experimental seed treatments supplied by Seed Dynamics (Salinas, CA) and Incotec (Salinas, CA).

Note: All are systemic when delivered as seed treatments.

Seed Treatment Insecticides for Maggot Control (Onion & Seed Corn)



Summary
Insecticide Seed Treatments

- Onions were best protected from maggot damage using Entrust, Poncho 600, or Mundial 500.
- Negligible differences between seed trt companies
- Trigard (cyromazine) provided nearly adequate levels of protection (seed corn maggot).
- Lorsban 15 G failed to control seed maggots
- Highly efficacious insecticides must be registered soon in WI to:
  - (1) slow resistance
  - (2) control seed corn maggot

Insecticide Seed Treatments: Early Season Onion Thrips Control

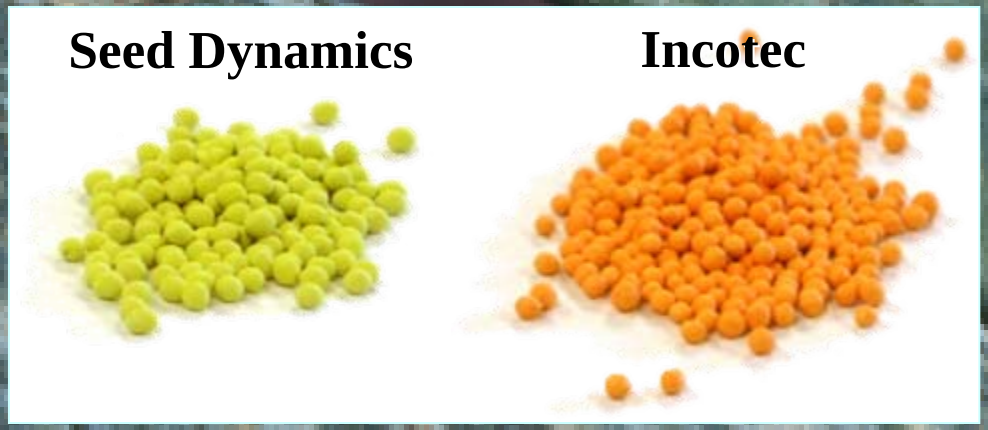
Treatments

- Trigard
- Lorsban 15G
- Entrust
- Poncho 600
- Mundial 500

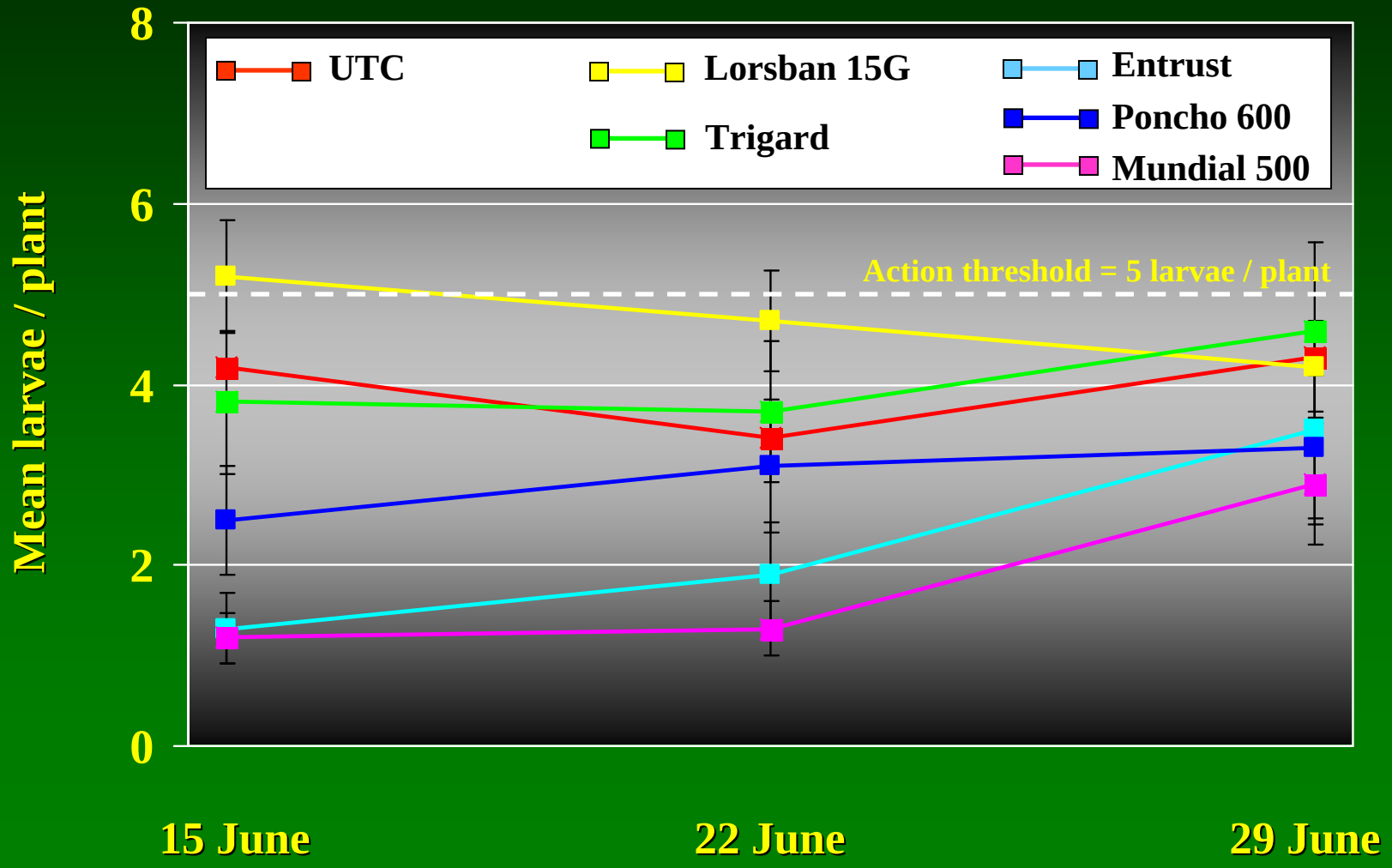
Nondestructively sampled

3, weekly sample dates:

- 15, 22, & 29 June

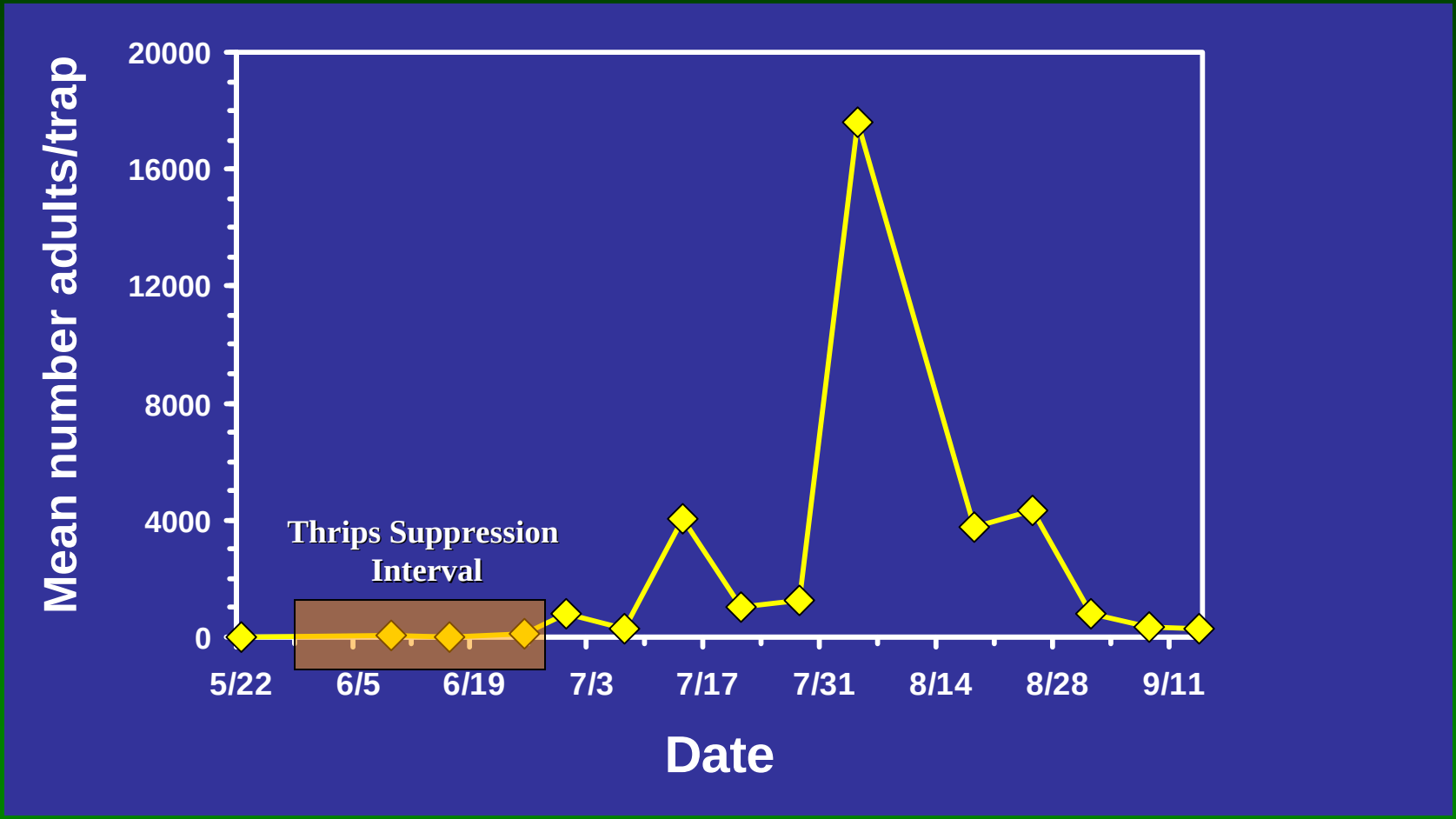


Onion Thrips 'Suppression' Using Insecticide Seed Treatments



Early Season, Onion Thrips Ecology

- Colonize onion in late June to July
- Four to six generations per season



Onion Thrips Suppression Summary

- Immature onion thrips populations did not exceed established thresholds
- Trigard and Lorsban 15G failed to provide thrips suppression compared with UTC
- Thrips suppression extended over 2 out of 3 successive weeks (Entrust, Mundial).
- Suppression level was insufficient to maintain populations below damaging levels

Foliar-Applied Insecticides 2007 Product Evaluations

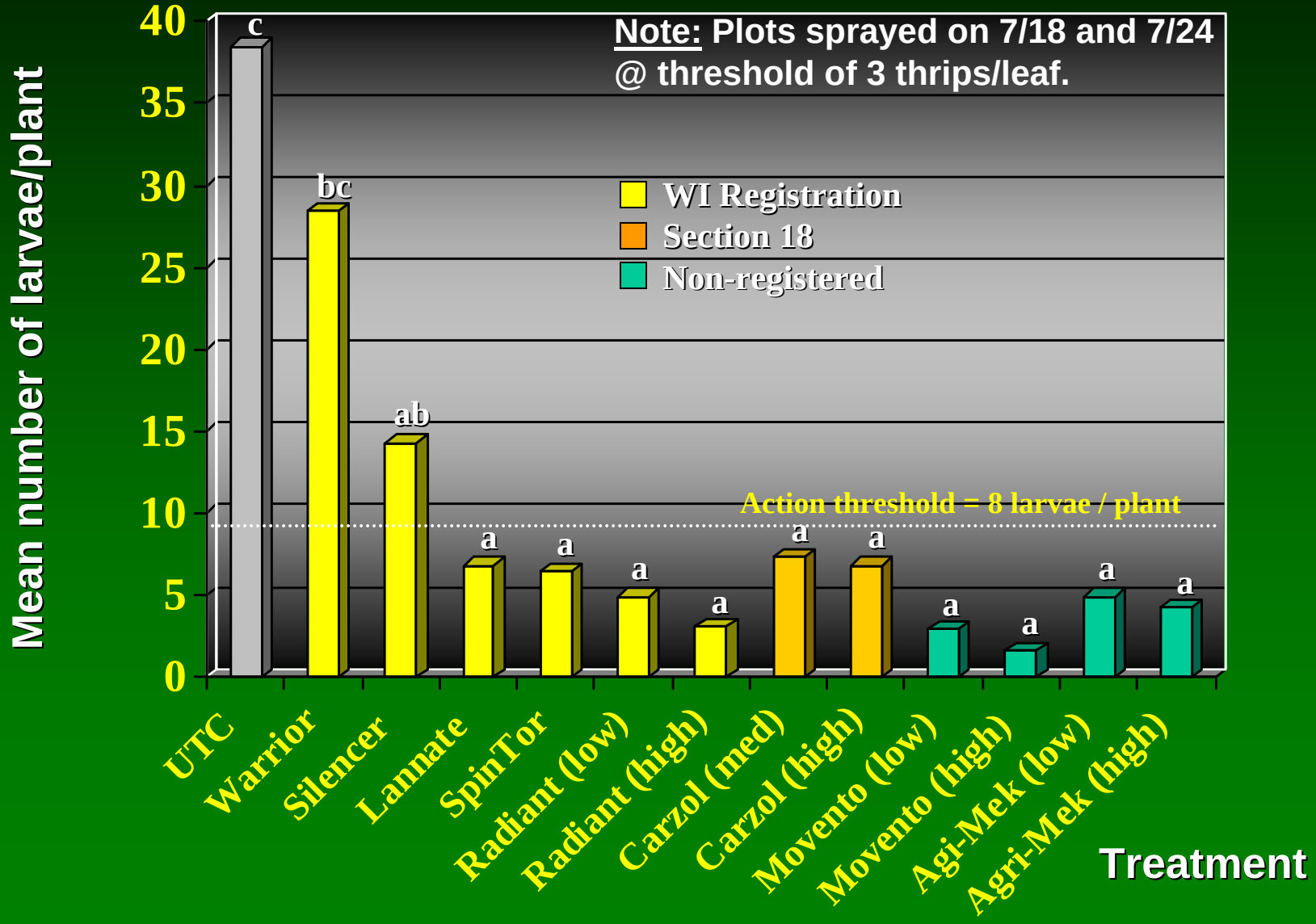
Product	Active Ingredient	Rate (amnt/acre)
Warrior	lambda-cyhalothrin	1.9 and 3.8 fl oz
Mana - Silencer	lambda-cyhalothrin	1.9 and 3.8 fl oz
Lannate LV	methomyl	48 fl oz
SpinTor 2SC	spinosad	4 and 6 fl oz
*Radiant SC	spinetoram	5 and 7 fl oz
**Carzol SP	formetanate hydrocloride	0.75, 1 and 1.5 lbs
Movento	spirotetramat	5 and 8 fl oz
Agri-Mek 0.15EC	abamectin	8 and 10 fl oz

Note: Products highlighted in yellow were labeled on onion in WI in 2007;

*Radiant received a Section 3c label use in November, 2007.

**Carzol was permitted for use in WI under a Section 18.

Foliar-Applied Insecticides for Onion Thrips Control



Reduced Risk Foliar Options New Registration 2007

❖ Radiant®SC (spinetoram)

❖Macrocyclic lactone (spinosad: MoA group 5)
- Use rate 4.5 - 6 oz a.i./a (CPB)
- Control of onion thrips

❖10-14 days persistence (photostability)

❖Very low impact on beneficials

❖Low mammalian toxicity

Reduced Risk Foliar Options New Registrations 2008-09

❖ Movento® (spirotetramat):

- Tetramic acid class (MoA Group 23)
  - Use rate 8 – 16 fl oz (Thysanoptera)
  - Fully systemic movement (2 directions)
- 10 - 14 days persistence
- Very low impact on beneficials
- Very low mammalian toxicity
- Section 3 Registration (mid – late, 2008)

Reduced Risk Foliar Options New Registrations 2008-09

- **Agri-Mek® 0.15 EC (abamectin):**

Syngenta Agri-Mek 0.15EC

- Chlorine channel activators (MoA Group 6)
  - Use rate 5 – 8 fl oz (Thysanoptera)
- 7-10 days persistence
- Very low impact on beneficials
- Very low mammalian toxicity
- Section 3 Registration (2009-2010)

Insecticide Control Failures in Wisconsin are more Frequent Because…?

- **Populations in Wisconsin may be resistant, similar to populations in other locales.**

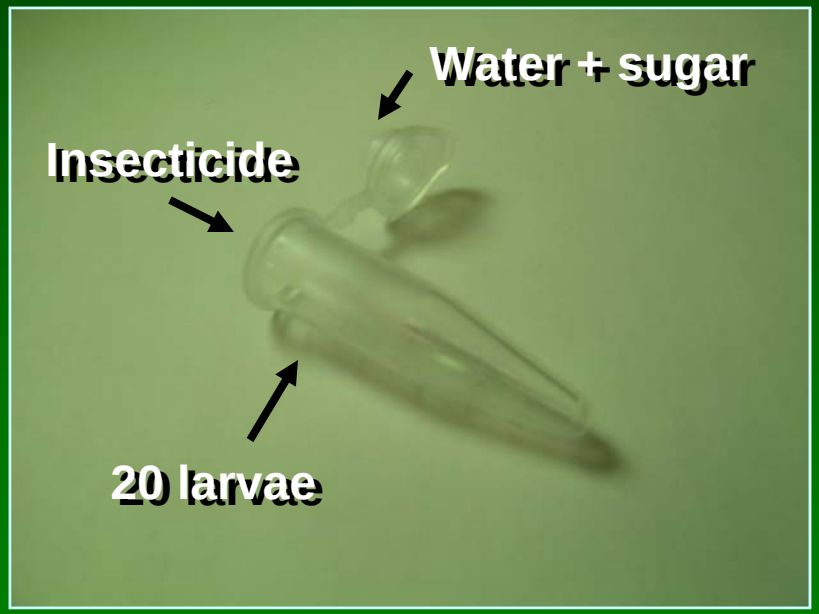
  - ✓ **Environmental conditions become hot and dry.**
  - ✓ **Spray coverage may be inadequate.**
  - ✓ **Application threshold adjustments.**

TIBS Survey for Insecticide Resistance

- **Expose thrips to insecticides in the lab to avoid issues such as:**

(1) inadequate spray coverage

(2) environmental conditions that could affect control



Insecticide Control Options

- **Rotate insecticides (classes if possible)**
  - **e.g., spinosad, (spinetoram), carbamate, spiroteramat, abamectin, carbamate, pyrethroid**
- **Two successive applications of one product to control a generation**
- **Time applications based on most appropriate threshold**
- **Avoid tank mixing insecticides**

Insecticide control failures could be reduced by:

1. Monitoring onion thrips populations for resistance

2. Using a nozzle and gallonage that provides better coverage

3. Using insecticides belonging to new classes

4. Adopting insecticide resistance management – rotating classes of chemistry


Questions?