



# Practices for Improved Thrips Management in the Klamath Basin

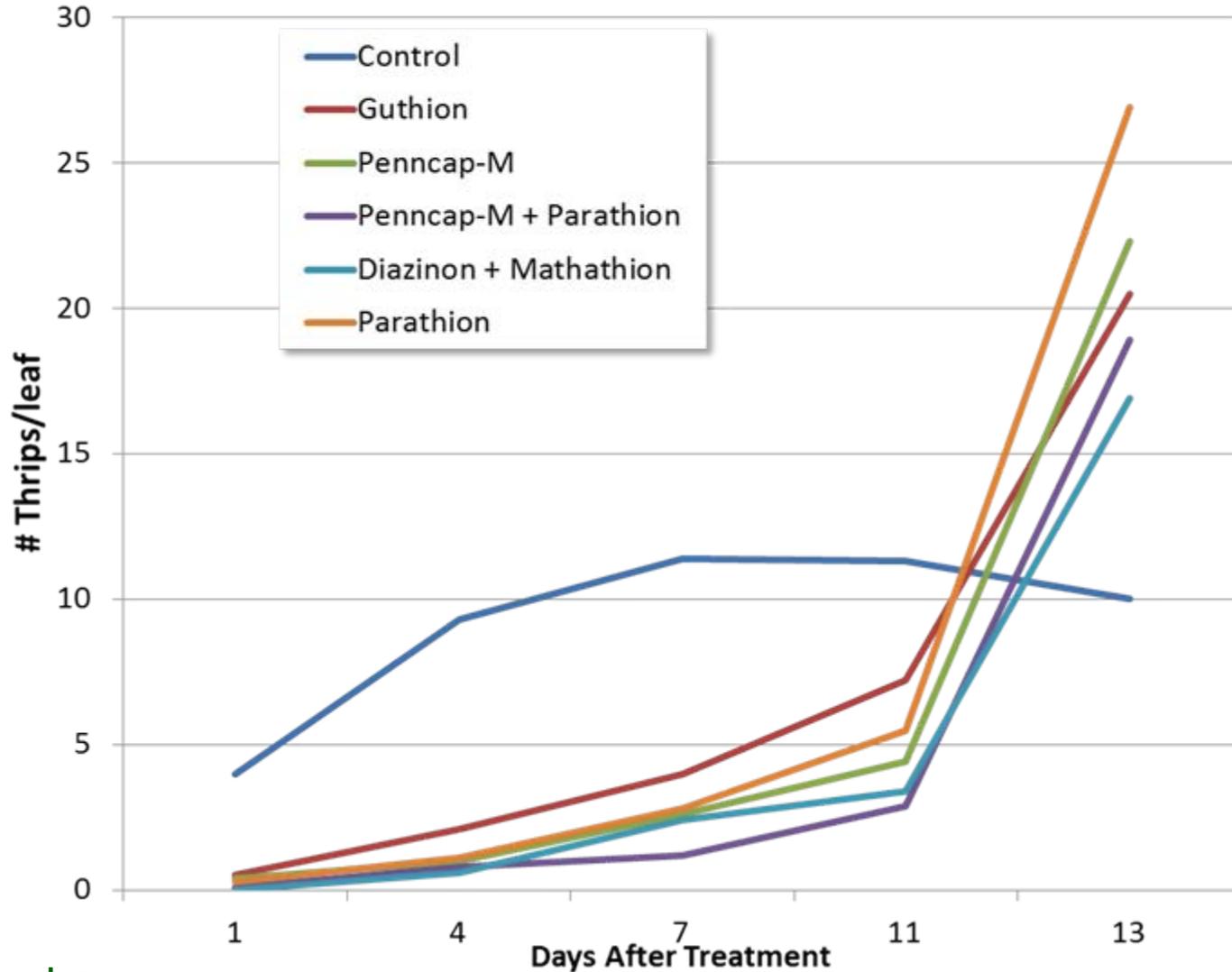
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Rob Wilson, IREC Director

Funded by CGORAB



# Thrips Control in Fresh Market Onions

## Lancaster 1986



Thrips feed by piercing and rasping the leaf surface to liberate juices from the plant cells. Thrips release substances that help predigest the onion plant tissue. Using their mouth parts they suck up the plant content.

Extensive damage is silvery patches. Patches can occupy most of leaf surface and plant cannot adequately photosynthesize. Plant loses more water than normal through the damaged tissues and plant pathogens penetrate.



UC Statewide IPM Project  
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# Cultural Control Methods

- Nitrogen management
- Mulches
- Trap crops and inter-cropping
  - Carrot, crucifers, cucurbits, some flowers;
  - Disk or treat trap crop
- Sprinkler irrigation
  - Thrips prefer warm and dry conditions
- Field selection
  - Avoid planting adjacent to grain and alfalfa





**Not very practical in IM area. If you don't plant next to an alfalfa or grain fields, not many fields left to plant onions**



# Objectives

- Compare effectiveness of a range of insecticides
- Compare efficacy of two insecticide treatments applied via chemigation vs. foliar-applied spray application
- Evaluate the need for an adjuvant when applying insecticides via chemigation
- Evaluate different strategies for thrips management over the season to compare single insecticides, tank mixes, alternating chemistries and application timing.

# My Predictions

- **Insecticide Comparison**
  - Warrior would be ineffective
  - Radiant would be one of most effective
  - Movento would be effective because everyone wants a Section 18
- **Chemigation would be more effective than spray application due to coverage**
- **Adjuvant would have no effect with chemigation treatment**
- **Season-long Strategy**
  - Rotating insecticides would be best approach
  - Early start date would be preferable strategy
  - Plots untreated for entire season would yield significantly lower with noticeable but minor differences among other treatments





10 whole plants collected from each plot and stored in plastic bag



Onion leaves pulled apart and left to soak for in solution with water, bleach and dish detergent

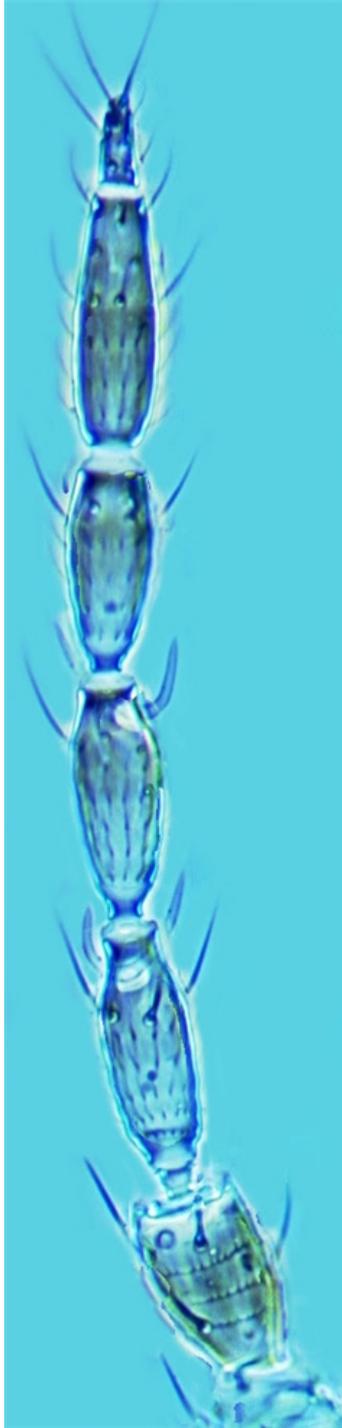


After 10 minutes shaken and then soak for 10 more minutes. Rinsed and poured into pots with fine screens. Backwash thrips from fine screen with ethanol into vials.

# Onion Thrips

*Thrips tabaci*

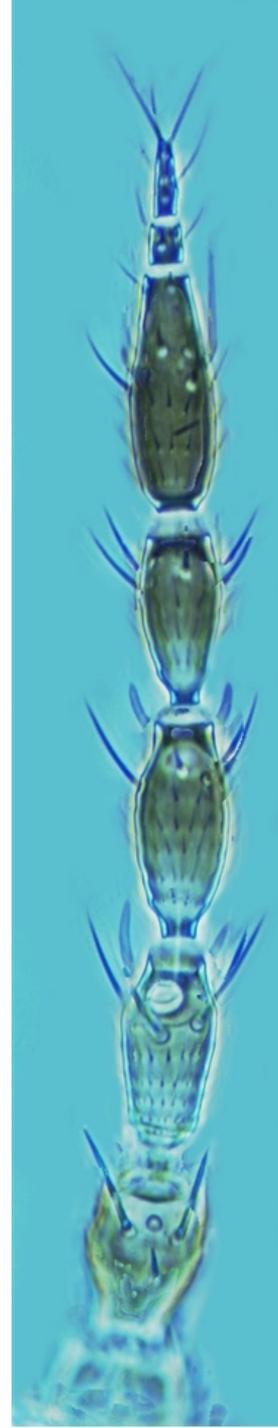
*Asexual  
reproduction by  
females  
(parthenogenesis)*



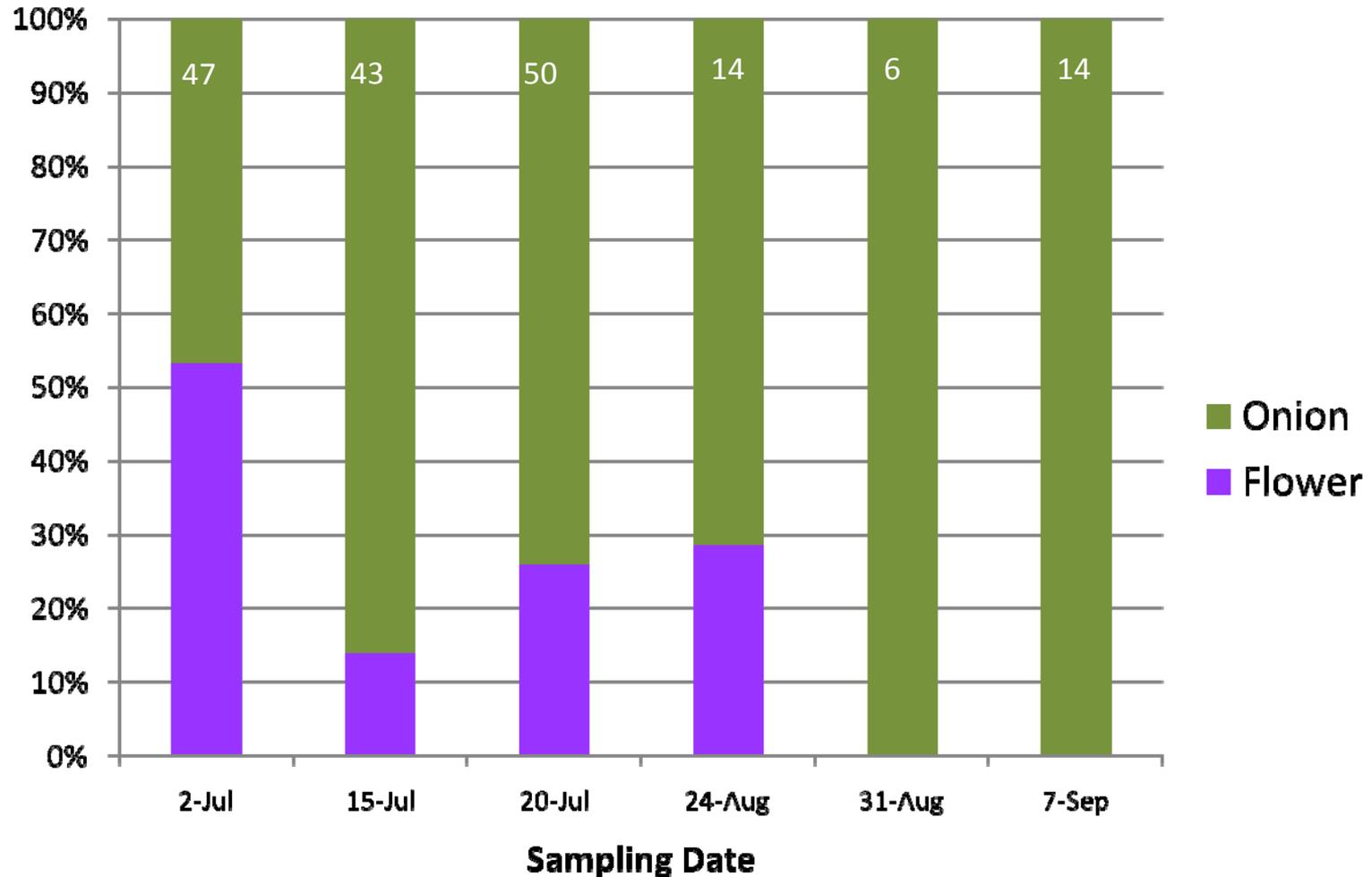
# Western Flower Thrips

*Frankliniella  
occidentalis*

*Reproduces  
sexually, males  
and females  
common*



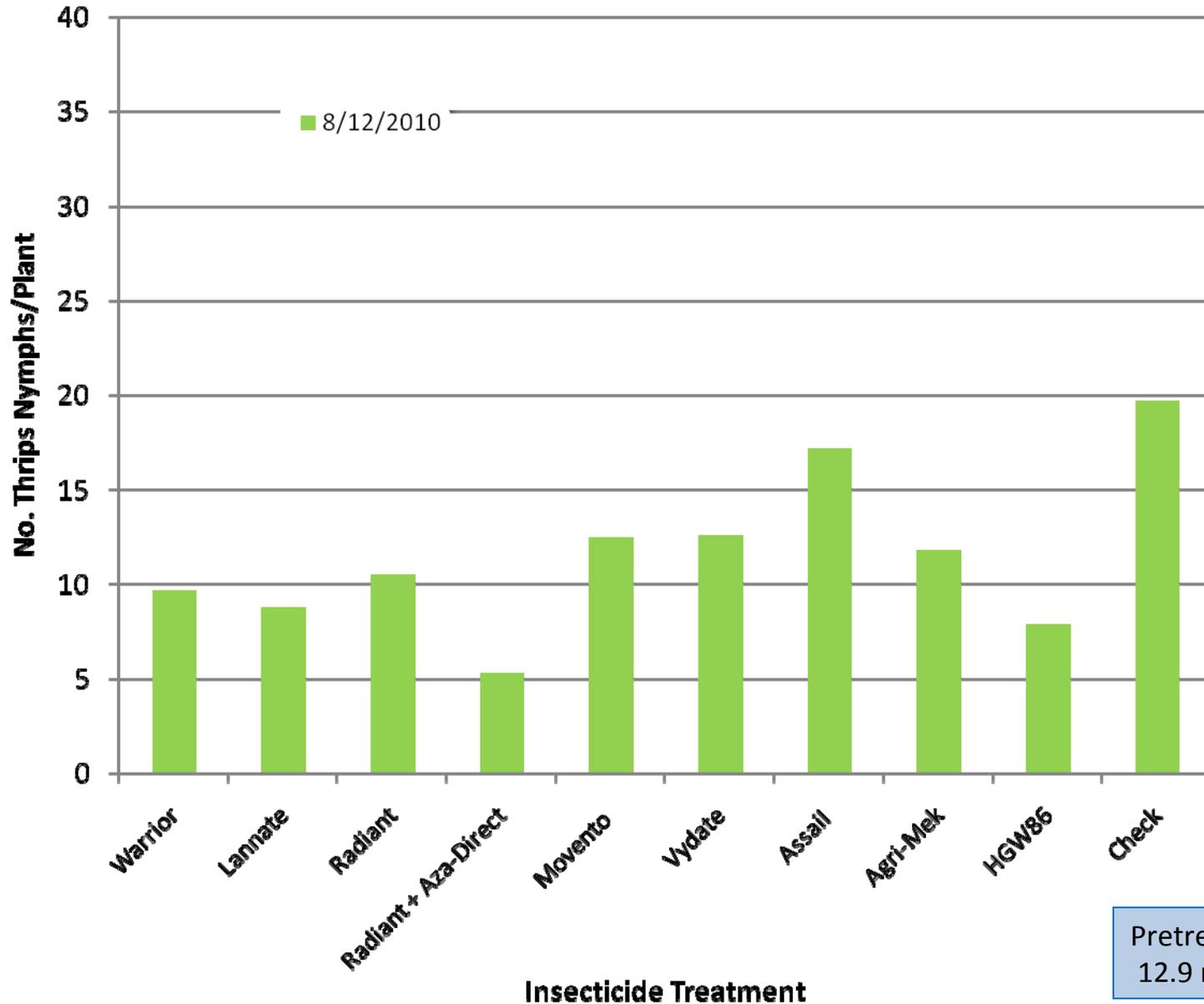
# Relative Percentage of Onion Thrips vs. Western Flower Thrips



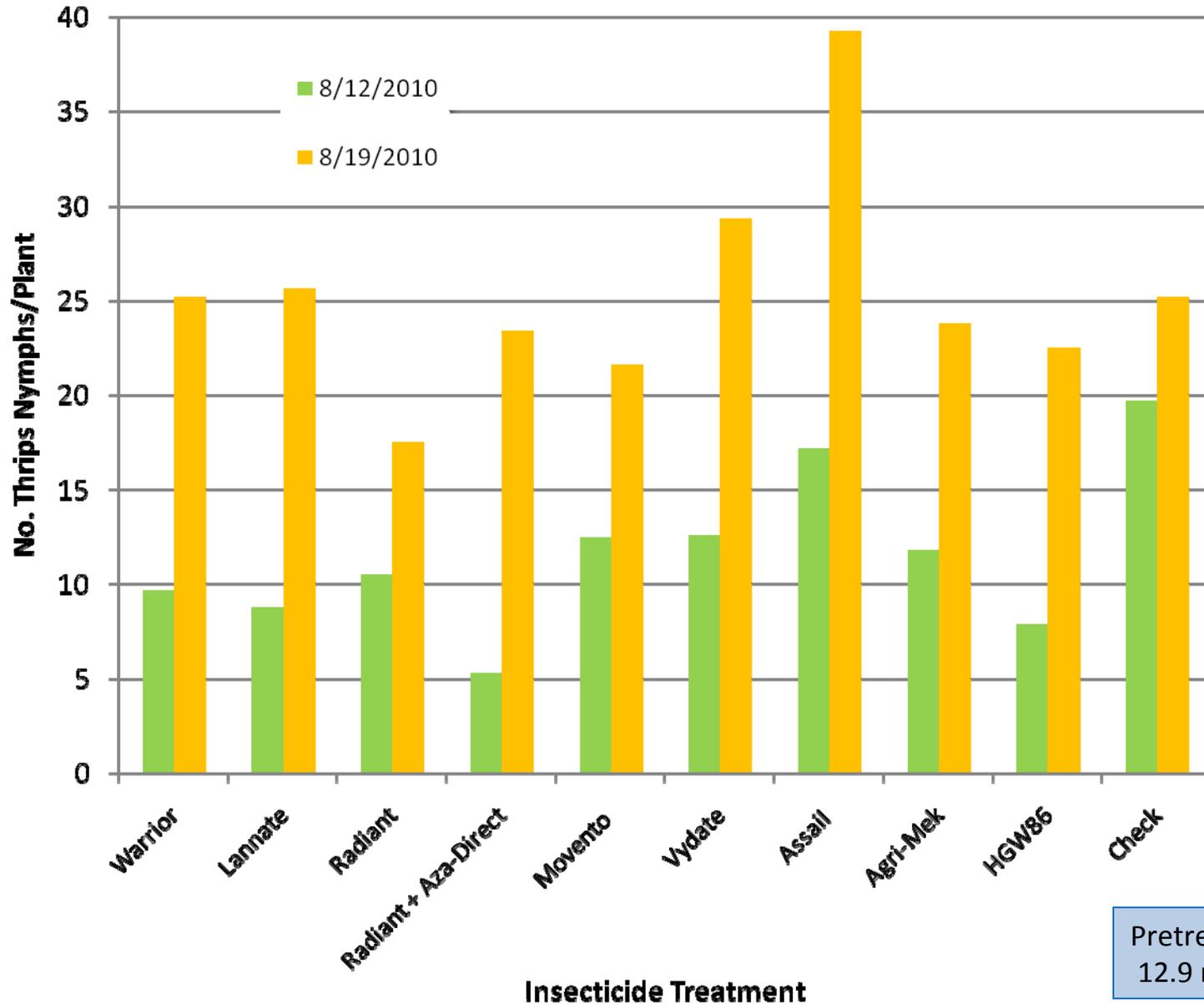
# Insecticides Evaluated

Insecticide	Rate	Comments
Warrior	1.92 oz/A	Pyrethroid standard or common treatment in the area.
Lannate	3 pt/A	Carbamate old insecticide commonly used for lep. control
Radiant	8 oz/A	Spinosyns. Has both contact and ingestion activity. Attacks nervous system. Locally systemic.
Radiant + Aza Direct	8 oz/A + 12 oz	Biological insecticide from neem tree insect repellent, antifeedant, and growth regulator.
Movento	5 oz/A	Systemic insecticide, Inhibits lipid biosynthesis.
Vydate	4 pts	Carbamate insecticide
Assail	8 oz dry	Neonicotinoid class of insecticides
Agri-Mek	16 fl oz	Avermectins. Limited systemic activity. Attacks nervous system.
HGW86	20.5 fl oz	New DuPont insecticide. Diamide insecticide class

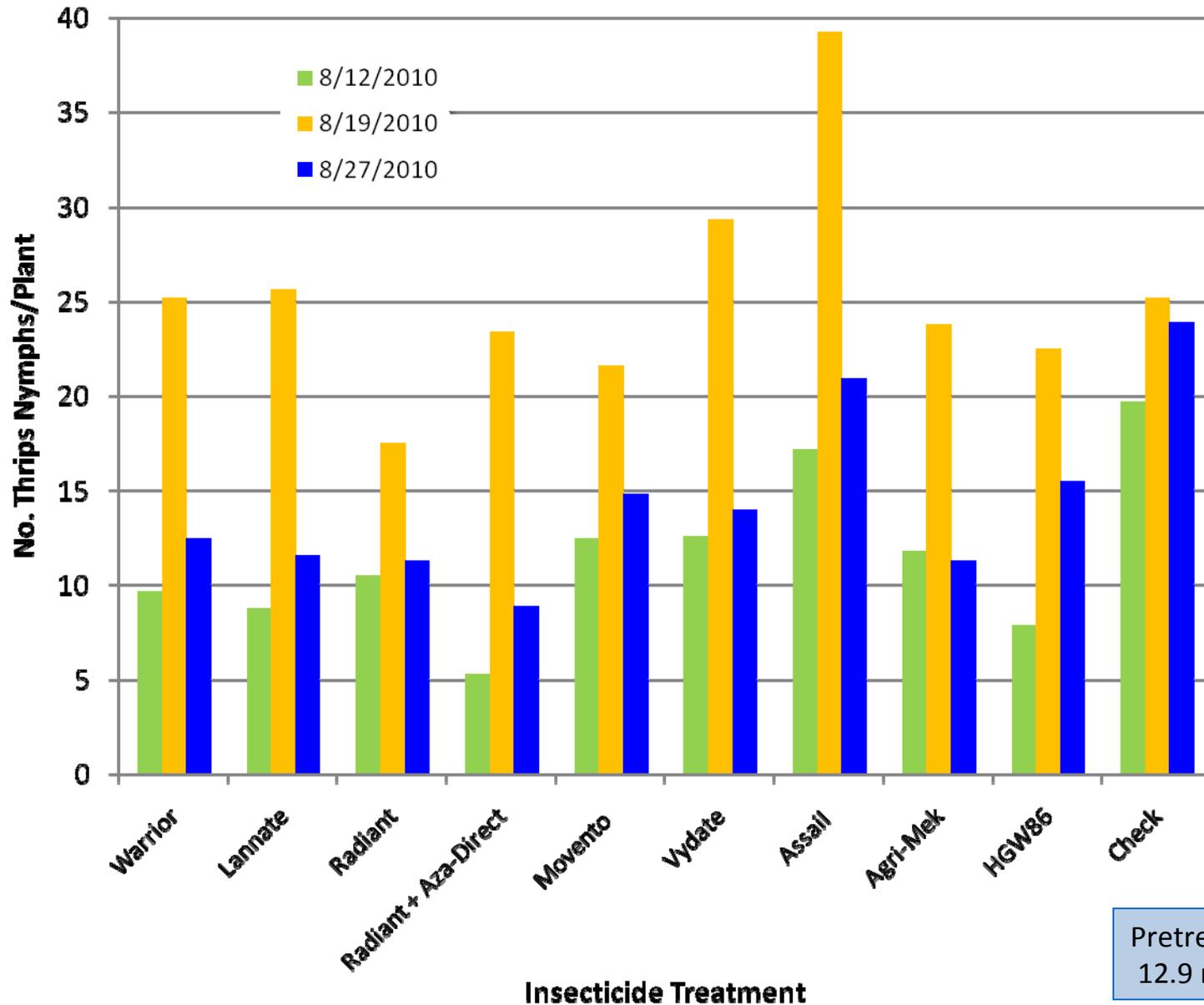
# Insecticide Treatment Effects on Thrips Population



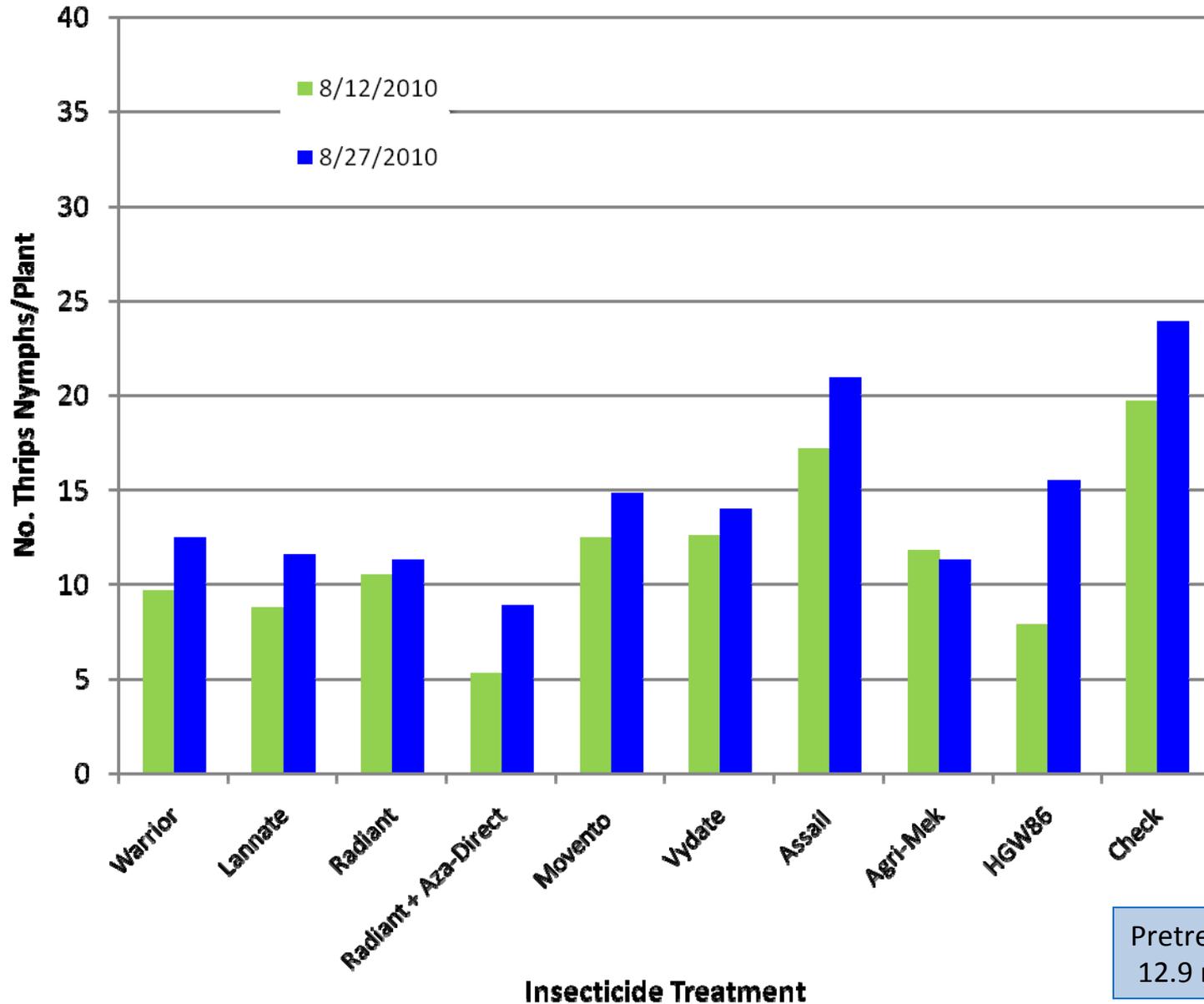
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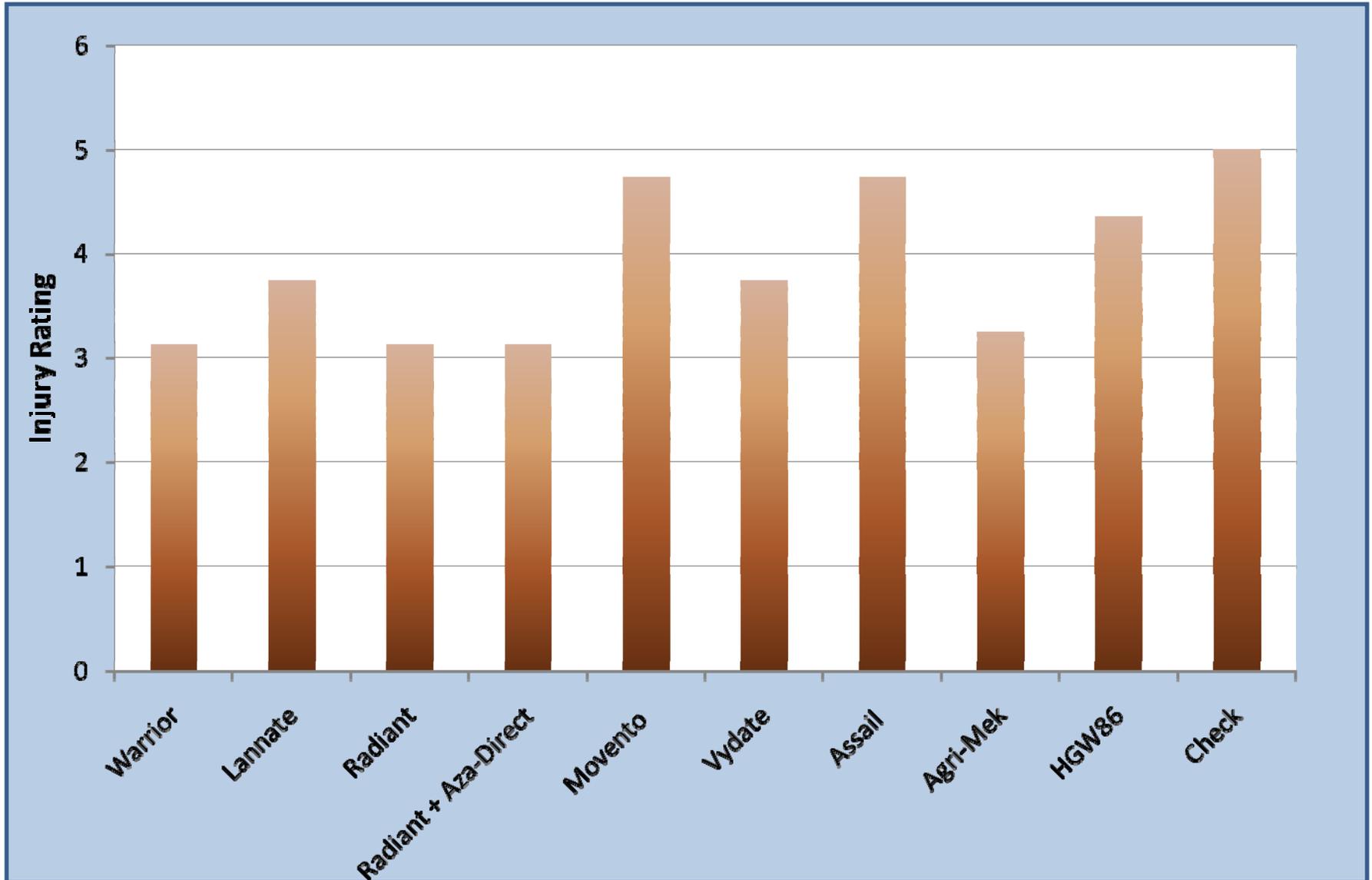
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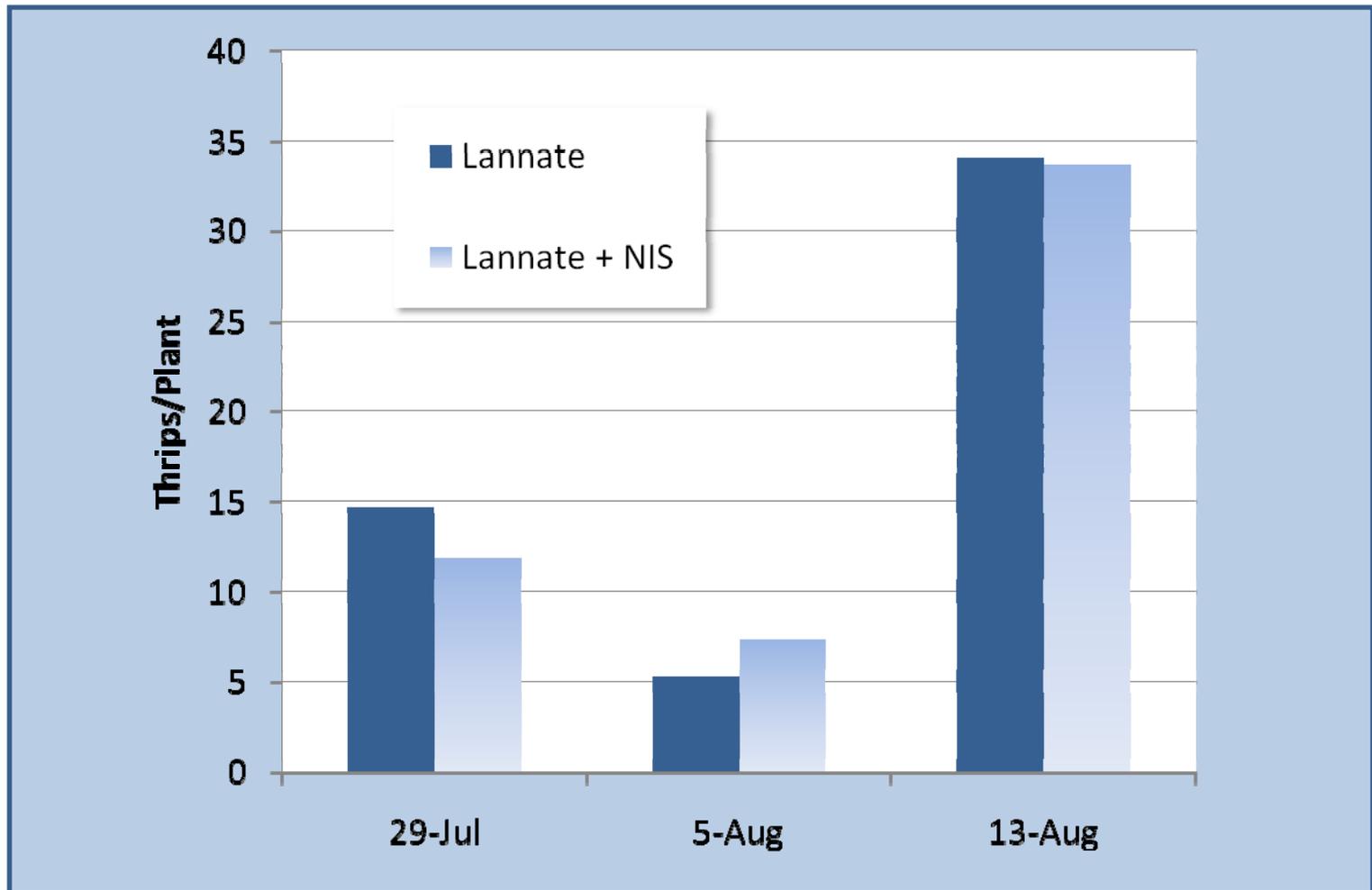


# Effect of Insecticide Treatment on Onion Thrips Injury Symptoms

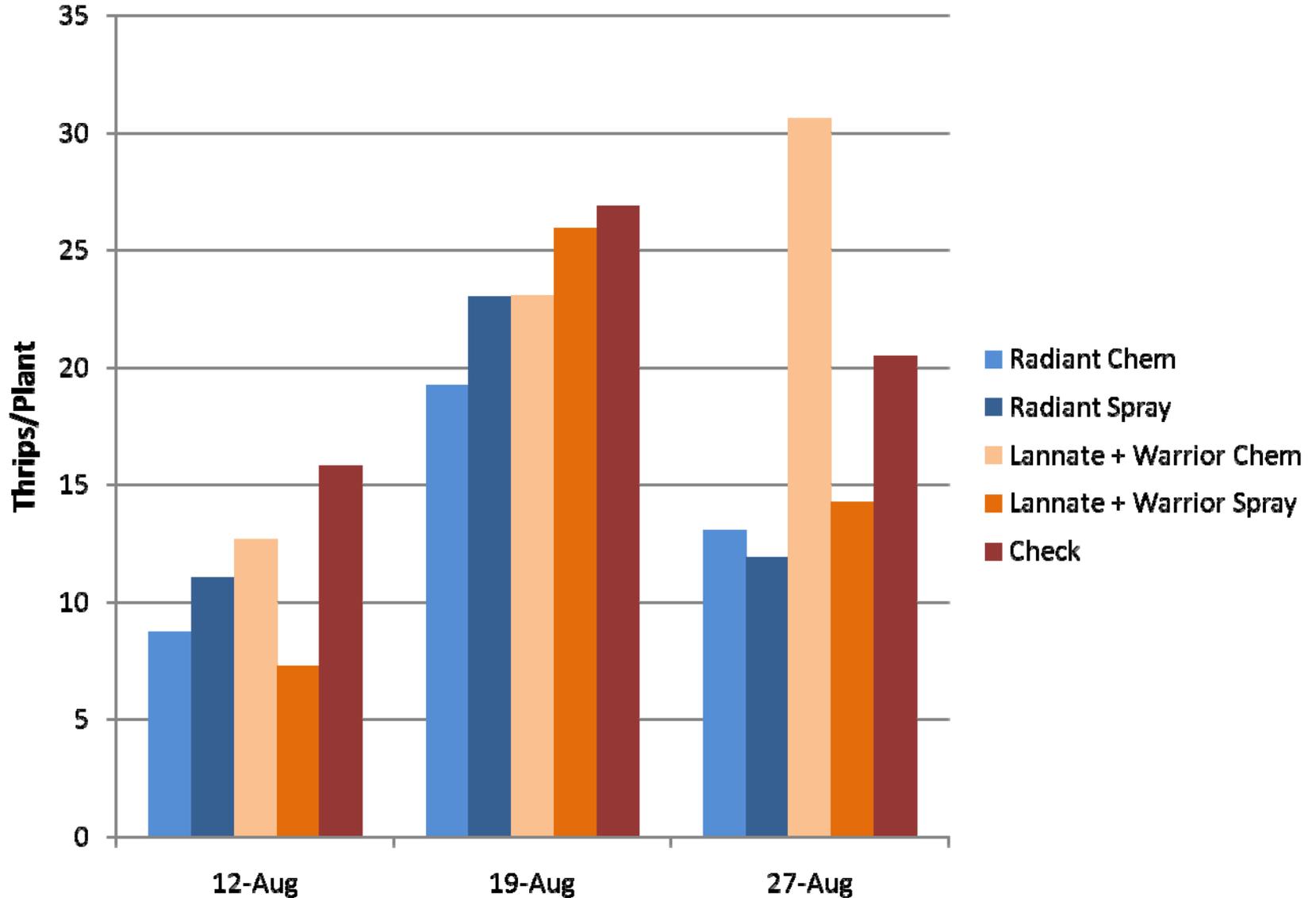




# Adjuvant Effect with Chemigation



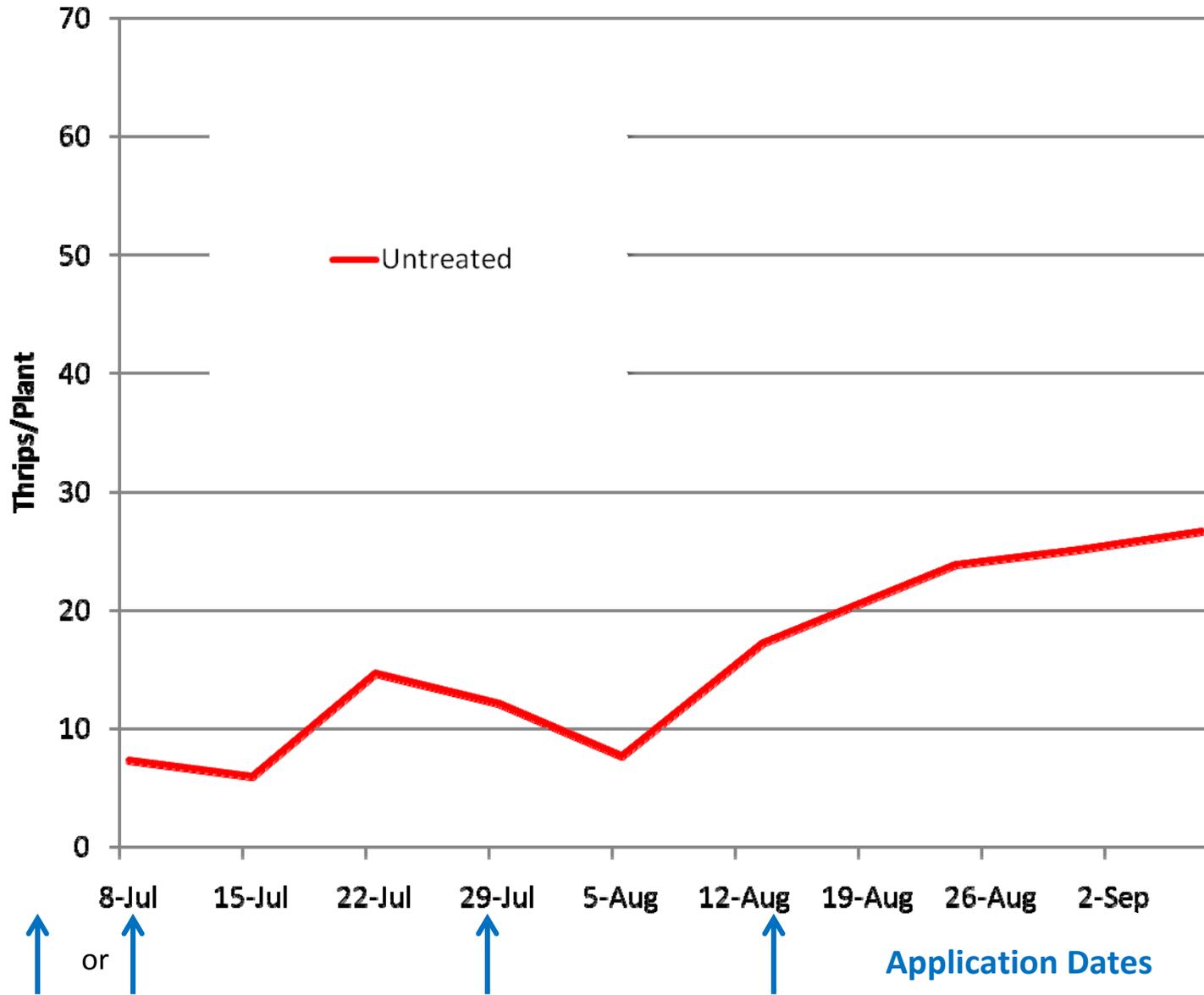
# Chemigation vs. Spray Application



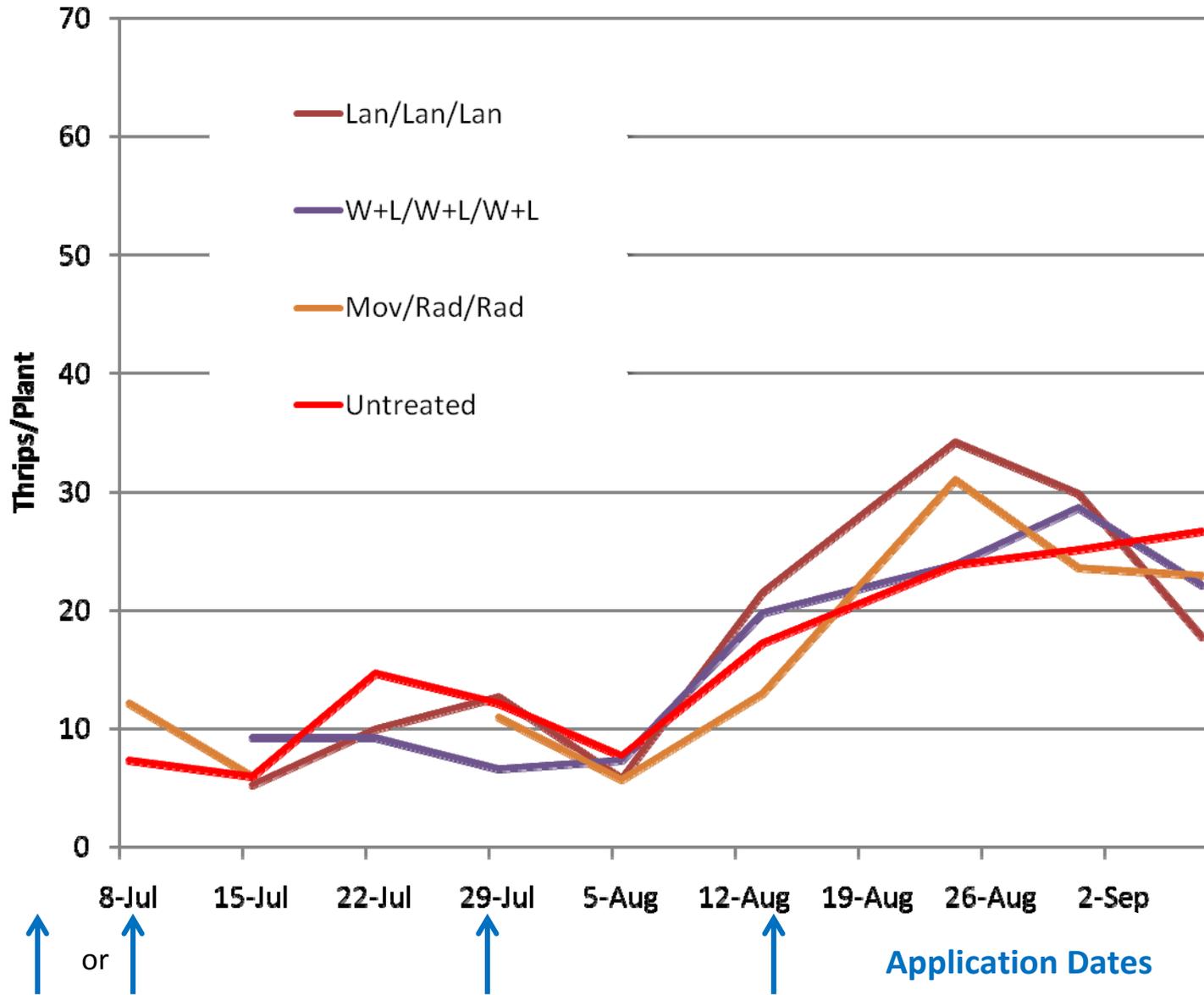
# Season-Long Thrips Management Strategy Treatments

1st Application (6/30) or (7/8)	2nd Application (7/29)	3rd Application (8/16)
Warrior (7/8)	Warrior	Warrior
Lannate (7/8)	Lannate	Lannate
Warrior (7/8)	Lannate	Warrior
Warrior+Lannate (7/8)	Warrior+Lannate	Warrior+Lannate
Warrior (6/30)	Lannate	Warrior
Movento (6/30)	Radiant	Radiant
Untreated	Untreated	Untreated

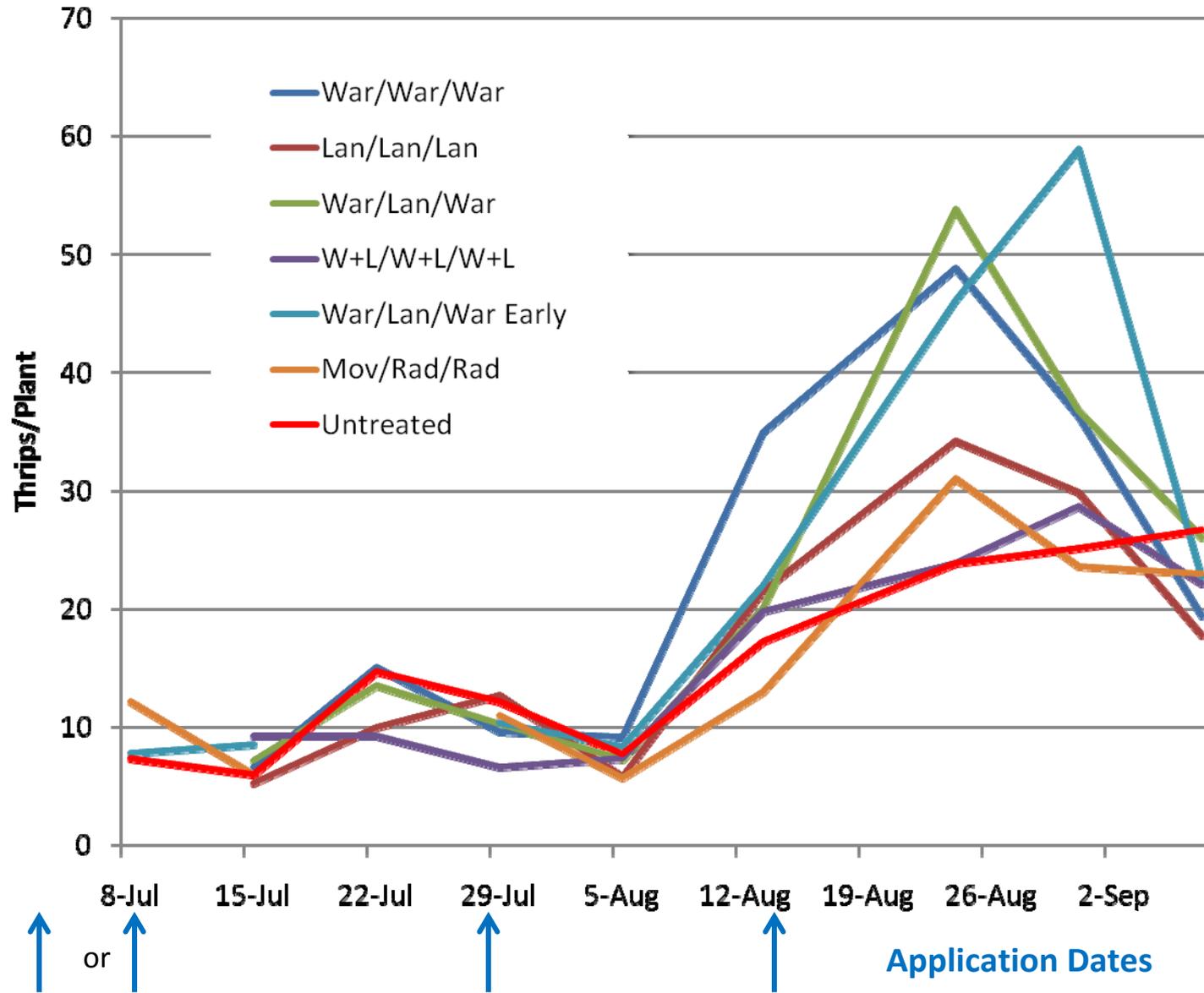
# Effect of Control Strategy on Thrips Population



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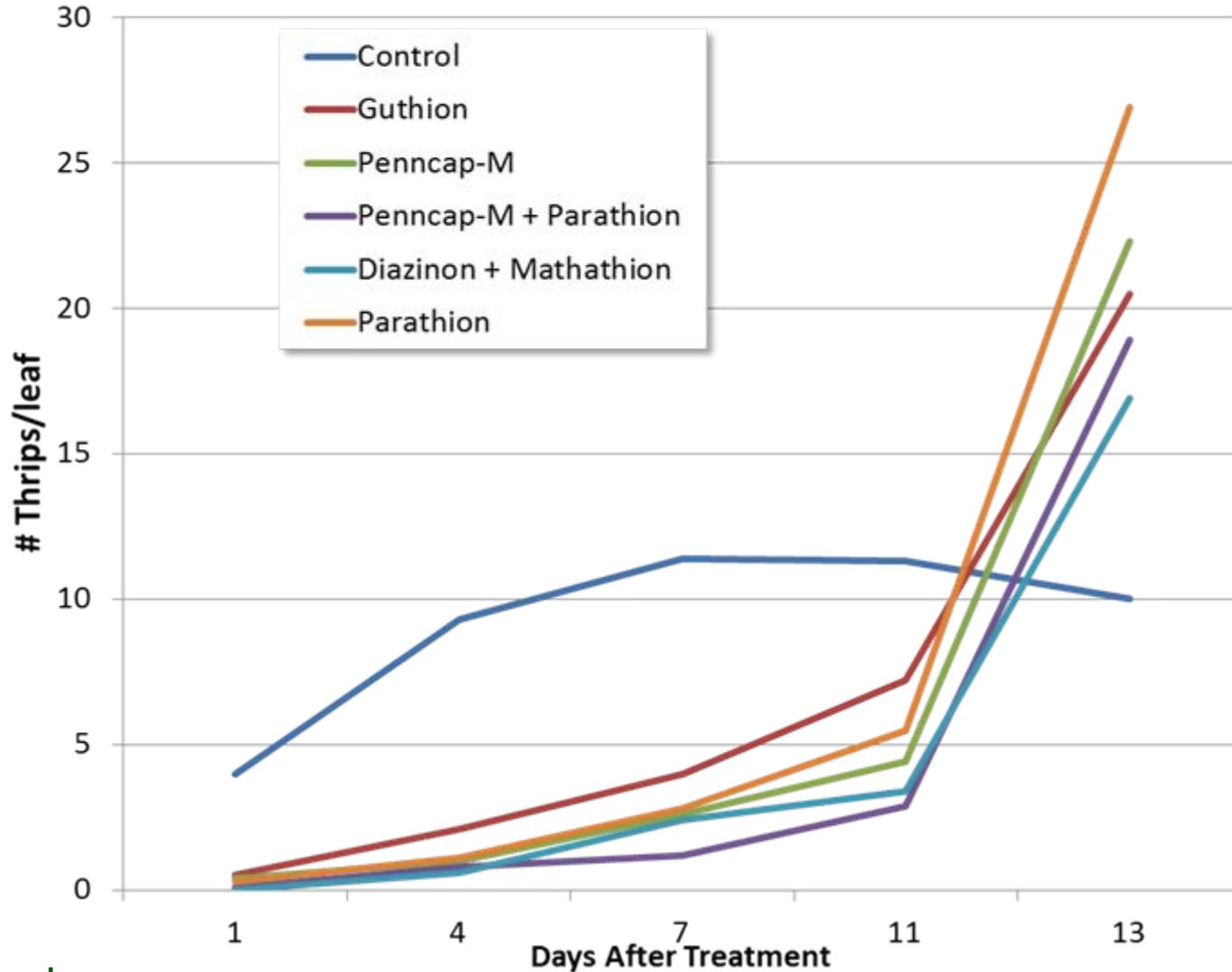


# Effect of Control Strategy on Thrips Population



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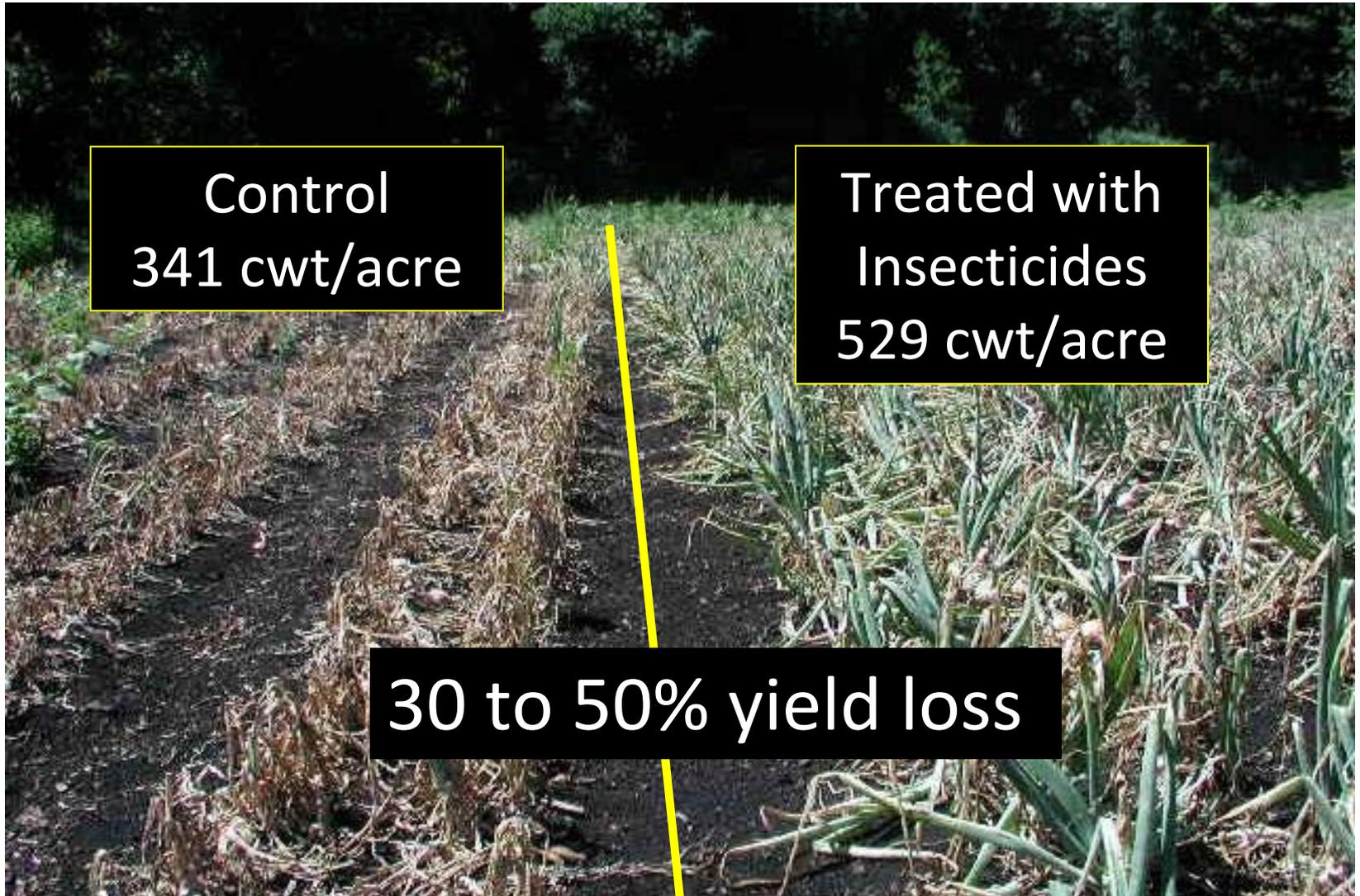
# Season-Long Thrips Management Effect on Onion Yield

1st Application	2nd Application (7/29)	3rd Application (8/16)	Yield (Tons/A)
Warrior (7/8)	Warrior	Warrior	<b>23.5</b>
Lannate (7/8)	Lannate	Lannate	<b>24.6</b>
Warrior (7/8)	Lannate	Warrior	<b>23.5</b>
Warrior+Lannate (7/8)	Warrior+Lannate	Warrior+Lannate	<b>24.2</b>
Warrior (6/30)	Lannate	Warrior	<b>23.2</b>
Movento (6/30)	Radiant	Radiant	<b>23.6</b>
Untreated	Untreated	Untreated	<b>23.9</b>
			<b>NS</b>

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Warrior (7/8)	Lannate	Warrior	<b>23.5</b>
Warrior+Lannate (7/8)	Warrior+Lannate	Warrior+Lannate	<b>24.2</b>
Warrior (6/30)	Lannate	Warrior	<b>23.2</b>
Movento (6/30)	Radiant	Radiant	<b>23.6</b>
Untreated	Untreated	Untreated	<b>23.9</b>
			<b>NS</b>

# Onion Thrips Damage in New York State



# Insecticide Sequence

Proposed by Brain Nault Professor, Dept. of Entomology Cornell University

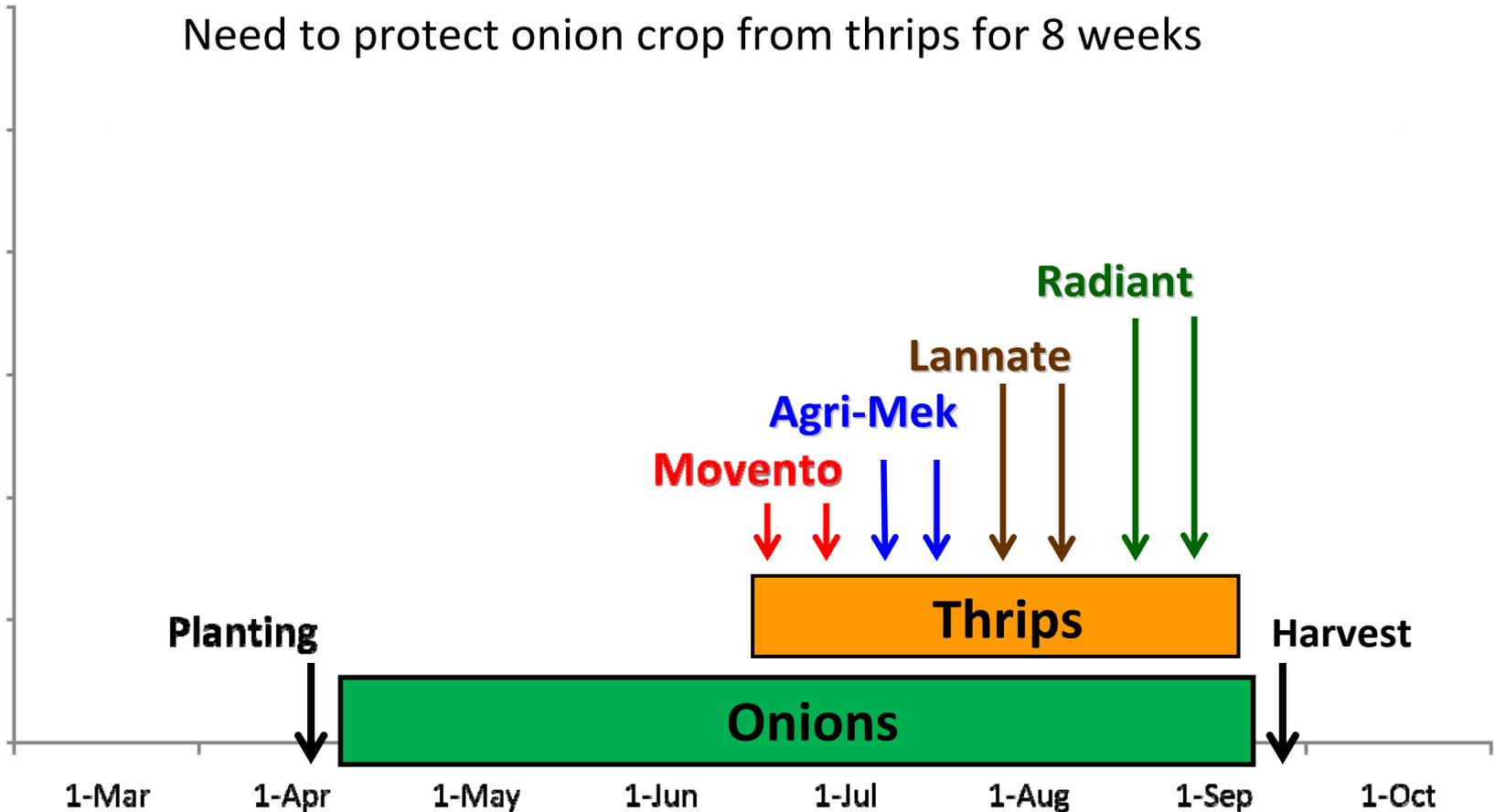
(when registered)

- **Movento** not effective on adults so should be used early in the season when adult populations are low.
- **Agri-Mek** must be used early due to 30 day PHI
- **Radiant** can be used later when populations are high
- Do not apply same insecticide more than twice
- Product should be used consecutively
  - Reduces the number of generations exposed to same product
  - Thrips can complete the life cycle in 14 to 30 days. Typically 2 – 3 weeks (even shorter high temperatures)

# Example Insecticide Sequence

Proposed by Brain Nault Professor, Dept. of Entomology Cornell University

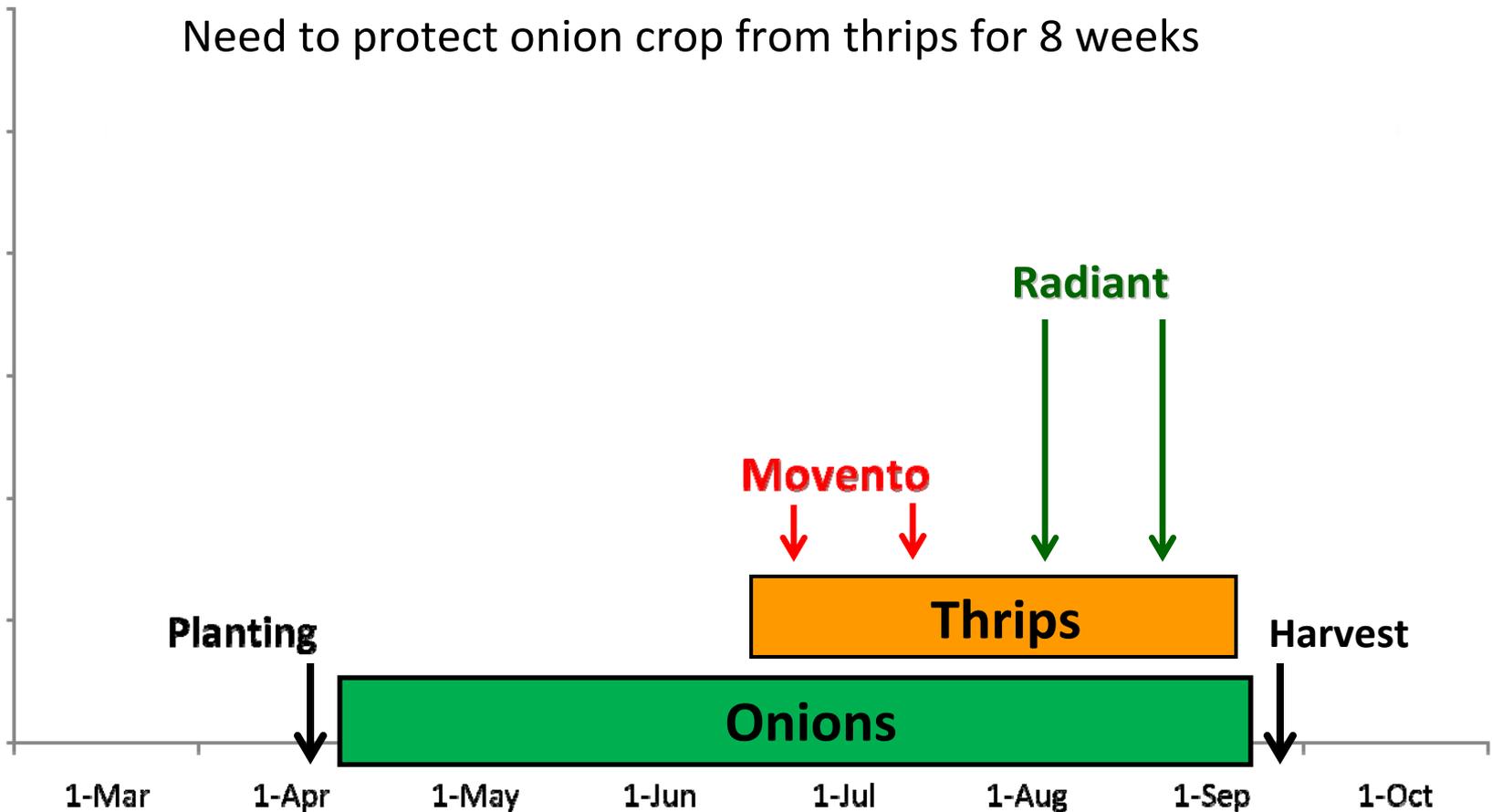
Need to protect onion crop from thrips for 8 weeks



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# Conclusions

- **Mix of thrips species in Klamath Basin**
  - **predominantly onion thrips**
- **Thrips sampling protocol problematic**
- **Need to sample sooner after application to determine initial knockdown?**
- **Thrips extremely difficult to control with spray application or chemigation**
- **No clear-cut consistent advantage for chemigation or spray**
- **Adjuvant did not have consistent effect**
  - **However, may not be able to detect small differences in control with sampling variability**
- **Warrior used alone repeatedly spike in thrips population**
- **In agreement with other studies, Radiant appears to be one of most effective treatments**

# Conclusions (cont.)

- **Treatment had no effect on yield in this study**
  - Never achieved acceptable thrips control?
  - Needed another application in early August?
  - Population too low this year to cause significant yield decrease?
  - Sprinkler irrigation kept thrips population below level that impacts yield?
  - Thrips population from adjacent alfalfa and wheat field overwhelmed treatment effects?

# Next Year???

- **Go back to working with alfalfa?**
- **Insecticide comparison trial**
  - Start 1st application with materials to evaluate
  - Back-to-back applications with same material
- **No clear-cut difference in efficacy with chemigation or spray application**
  - Growers do one or other based on irrigation system and convenience, timeliness, etc.
  - Since thrips control so poor may be difficult to discern differences due to application method or adjuvant
- **Impact of thrips on yield not well understood for Klamath Basin**
  - Season-long trial--fewer treatments. (3 or 4 treatments and weekly sampling)
  - Focus on number of applications and strategy
- **Sampling protocol**
  - Return to cowboy entomology?