

Strategies to Optimize Thrips Control in the Klamath Basin

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Funded by CGORAB

Thrips feed by piercing 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 which can occupy most of leaf surface. Plant cannot adequately photosynthesize and plant pathogens can penetrate.

Objectives

- Compare effectiveness of a range of insecticides
- Evaluate different strategies for thrips management over the season to compare single insecticides, tank mixes, and alternating chemistries.

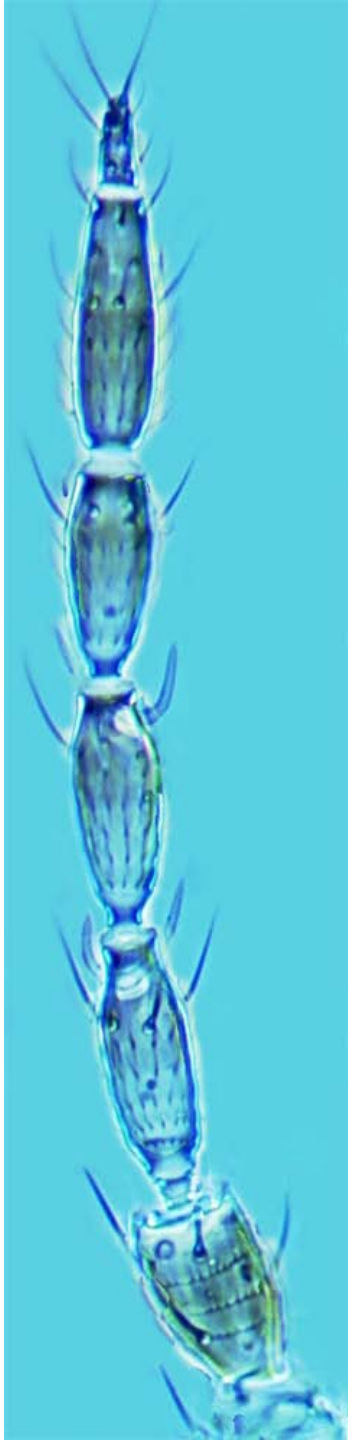
Insecticide Comparison Trial

Season-Long Thrips Strategy

Onion Thrips

Thrips tabaci

Asexual reproduction by females (parthenogenesis)

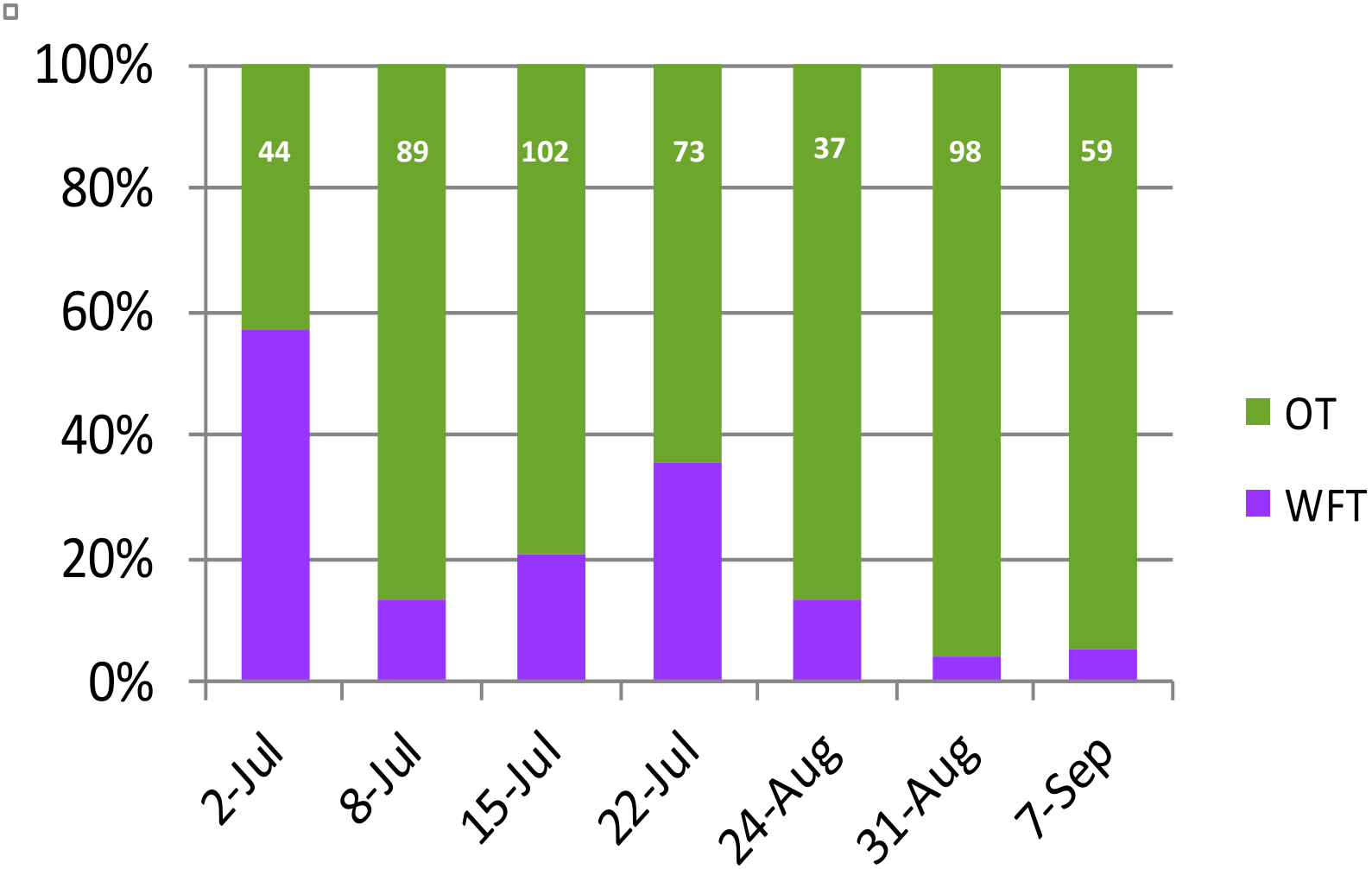


Western Flower Thrips

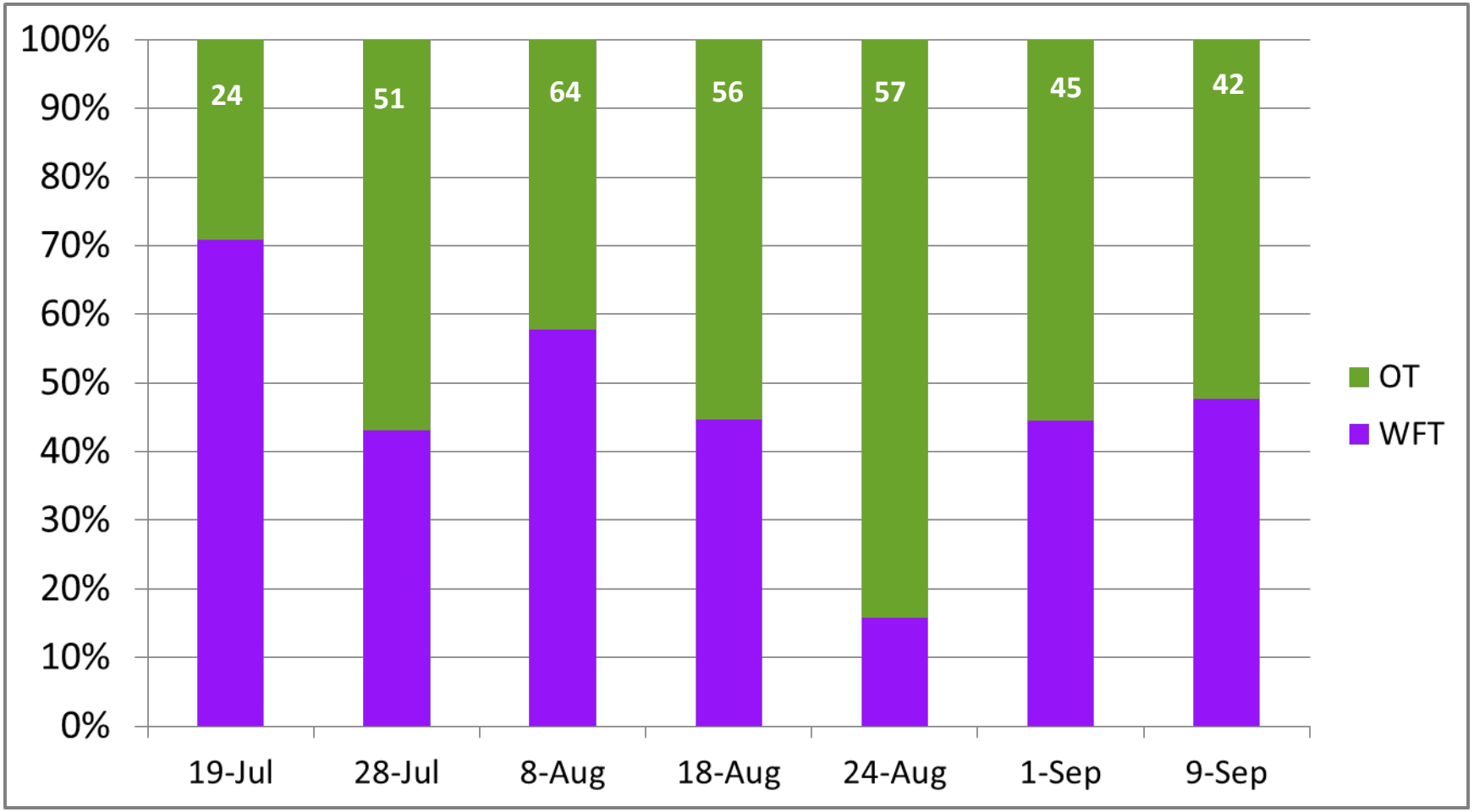
Frankliniella occidentalis

Reproduces sexually, males and females common

Relative Percentage of Onion Thrips vs. Western Flower Thrips 2010



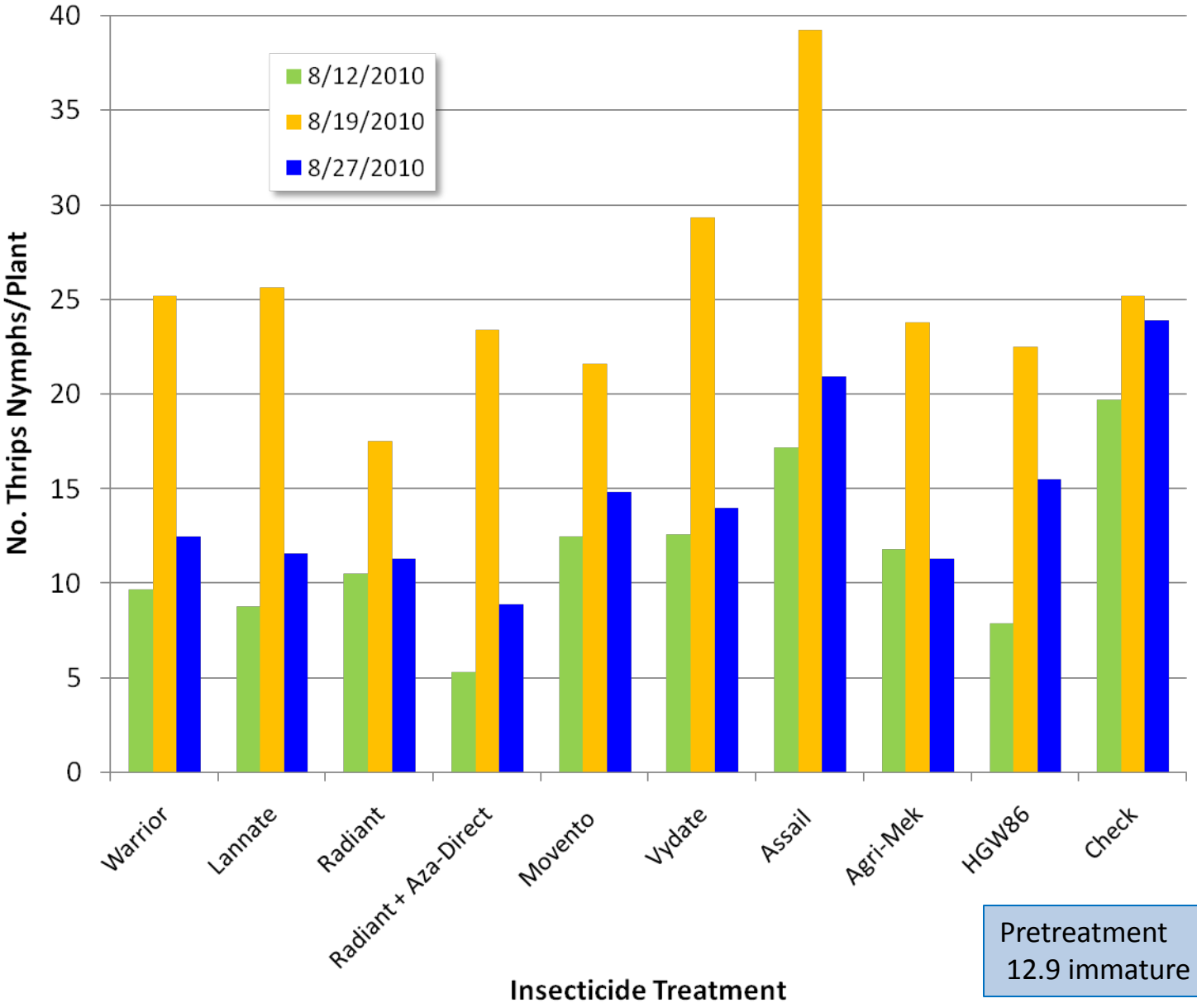
Relative Percentage of Onion Thrips vs. Western Flower Thrips 2011



Insecticides Evaluated 2010

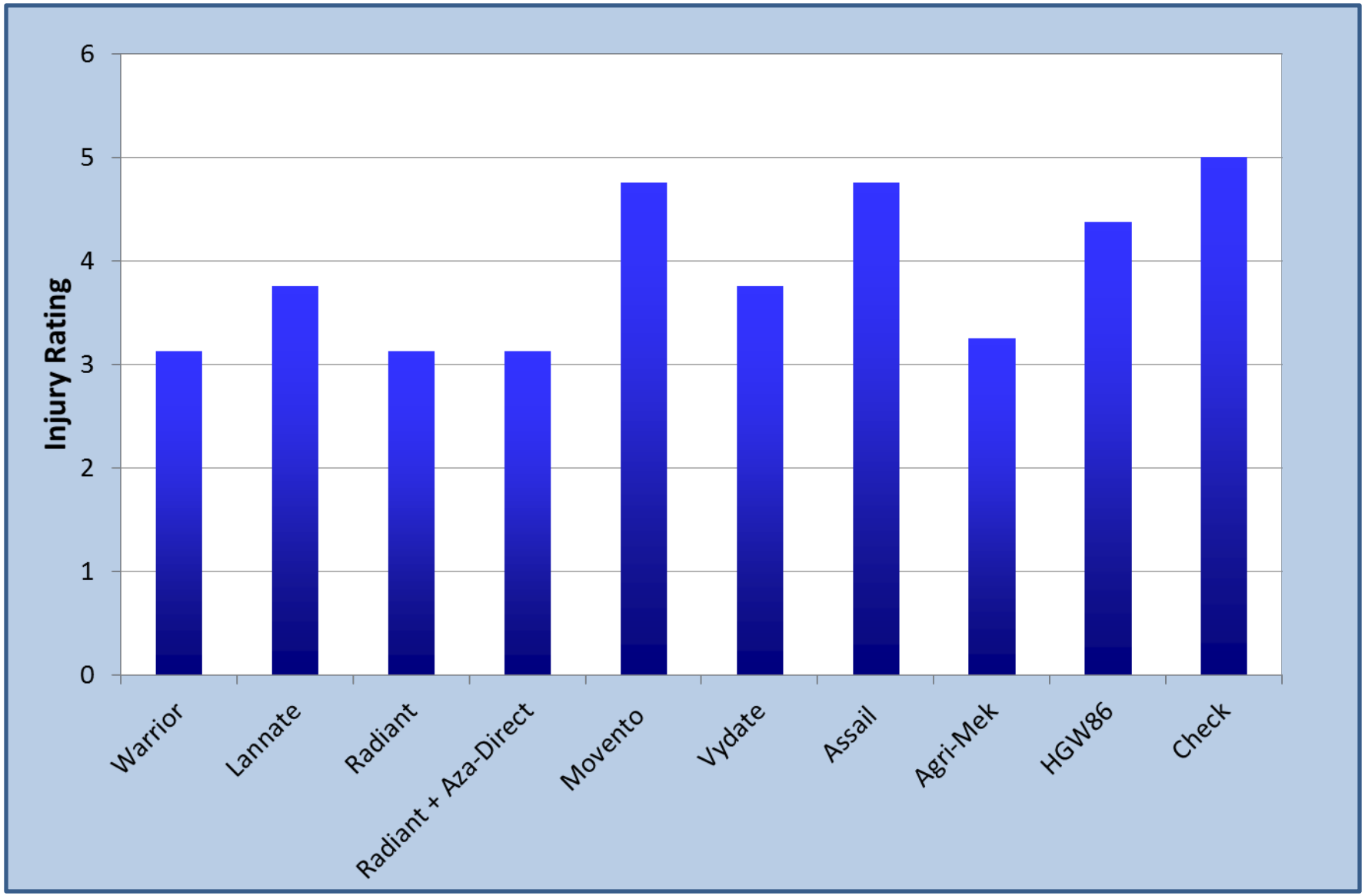
Insecticide	Rate	Comments
Warrior	1.92 oz/A	Pyrethroid was standard or common treatment in the area.
Lannate	3 pt/A	Carbamate old insecticide commonly used for lep. control
Radiant	8 oz/A	Spinosyns. Has both contact and ingestion activity. Attacks nervous system. Locally systemic.
Radiant + Aza Direct	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	Cyazypyr™ Diamide insecticide class

Insecticide Treatment Effects on Thrips Population 2010



Pretreatment
12.9 immature thrips/plant

Effect of Insecticide Treatment on Onion Thrips Injury Symptoms 2010



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Lannate/Movento		
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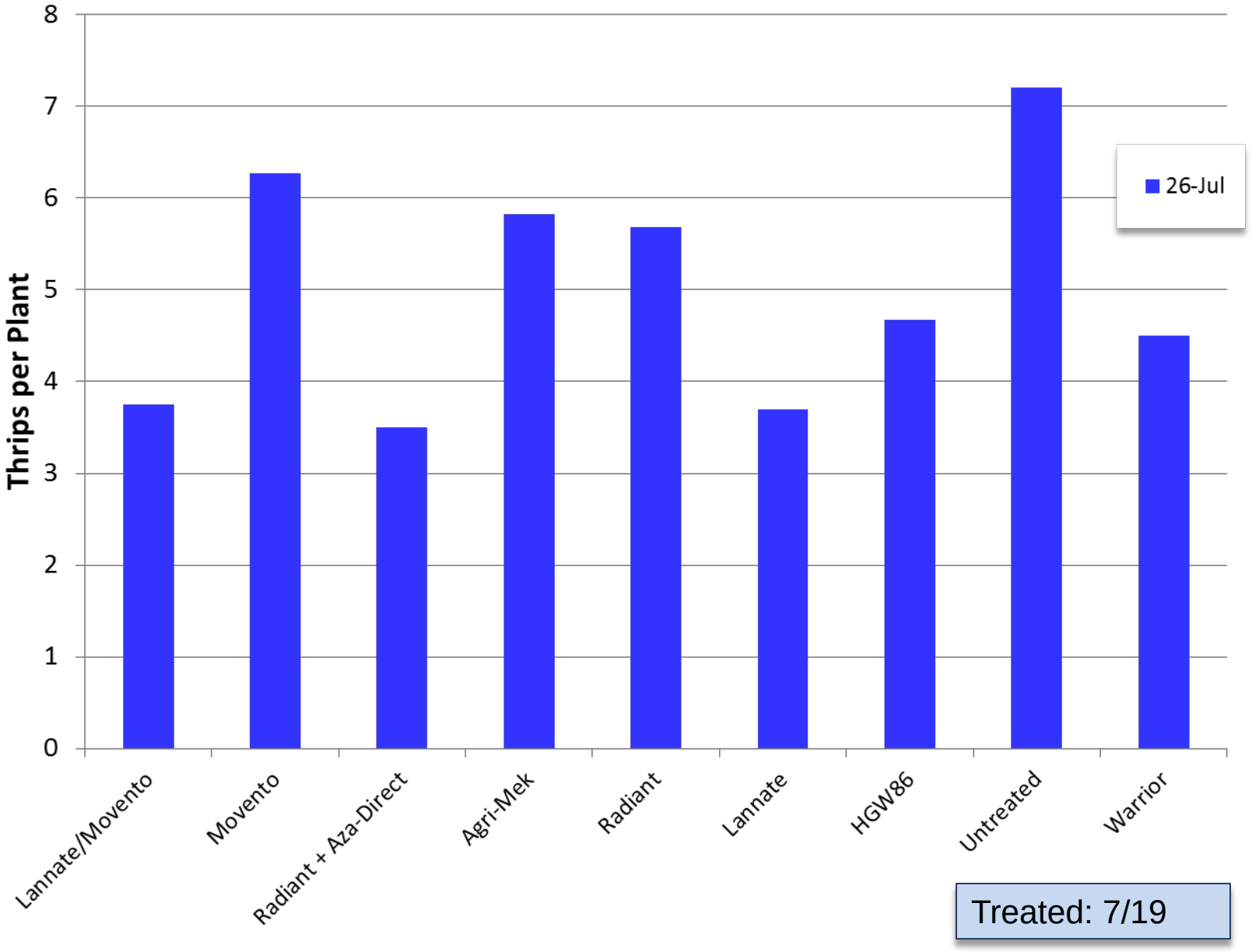
Insecticide Treatment Effects on Thrips Population

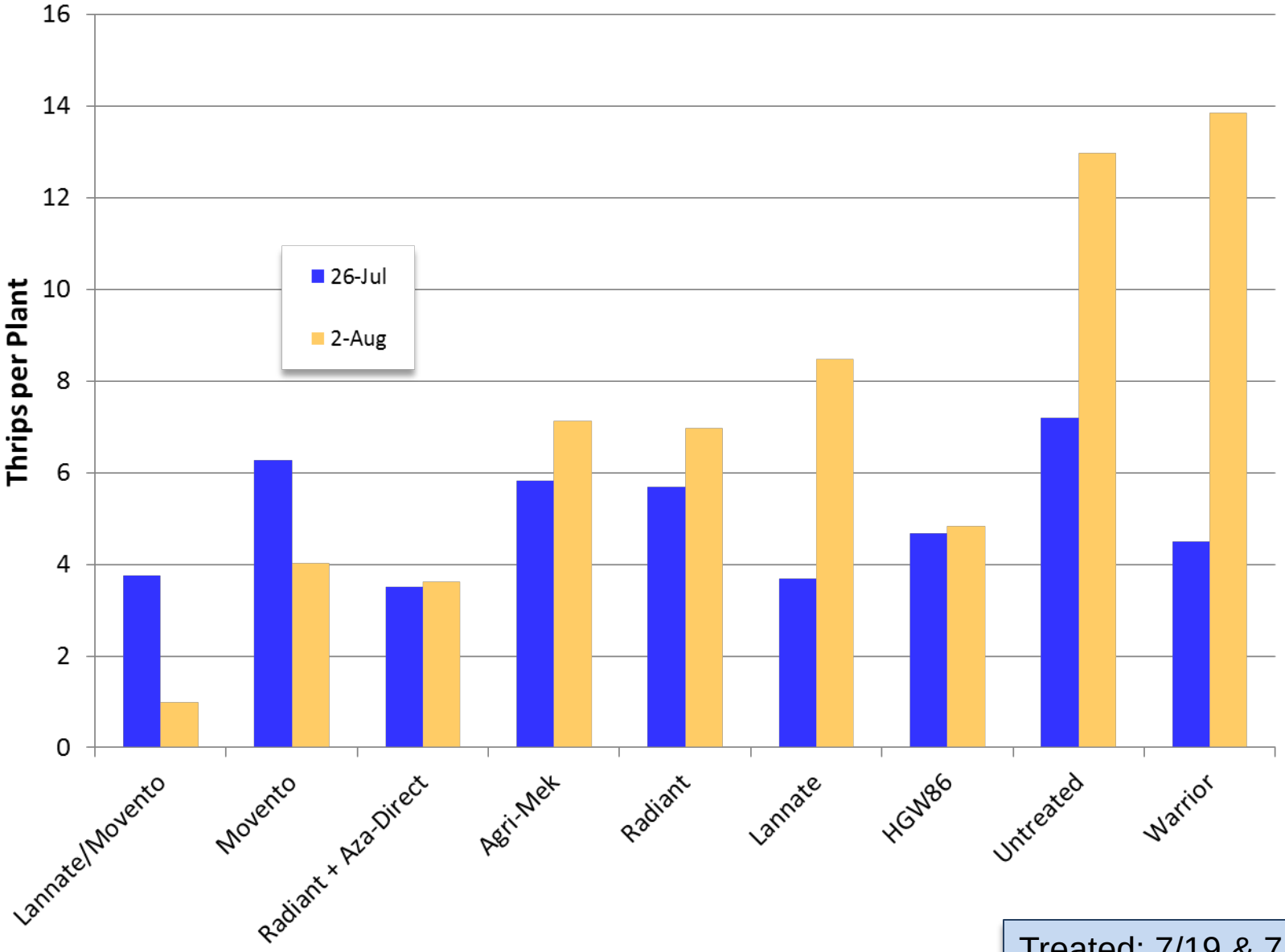
7 Days after 1st Application



Treated: 7/19

Insecticide Treatment Effects on Thrips Population

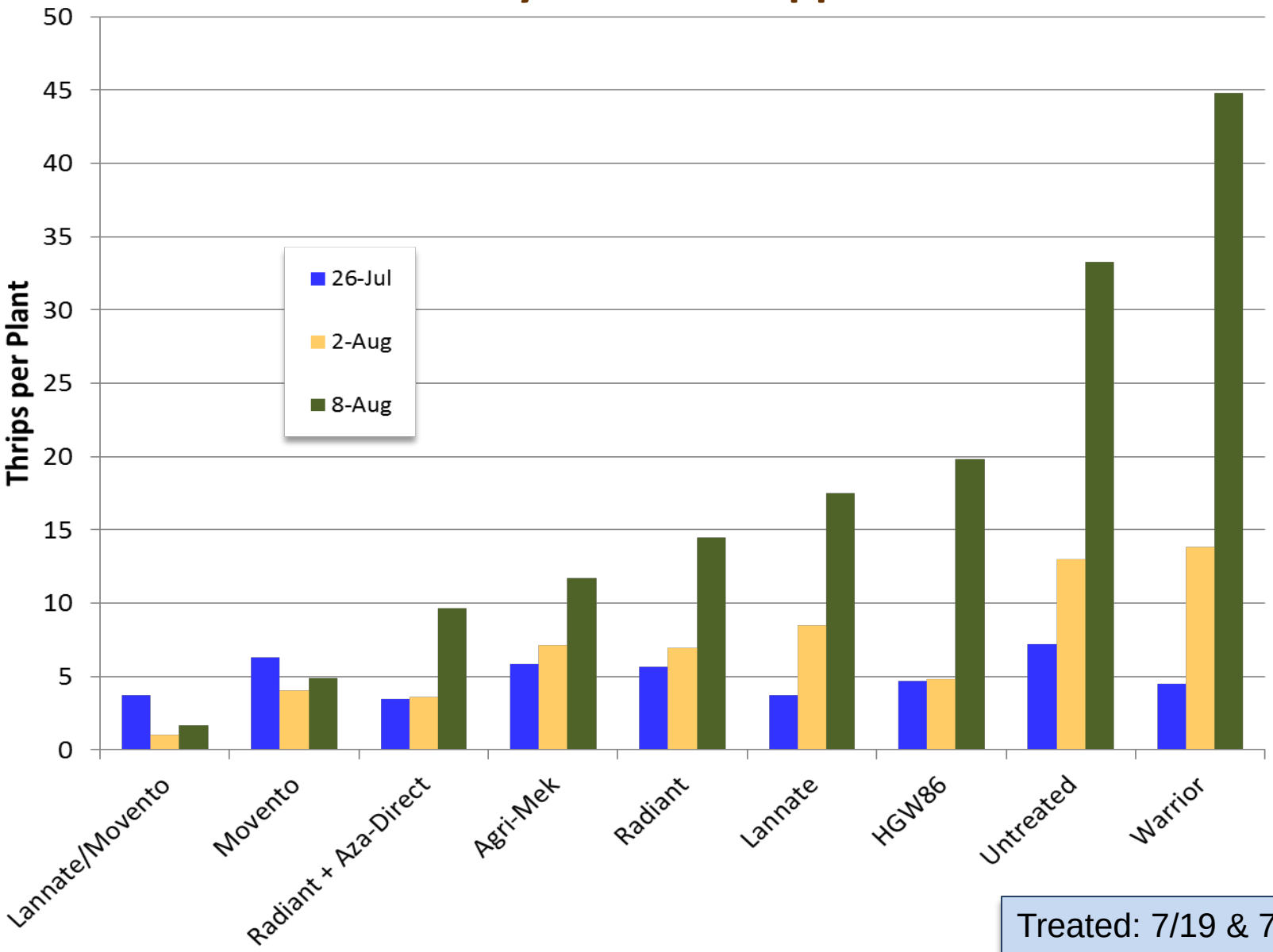
5 Days after 2nd Application



Treated: 7/19 & 7/28

Insecticide Treatment Effects on Thrips Population

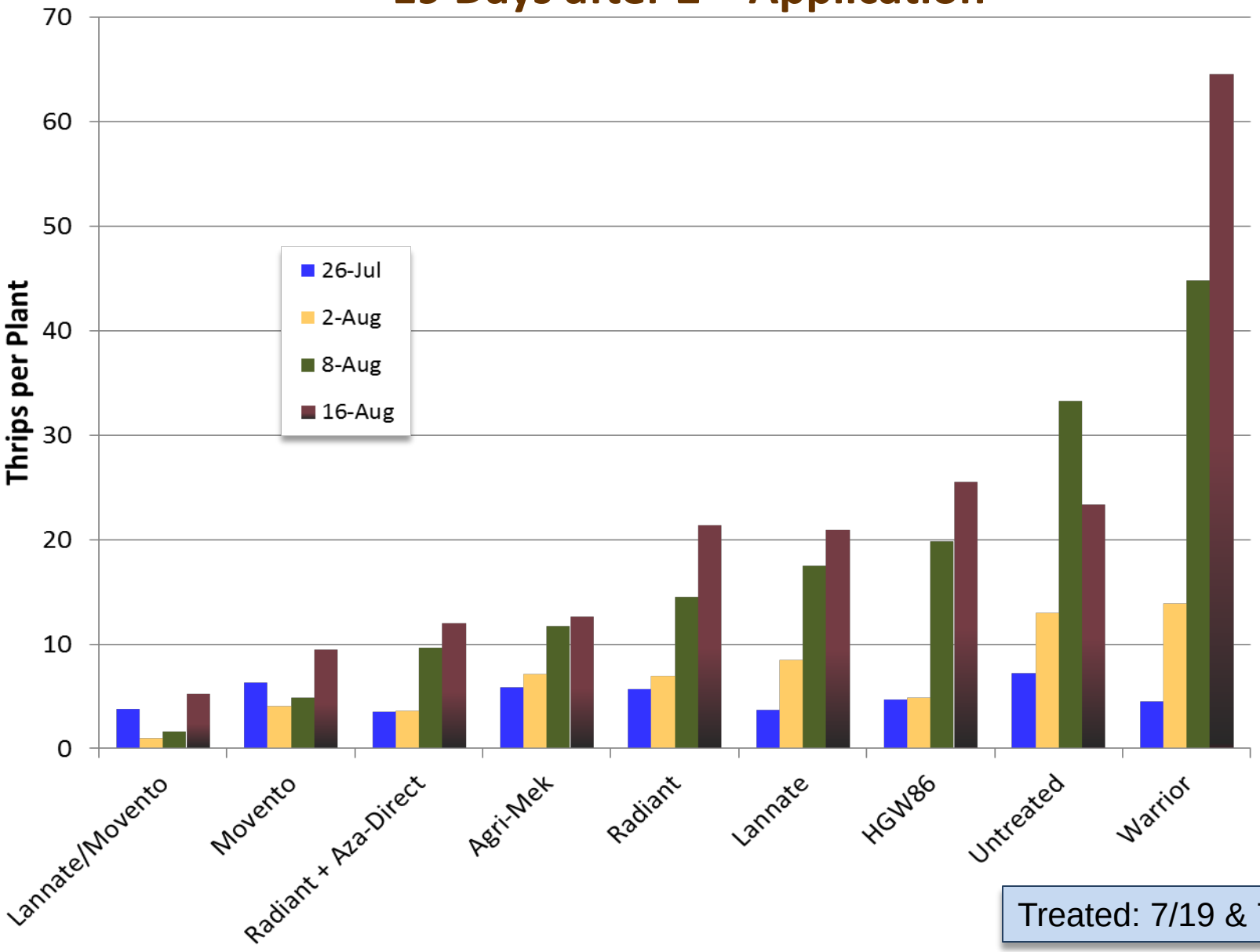
11 Days after 2nd Application



Treated: 7/19 & 7/28

Insecticide Treatment Effects on Thrips Population

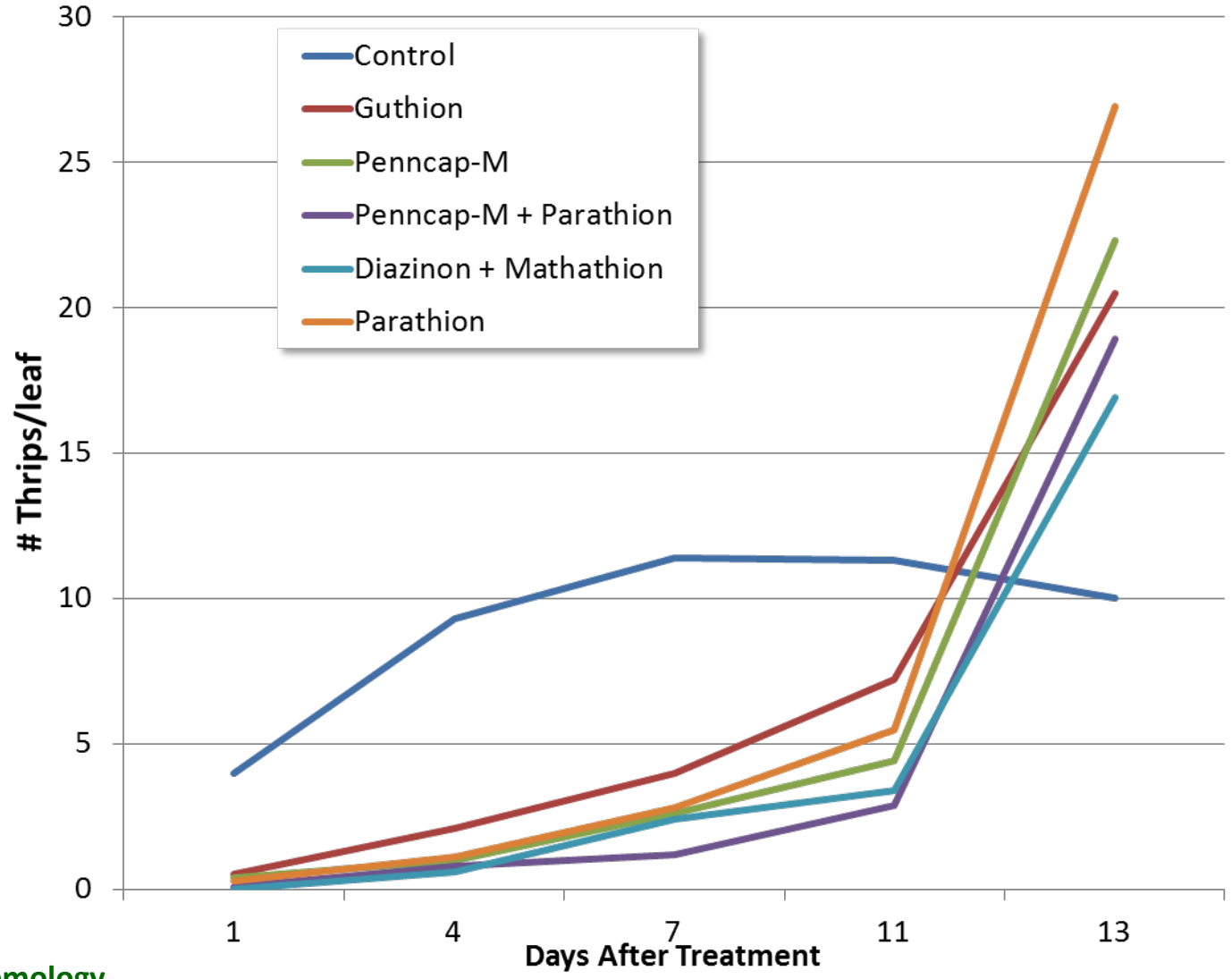
19 Days after 2nd Application



Treated: 7/19 & 7/28

Thrips Control in Fresh Market Onions

Lancaster 1986

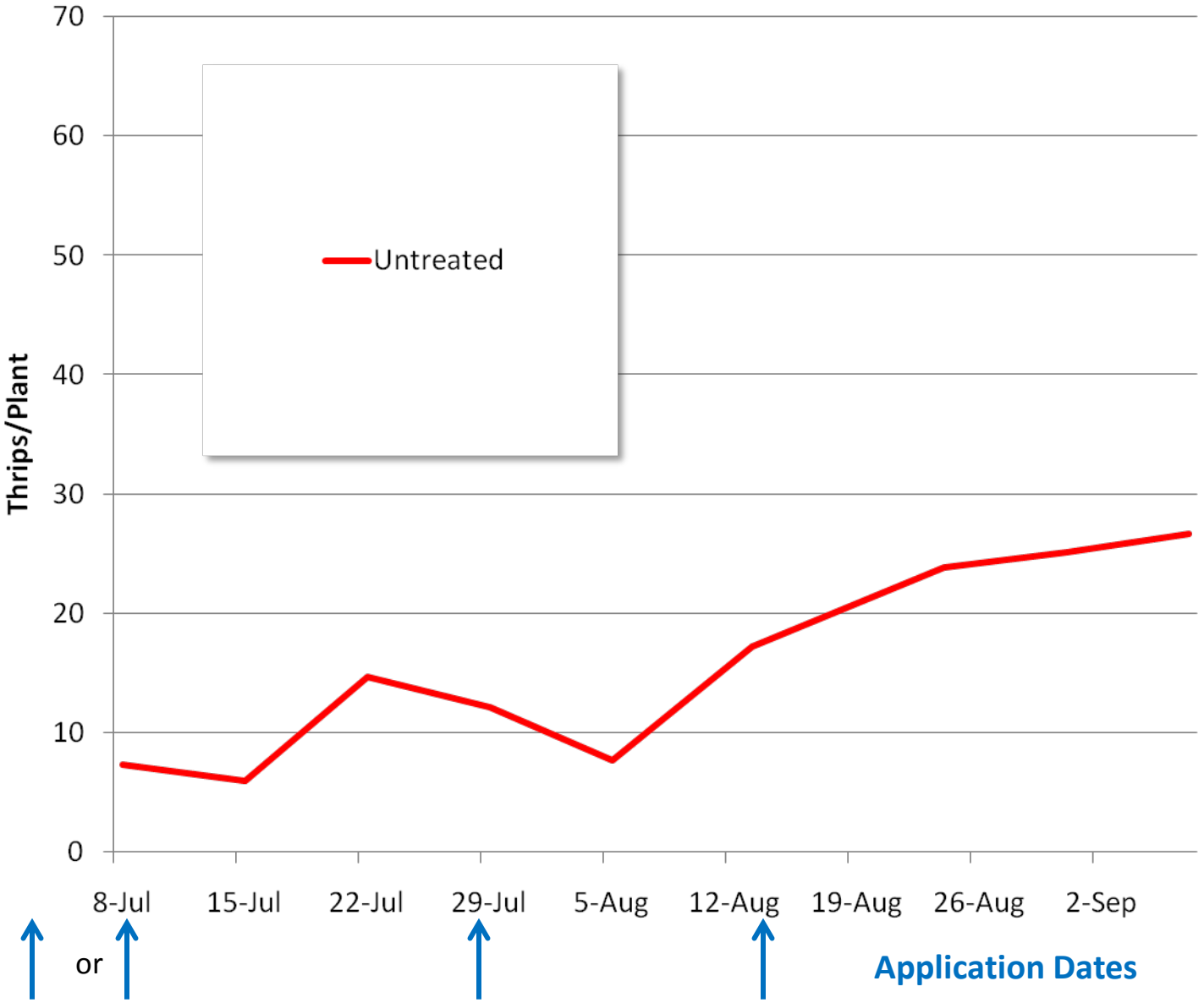


Cowboy entomology

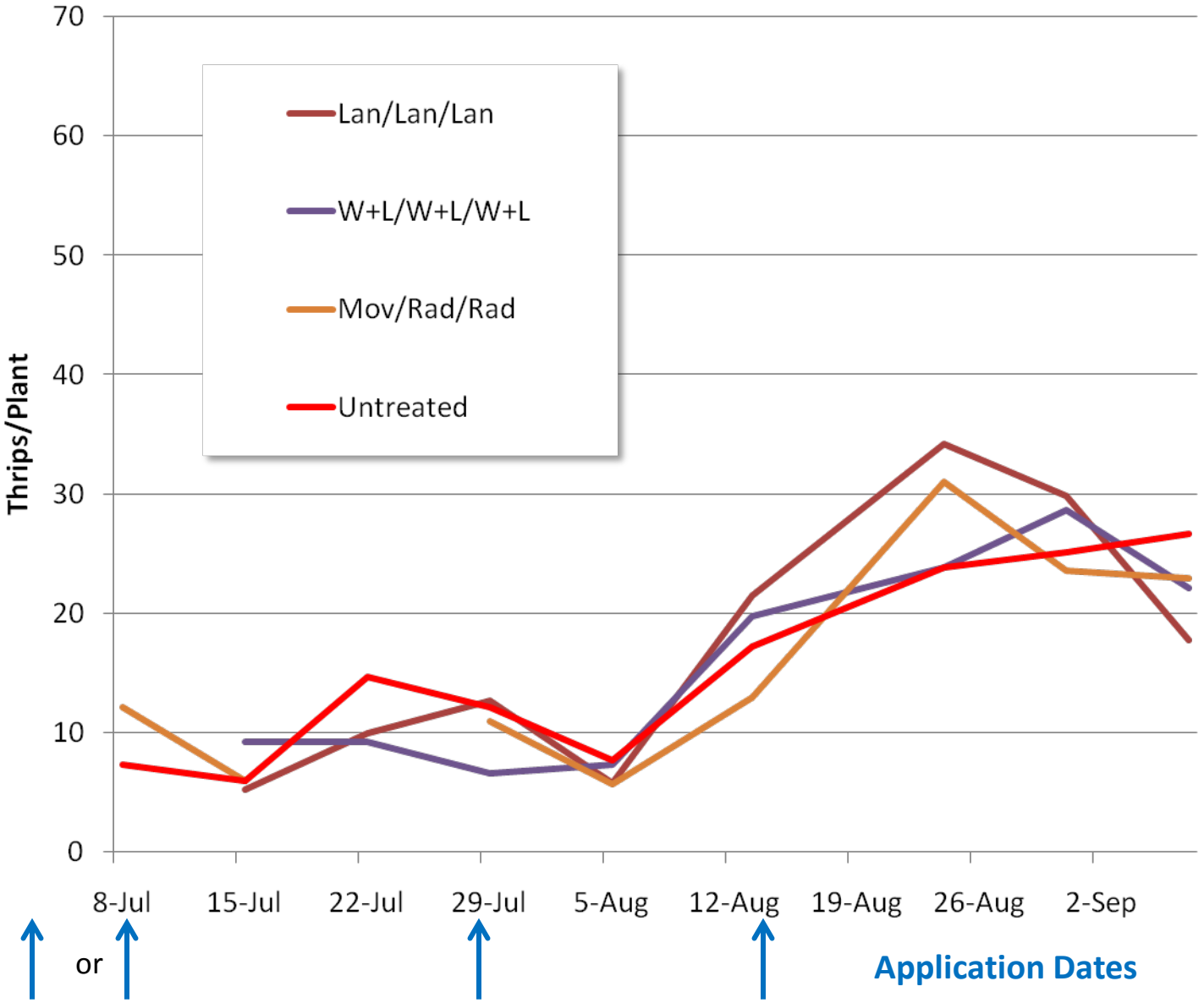
Season-Long Thrips Management Strategy Treatments

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

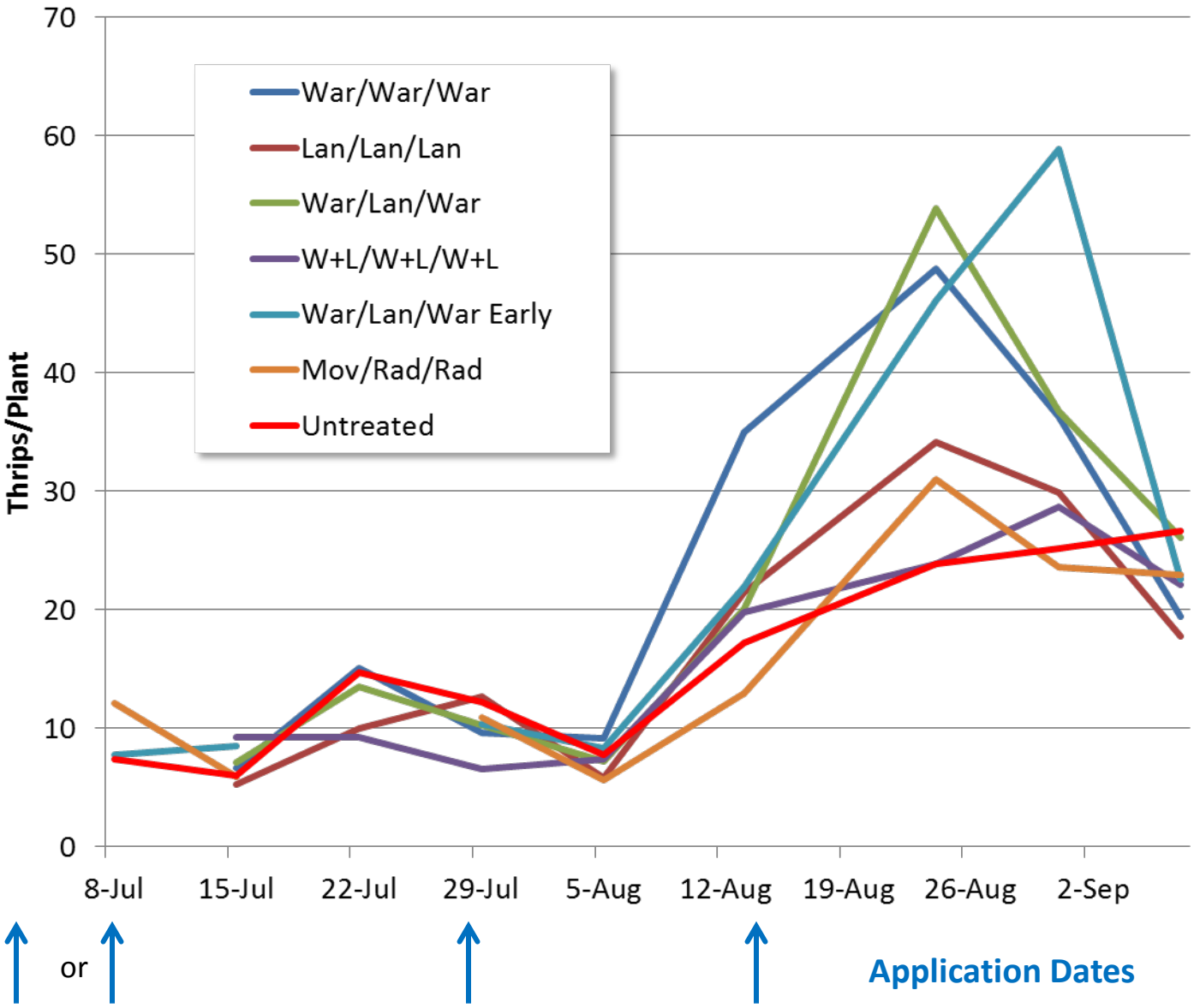
Effect of Control Strategy on Thrips Population



Effect of Control Strategy on Thrips Population



Effect of Control Strategy on Thrips Population



Insecticide Sequence

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

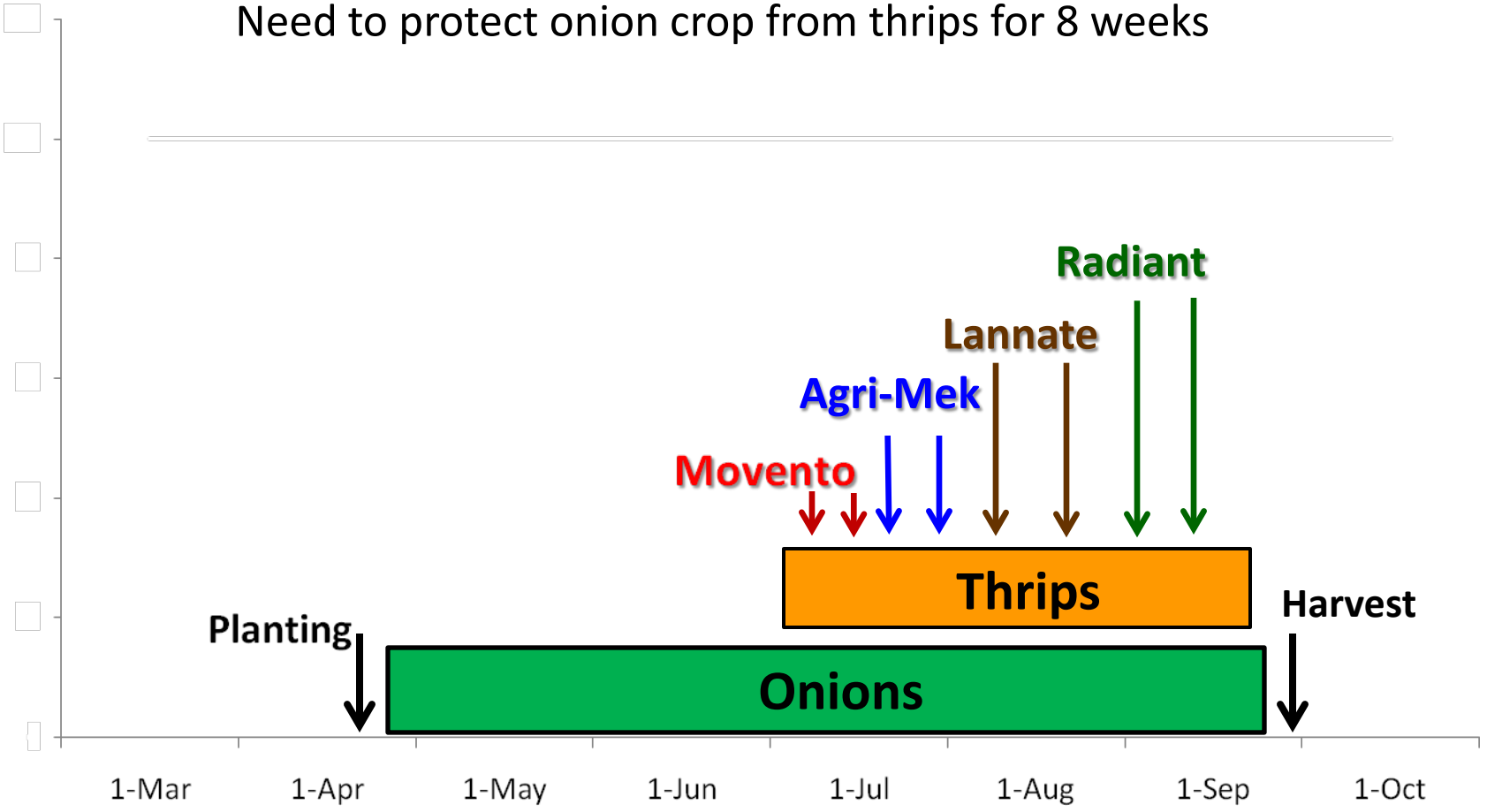
(when registered)

- 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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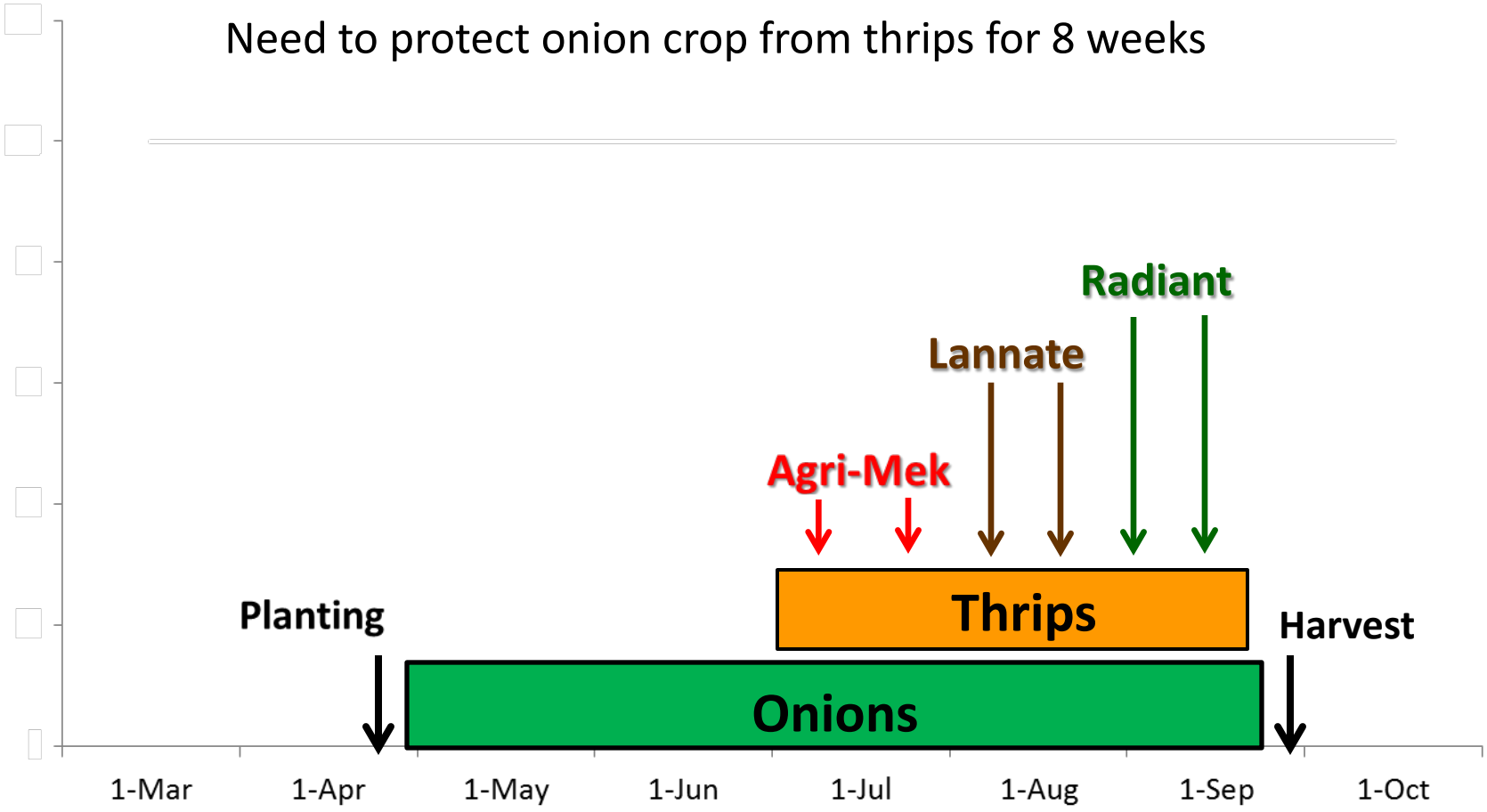


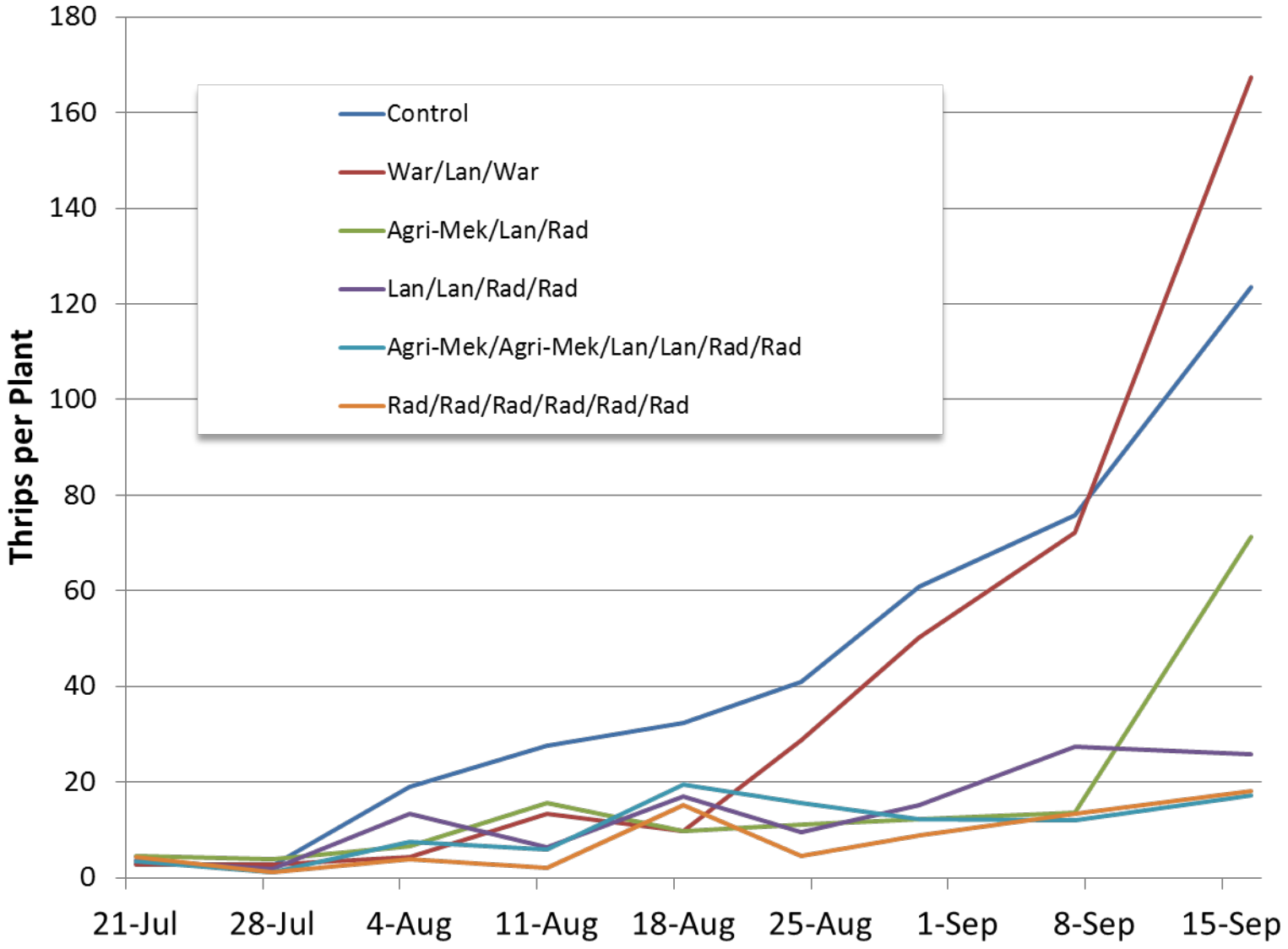
Season-Long Thrips Management

Treatment Strategies 2011

1st Application	2nd Application	3rd Application	4th Application	5th Application	6th Application
Untreated					
Warrior	Lannate	Warrior			
Agri-Mek	Lannate	Radiant			
Lannate	Lannate	Radiant	Radiant		
Agri-Mek	Agri-Mek	Lannate	Lannate	Radiant	Radiant
Radiant	Radiant	Radiant	Radiant	Radiant	Radiant

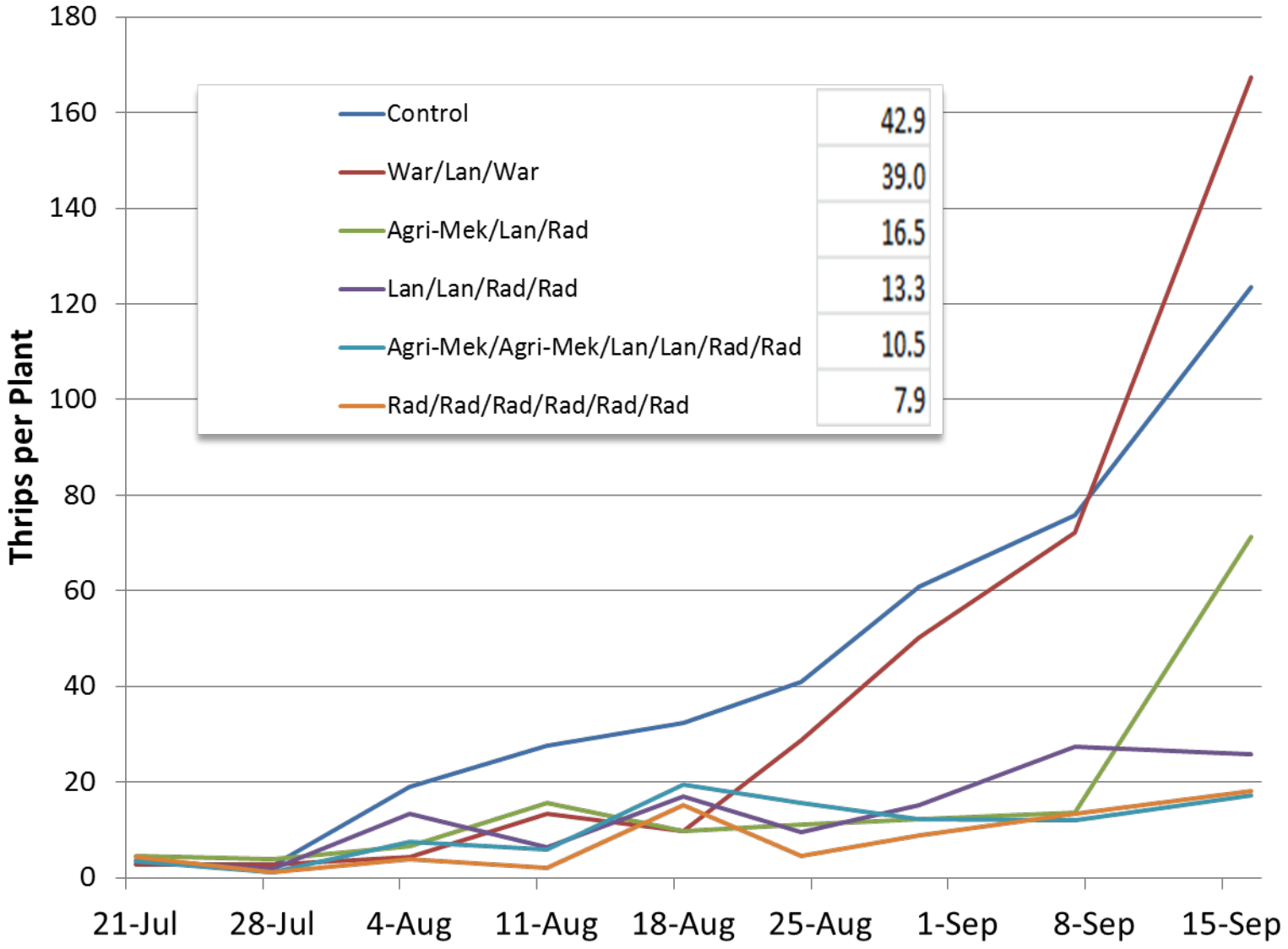
Season-Long Thrips Management Strategy

Effect on Thrips Population



Season-Long Thrips Management Strategy

Effect on Thrips Population



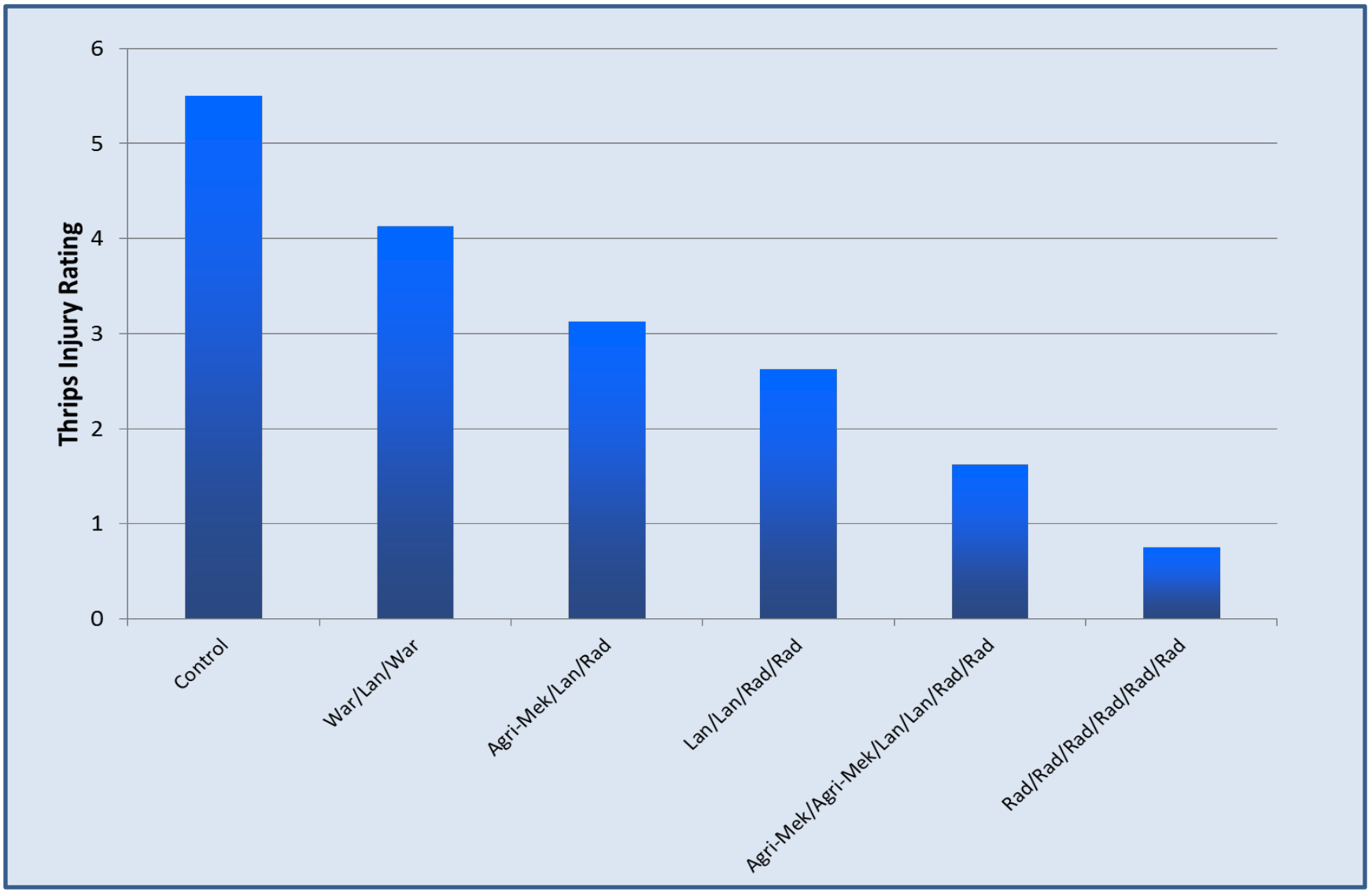
Resistance Management Principles

Brain Nault Professor, Dept. of Entomology Cornell University

- Products should be rotated across generations
  - Minimize exposure of the same generation to multiple active ingredients
  - Don’t use product more than twice per season
- Apply insecticide consecutively, 7 – 10 days apart
- Do not tank mix two effective insecticides
- Do not use same chemistry class more than on time per season and us treatment thresholds

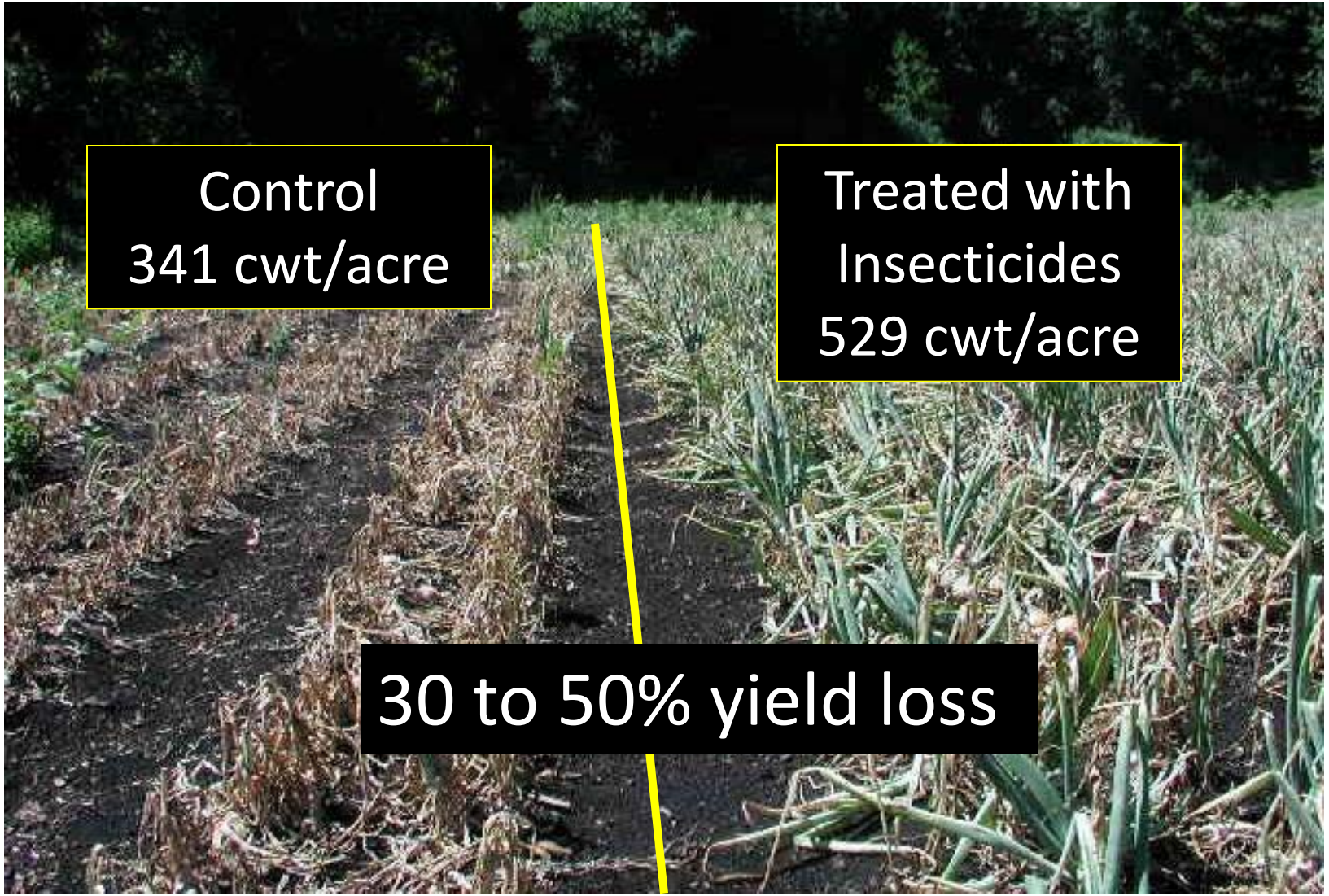
Season-Long Thrips Management Strategy

Effect on Onion Injury Rating




Control
Radiant

Onion Thrips Damage in New York State

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JOHN DEERE

Season-Long Thrips Management

Treatment Strategies 2011

1st Applic.	2nd Applic.	3rd Applic.	4th Applic.	5th Applic.	6th Applic.	Yield Tons/A
Untreated						17.9
Warrior	Lannate	Warrior				18.5
Agri-Mek	Lannate	Radiant				18.3
Lannate	Lannate	Radiant	Radiant			16.8
Agri-Mek	Agri-Mek	Lannate	Lannate	Radiant	Radiant	18.5
Radiant	Radiant	Radiant	Radiant	Radiant	Radiant	19.0
						NS

Conclusions

- Mix of thrips species in Klamath Basin
  - Predominantly onion thrips
  - More WFT early in season
- Counting thrips on plants better than rinsing technique
- Repeat applications of same insecticide superior method to evaluate performance
- Warrior initially knocked down population but caused subsequent spike (Role of beneficials in controlling thrips?)
- Movento very effective over two applications
- Movento plus Lannate extremely effective
- Aza-Direct plus Radiant lower thrips population than Radiant alone
- Brian Nault program may have merit
- Effect of thrips on yield in Klamath Basin???
  - Thrips may not be most damaging insect in Klamath Basin