Is intensive early-season thrips management worthwhile for mitigating iris yellow spot disease incidence and yield reduction?

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National Allium Research Conference
December 2, 2025

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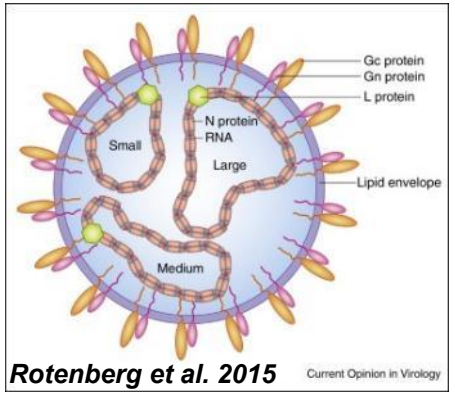
Onion thrips and IYSV are major problems in onion

Vector

Onion thrips

Pathogen



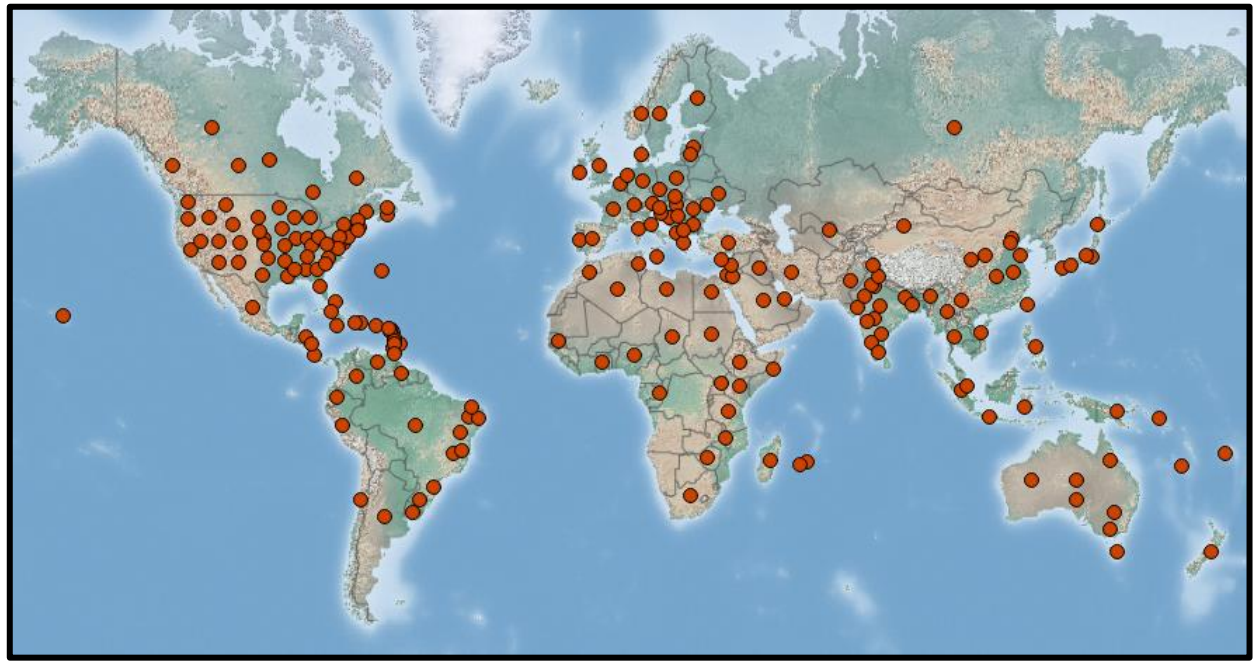
Iris yellow spot virus (IYSV)

Host

Onion

Onion thrips, *Thrips tabaci* Lindeman

- Polyphagous pest with a host range that includes hundreds of plant species
- Major pest of onion worldwide

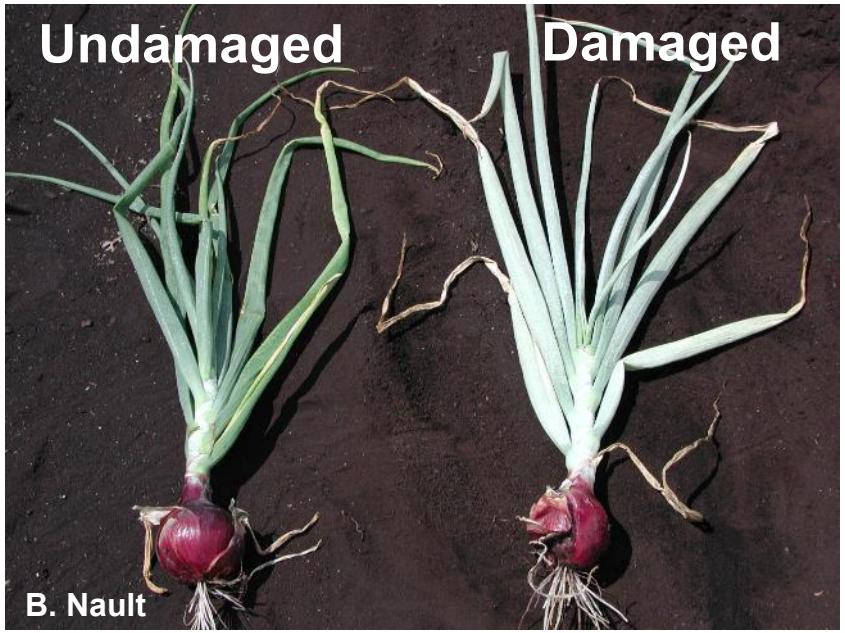


https://www.cabi.org/isc/datasheet/53746

Onion thrips is a major pest of onion

- **Feeding on foliage can reduce bulb weights 30-60%**

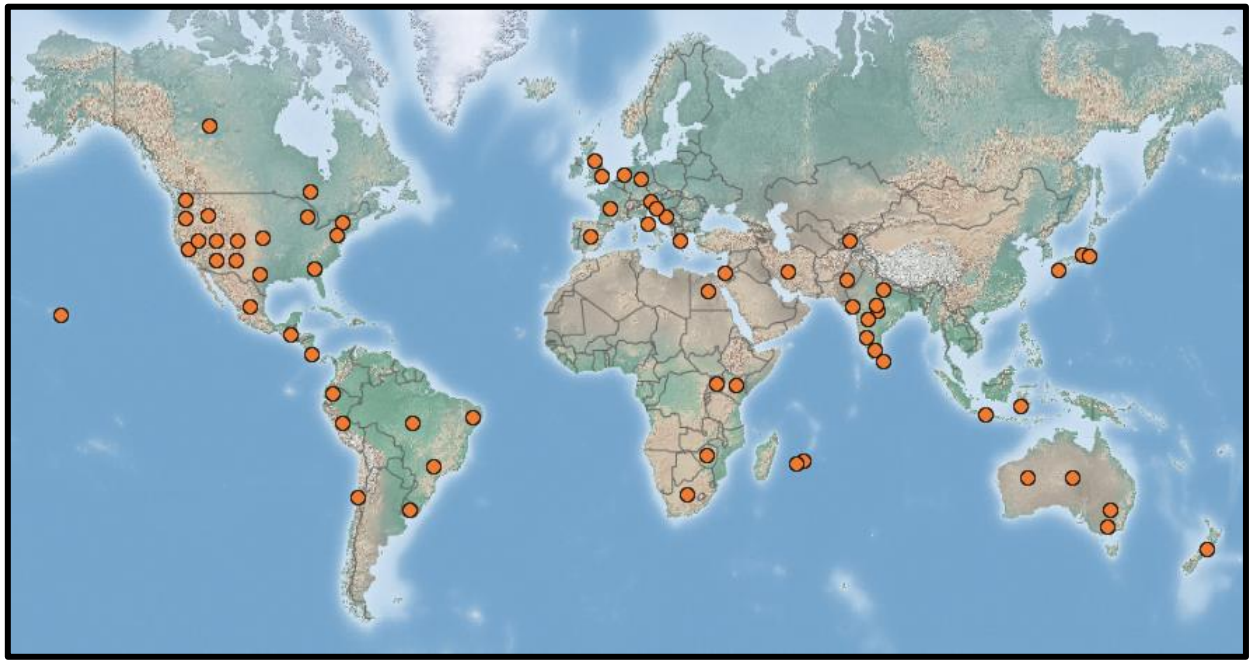
Nault and Huseth (2016) *J. Econ. Entomol*.
Leach et al. (2017) *Agric. Ecosys. Environ*.



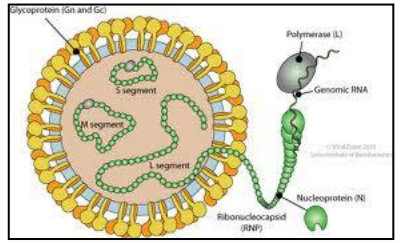
Thrips damage

Iris yellow spot virus (IYSV)

- **IYSV is a single-stranded, negative-sense RNA virus**
- **Wide host range of >40 plant *spp.***
- **IYSV causes iris yellow spot disease in onion worldwide**



https://www.cabi.org/isc/datasheet/28848#toDistributionMaps



Order: *Bunyavirales*

Family: *Tospoviridae*

Genus: *Orthotospovirus*

Species: *iridimaculaflavi*

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IYSV is a major pathogen of onion

- **IYSV reduces bulb yield and quality**
- **early infections typically worse**

Gent et al. (2006) *Plant Dis*.

Iris yellow spot disease symptoms

Onion crop killed prematurely

IYSV is transmitted by onion thrips

- Acquired by larvae
- Virus replicates in midgut; virus migrates to salivary glands
- IYSV is persistent and propagative
- Second instars and adults transmit
- Not transovarially transmitted
- Fecundity of viruliferous adults not affected, but they live longer
- IYSV is not seed transmitted/mechanically spread

Onion thrips larva

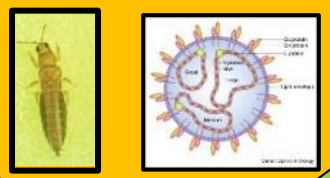
Kritzman et al. (2001); Ullman et al. (2002); Jones (2005); Robene-Soustrade et al. (2006); Chatzivassiliou et al. (2007); Whitfield et al. (2008); Leach et al. (2019)

Integrated Pest Management

Cultural Control

Plant Resistance

Onion thrips & IYSV



Chemical Control

Biological Control

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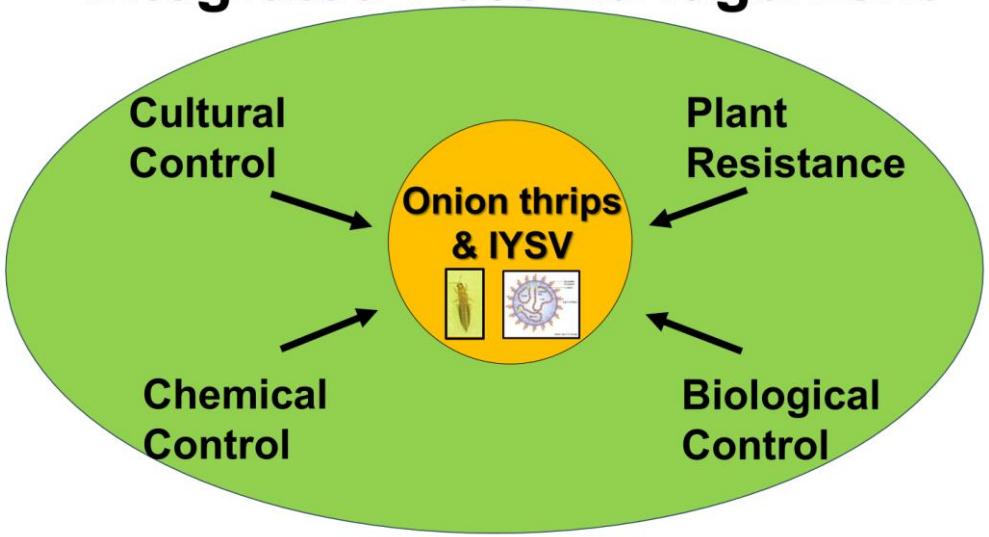
Agroecosystem
(Crop production, Landscape & Climate)

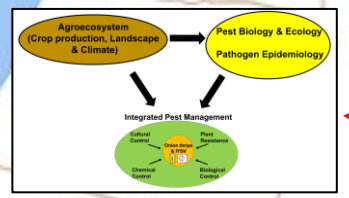
Pest Biology & Ecology

Pathogen Epidemiology

Integrated Pest Management



Onion thrips & IYSV management



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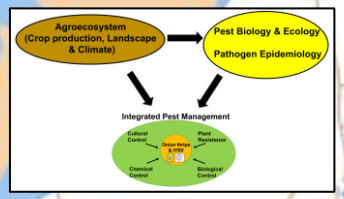

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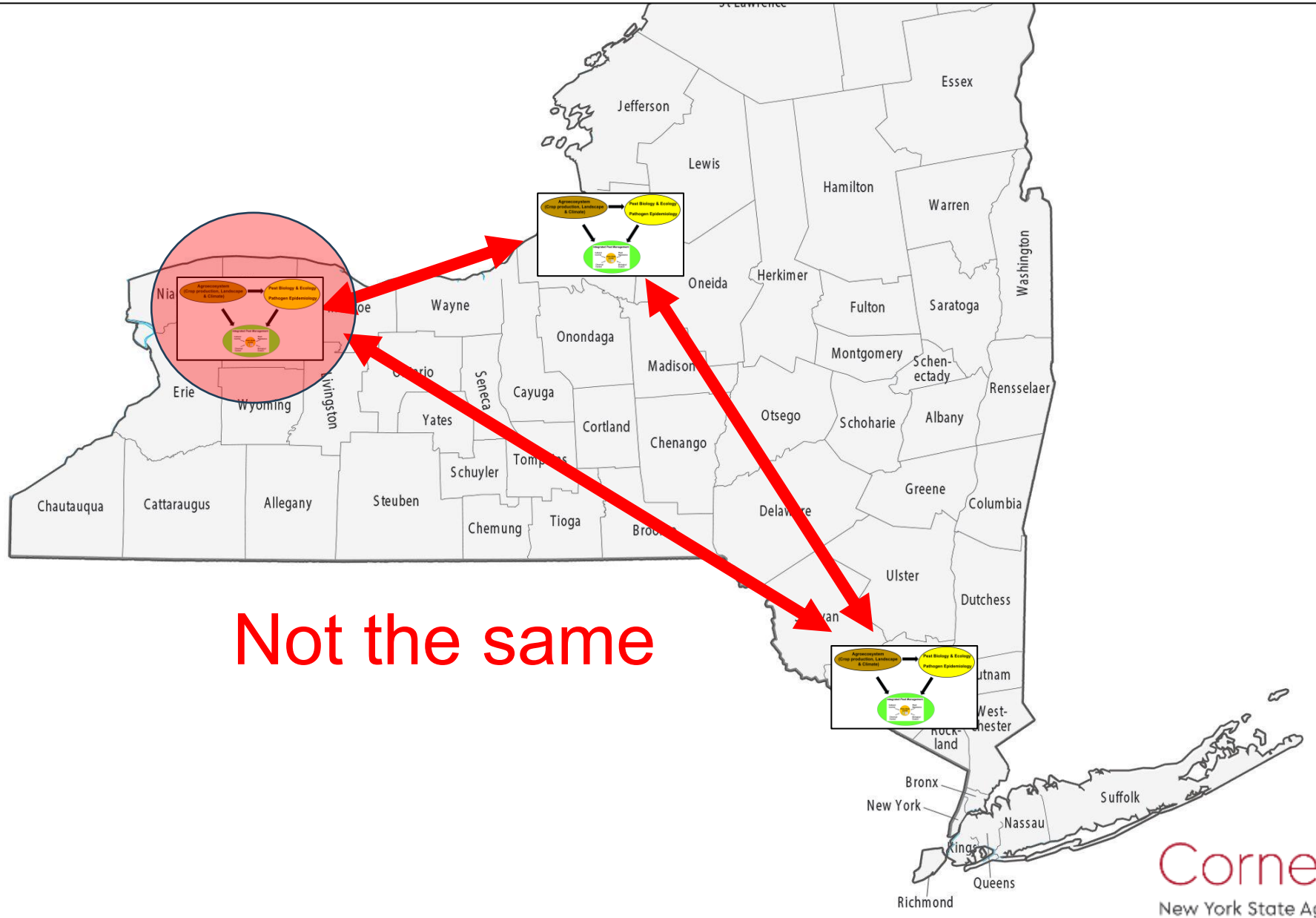
Onion thrips & IYSV management



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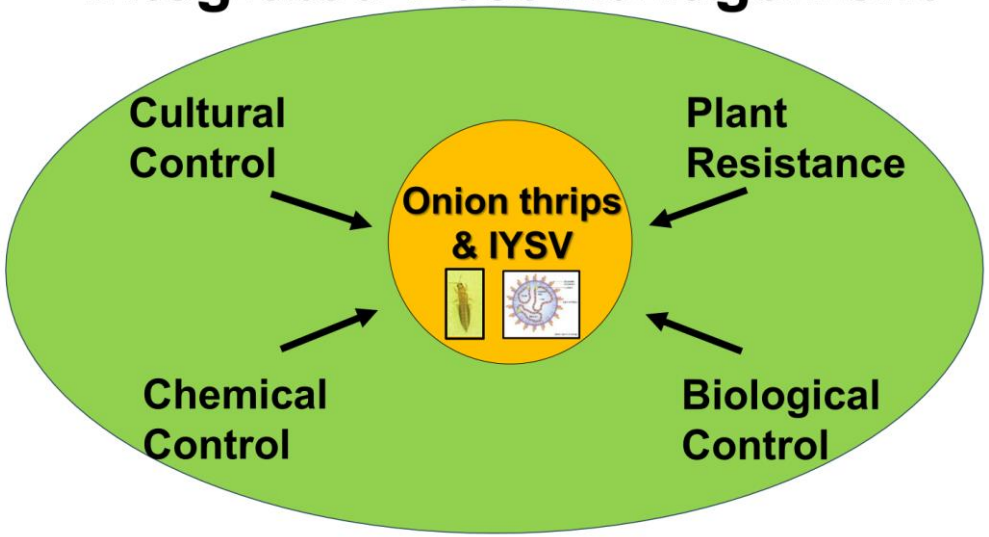
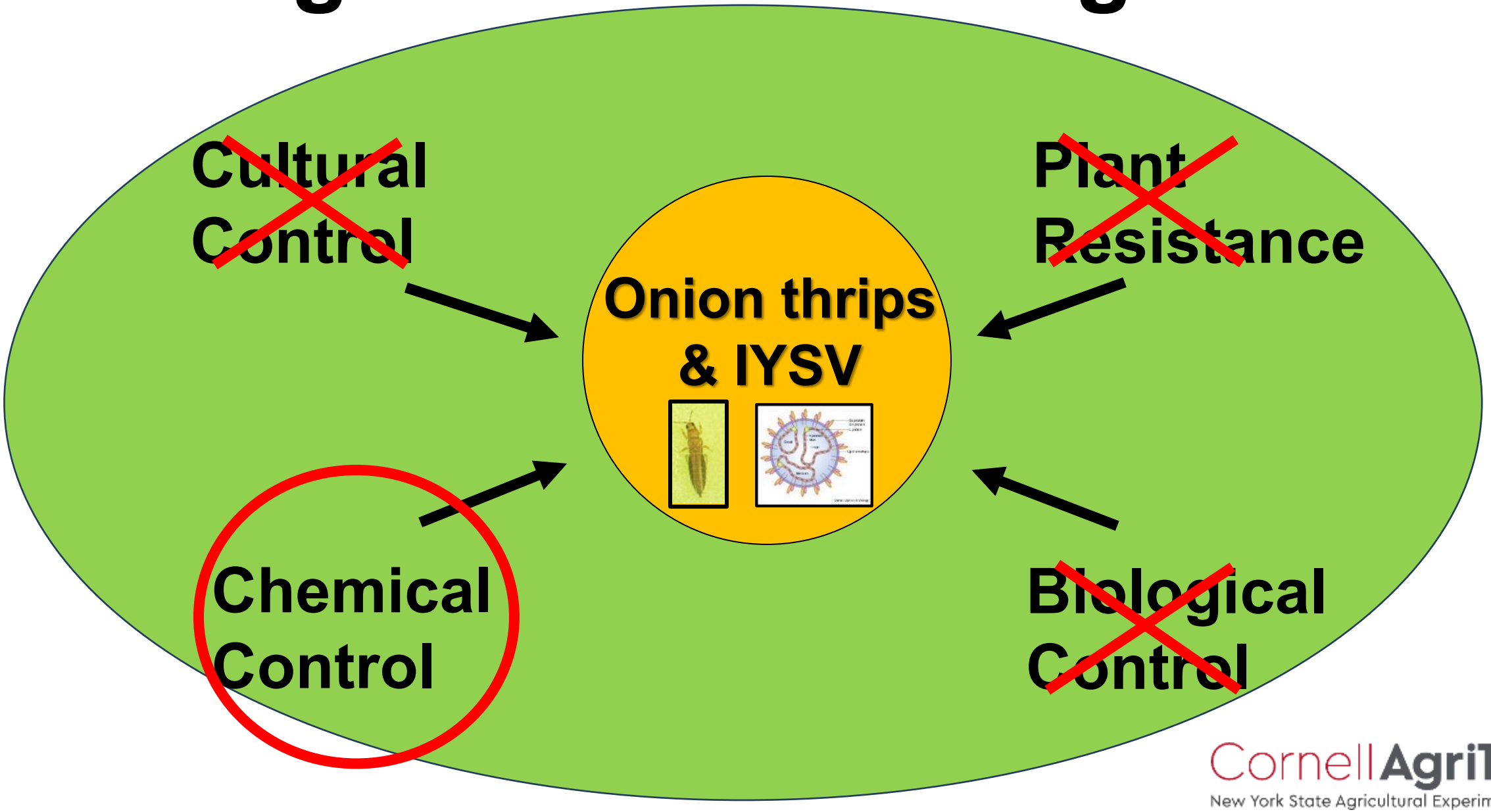


Integrated Pest Management



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Insecticides used to manage onion thrips

Product Name	Chemical Name	IRAC class
Agri-Mek SC	abamectin	6
EXIREL INSECT CONTROL	cyantraniliprole	28
Lannate™ INSECTICIDE	methomyl	1A
Minecto® Pro	abamectin + cyantraniliprole	6 + 28
MOVENTO®	spirotetramat	23
Senstar® INSECTICIDE	spirotetramat + pyriproxyfen	23 + 7C
NEW! Vertento® PLINAZOLIN® technology	isocycloseram	30
Radiant® SC INSECTICIDE	spinetoram	5
Warrior II with Zeon Technology®	lambda-cyhalothrin	3

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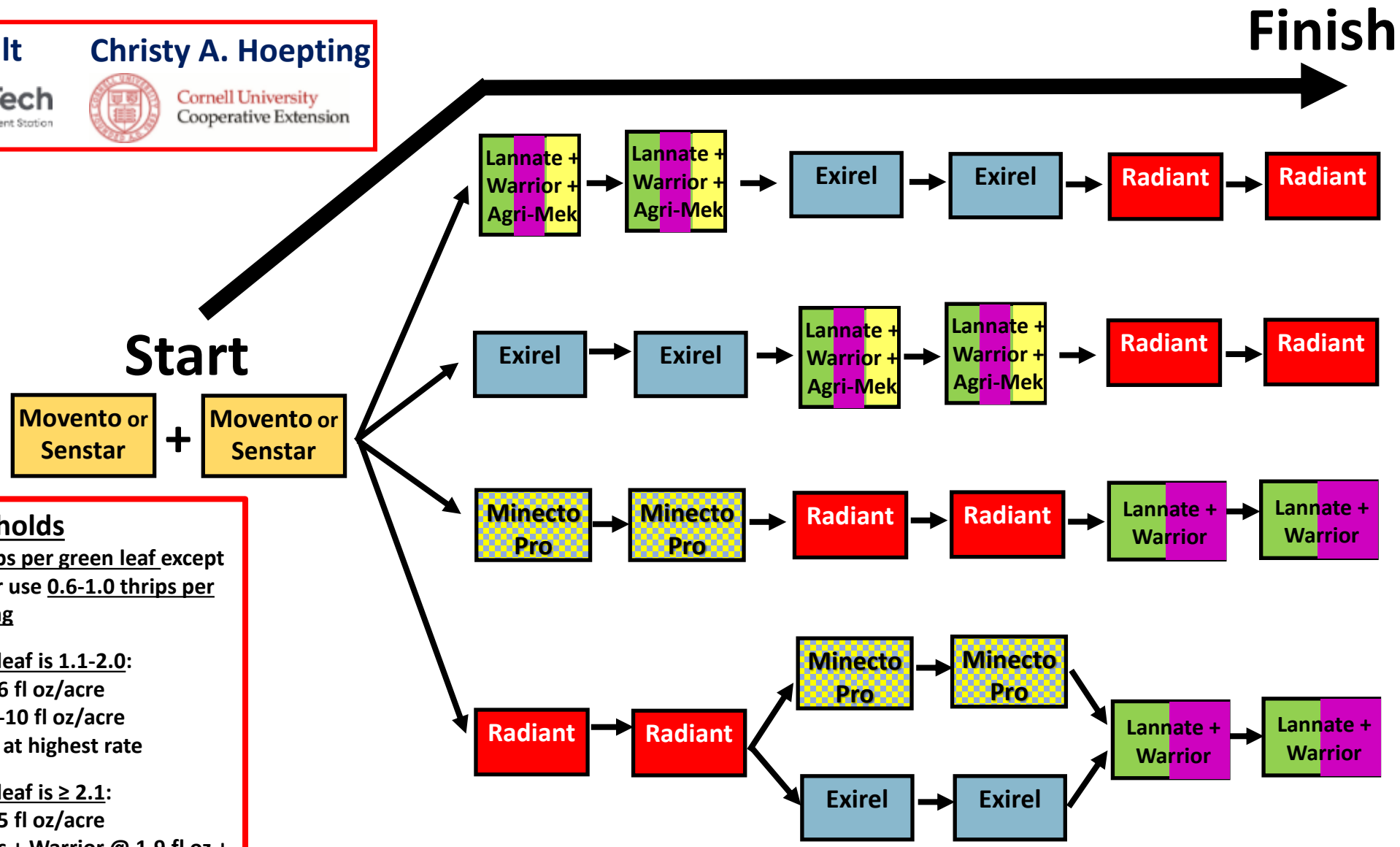
Onion thrips management guidelines for onion

Brian A. Nault — CornellAgriTech, New York State Agricultural Experiment Station

Christy A. Hoepting — Cornell University Cooperative Extension



Action Thresholds

*Use 1.1-2.0 thrips per green leaf except Movento/Senstar use 0.6-1.0 thrips per leaf or pre-bulbing

If avg. thrips per leaf is 1.1-2.0:

- Exirel @ 13.5-16 fl oz/acre
- Radiant SC @ 8-10 fl oz/acre
- Other products at highest rate

If avg. thrips per leaf is ≥ 2.1:

- Exirel @ 16-20.5 fl oz/acre
- Lannate @ 3 pts + Warrior @ 1.9 fl oz + Agri-Mek @ 3.5 fl oz

Last updated: 11-11-25

WARNING: Agri-Mek and Exirel should NOT be used in a sequence with Minecto Pro

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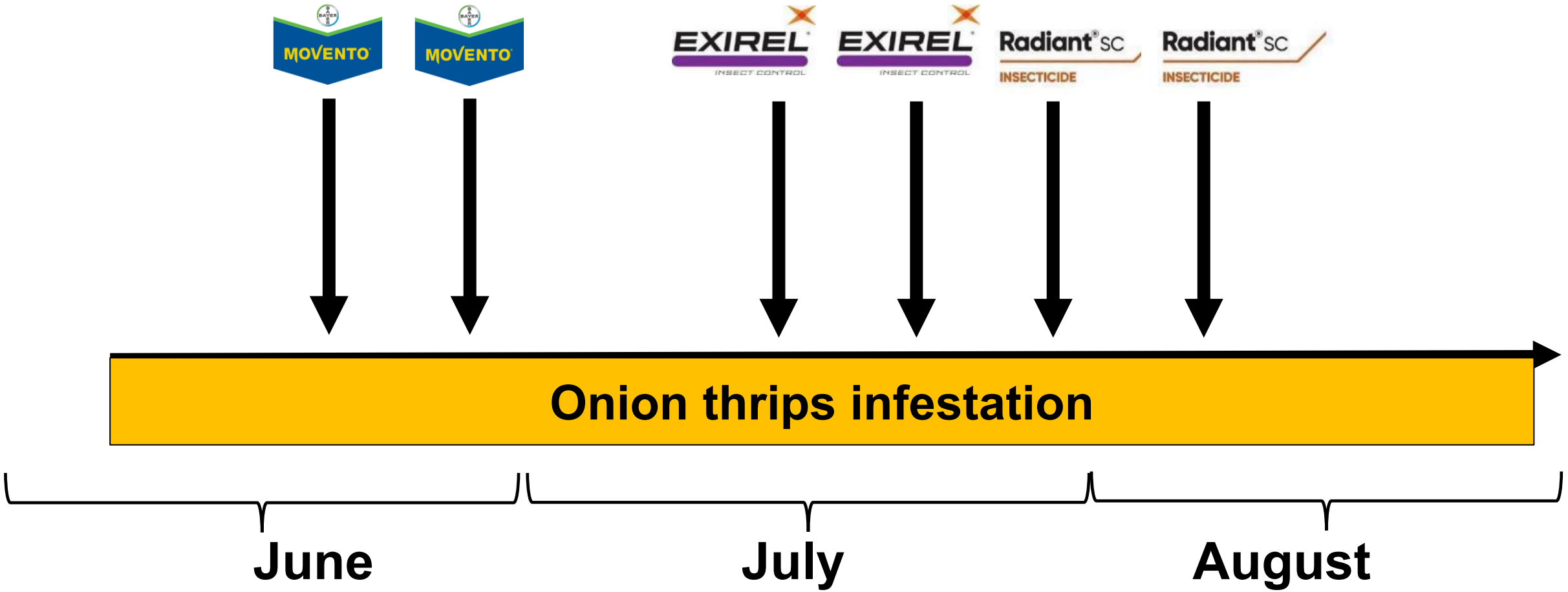
Standard insecticide program



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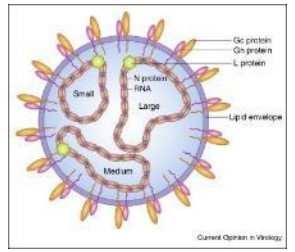
Standard insecticide program

thrips



IYSV

MOVENTO

MOVENTO

EXIREL INSECT CONTROL

EXIREL INSECT CONTROL

Radiant® SC INSECTICIDE

Radiant® SC INSECTICIDE

Onion thrips infestation

June **July** **August**

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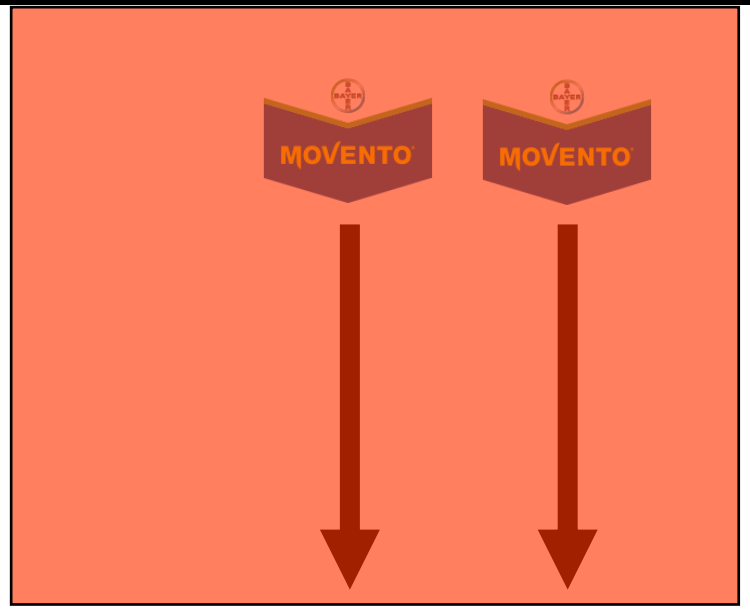
Standard insecticide program

IYSV detected in seeded onions



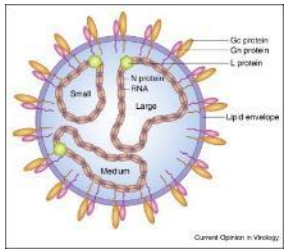
EXIREL INSECT CONTROL

EXIREL INSECT CONTROL

Radiant SC INSECTICIDE

Radiant SC INSECTICIDE

thrips



IYSV

Onion thrips infestation

June | July | August

Komondy et al. *Plant Disease* (2024)

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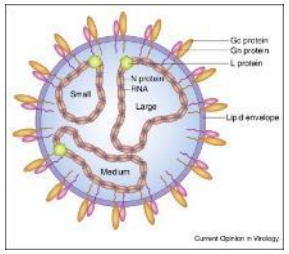
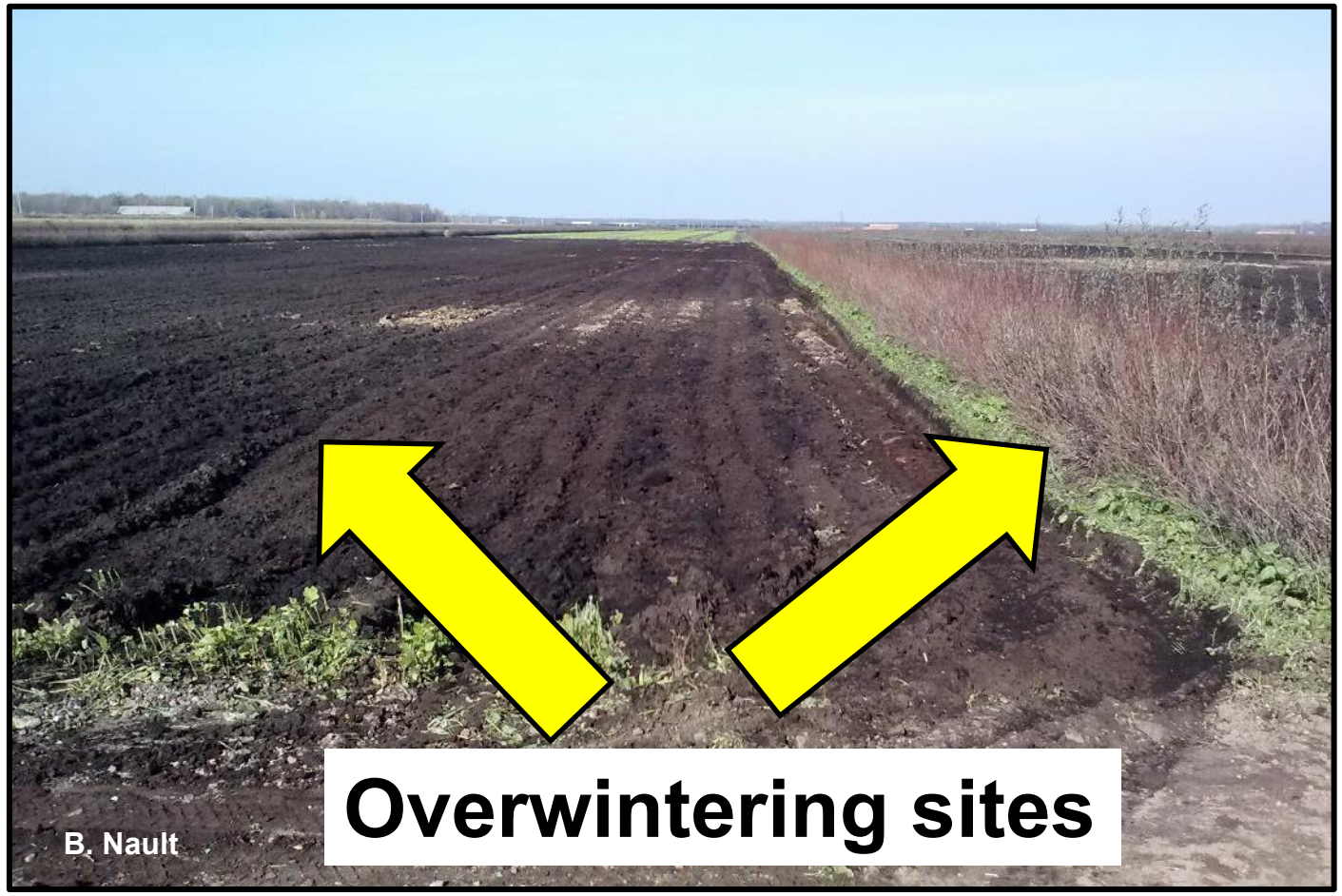
IYSV carrying thrips adults likely overwinter

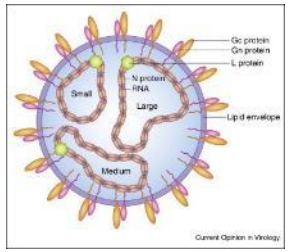
+





IYSV carrying thrips adults likely overwinter and colonize onion fields in early June

+



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Early-season epidemics of IYSV often kills the crop prematurely and reduces bulb yield

B. Nault

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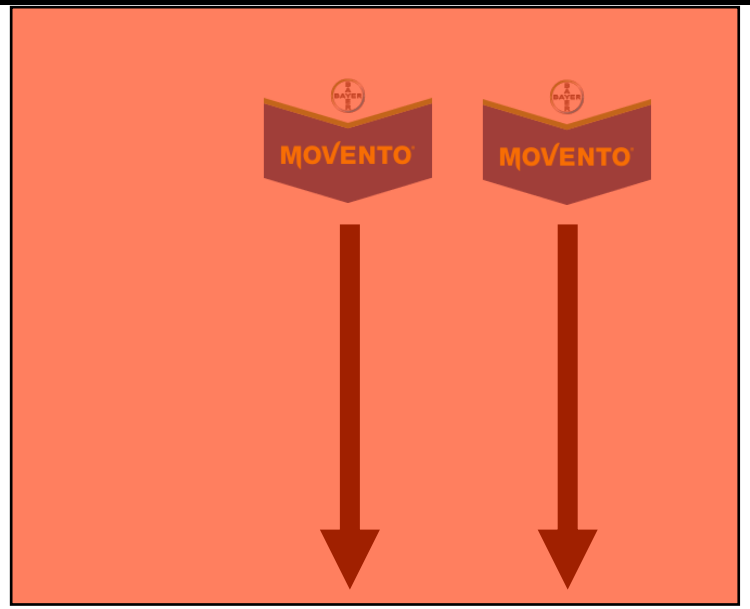
Standard insecticide program

IYSV detected in seeded onions



EXIREL INSECT CONTROL

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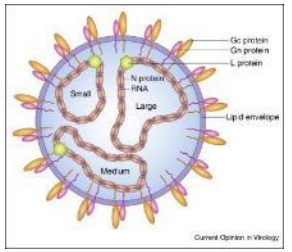
Radiant SC INSECTICIDE

Radiant SC INSECTICIDE

thrips



IYSV

Onion thrips infestation

June | July | August

Komondy et al. *Plant Disease* (2024)

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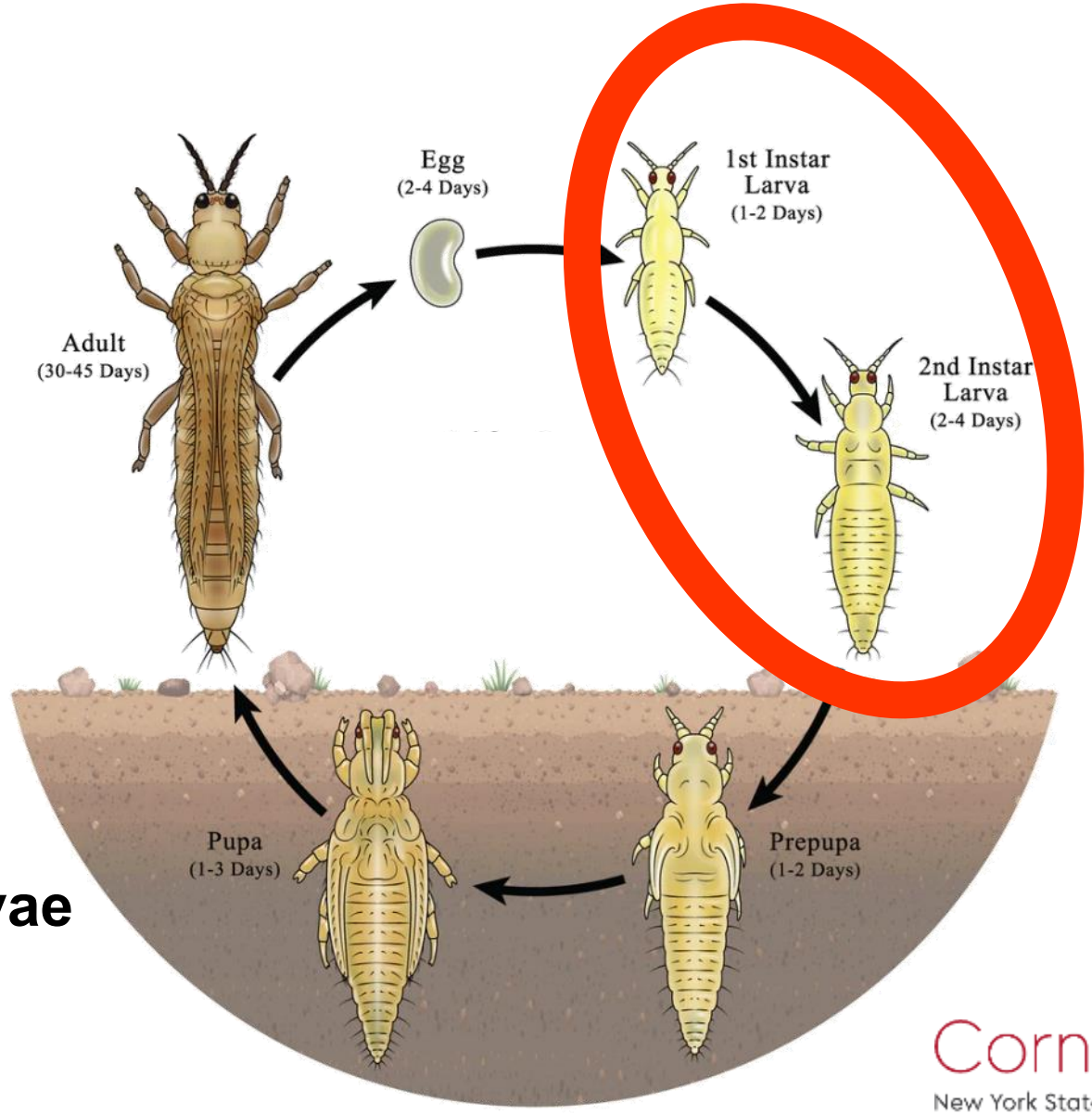
Movento is effective against larvae…

BAYER

MOVENTO®

- Systemic in onions
- Highly effective against larvae



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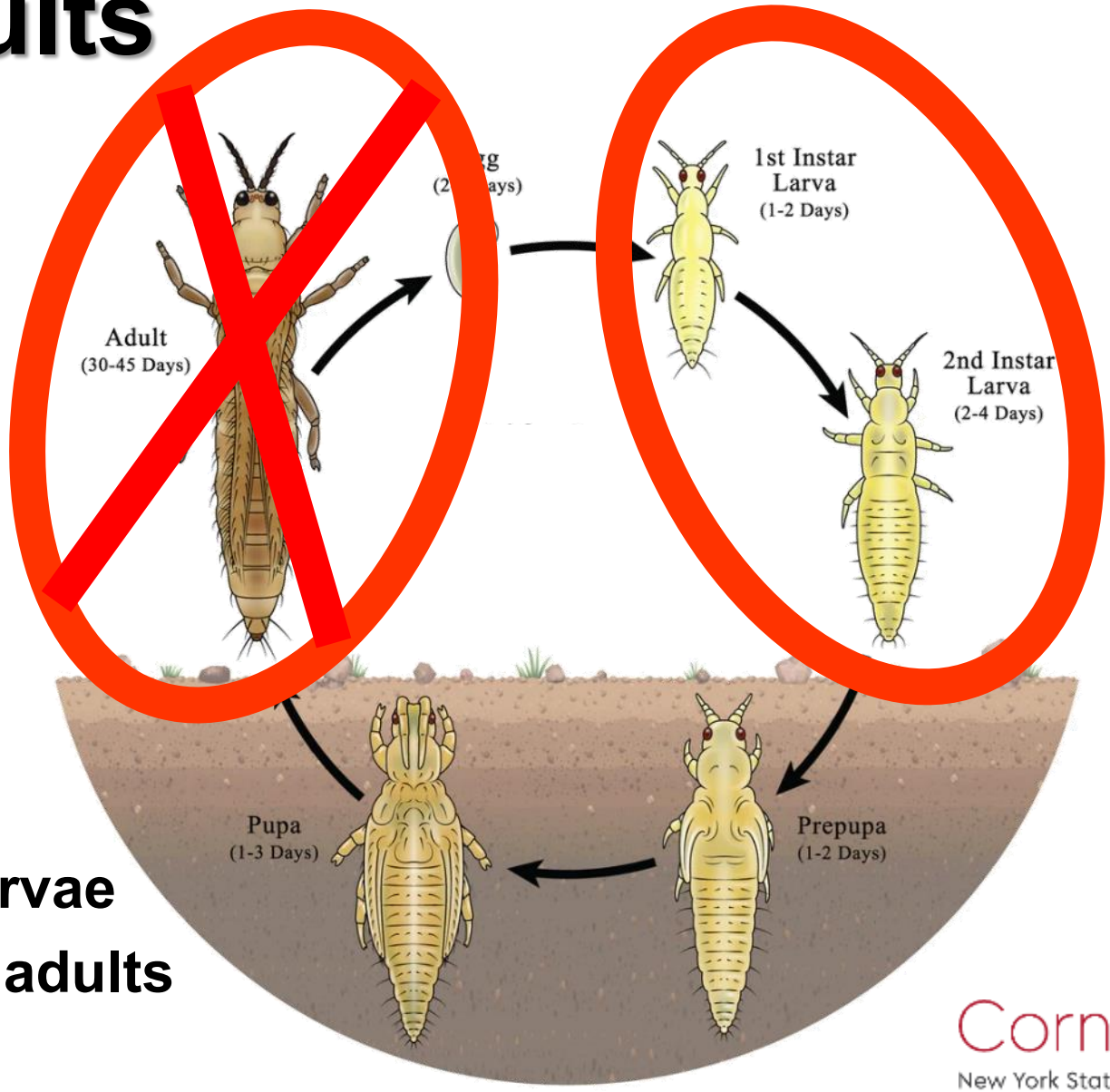
Movento is effective against larvae… but NOT adults



- Systemic in onions
- Highly effective against larvae
- Not very effective against adults

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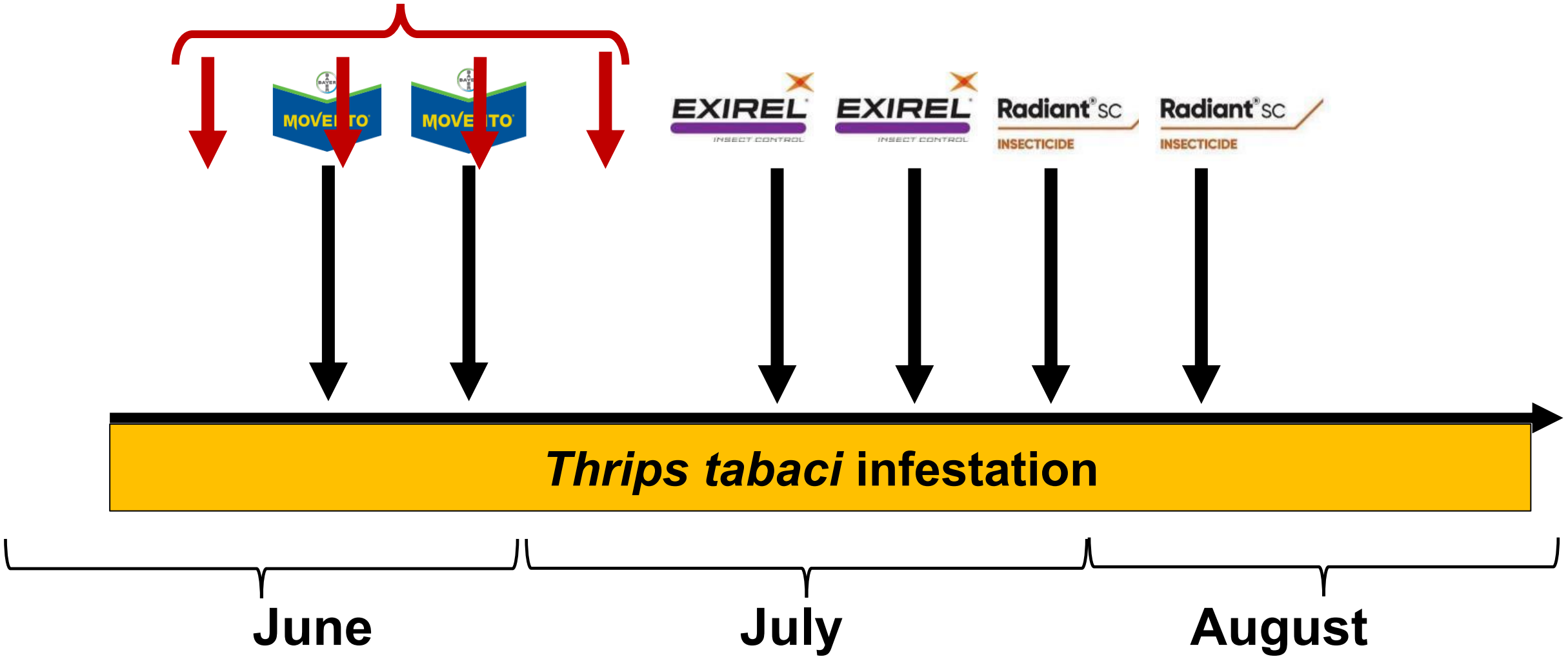
Intensive insecticide program

Insecticide known to kill adults

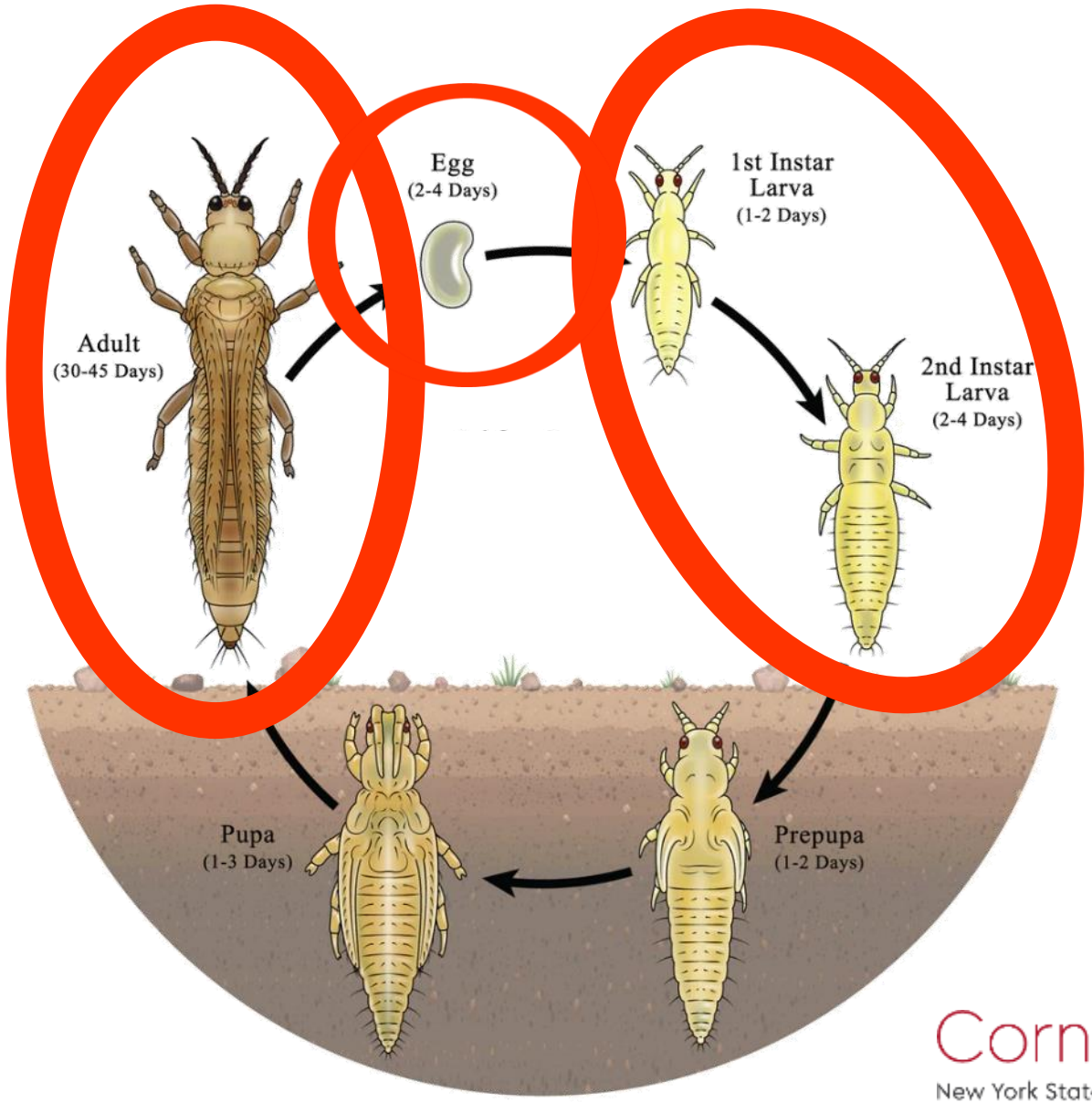


Lannate LV effective against adults, larvae and eggs

Lannate® LV

INSECTICIDE

methomyl (IRAC 1A)



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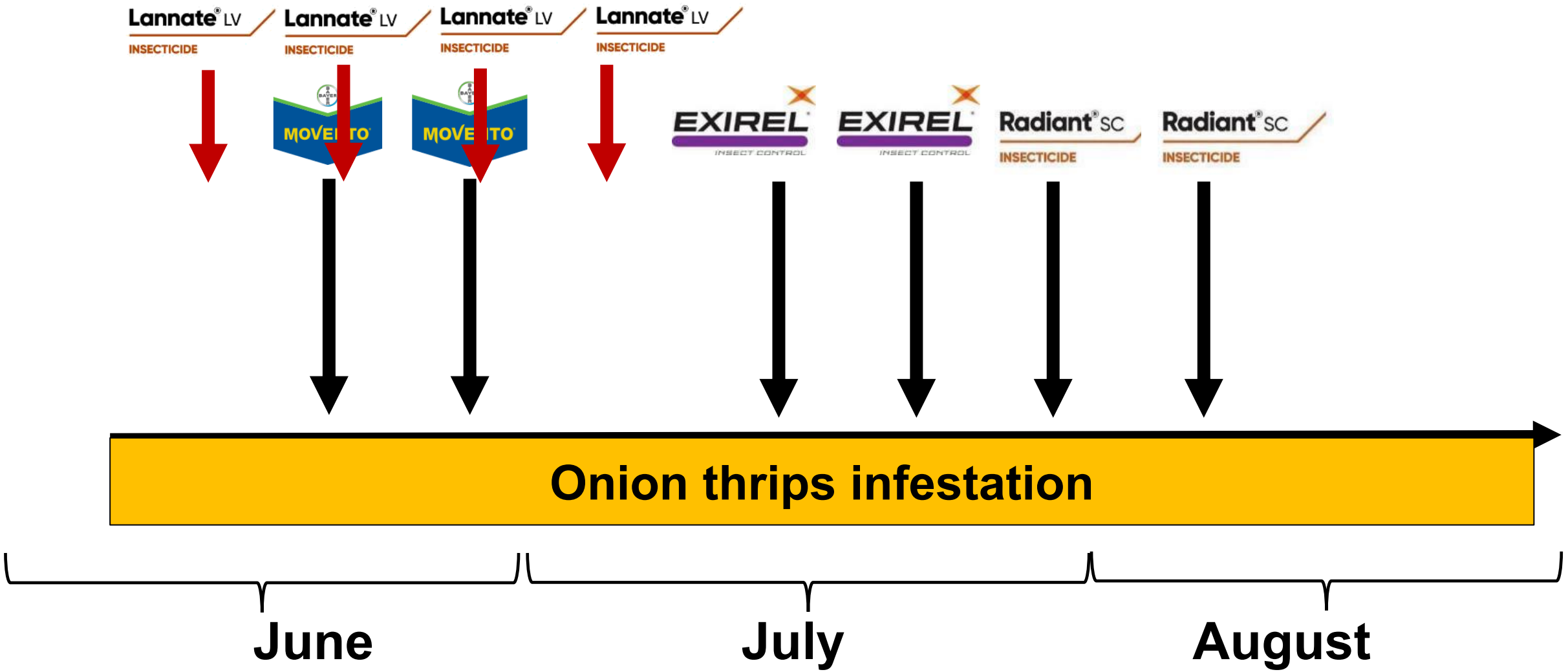
Intensive insecticide program



Objective

- **To compare thrips densities, IYSV incidence, and marketable bulb yield in onions managed following a standard insecticide program with an intensive insecticide program**

2024 ✓ **2025** ✗

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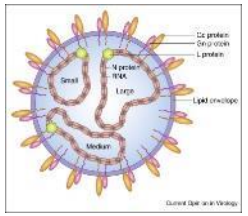
Hypotheses

An intensive insecticide program will:

- reduce thrips densities

- reduce IYS symptoms

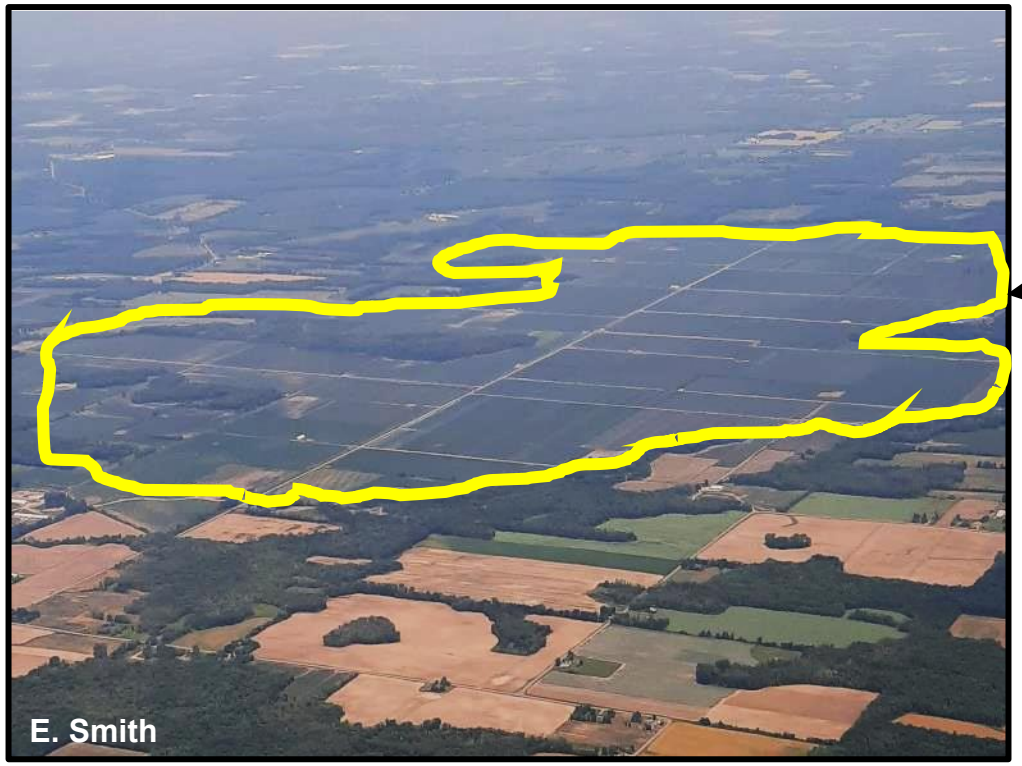
- reduce IYSV incidence



- increase bulb yield

Study site 2024

Elba Muck (Orleans Co.)



- Second largest onion production region in New York

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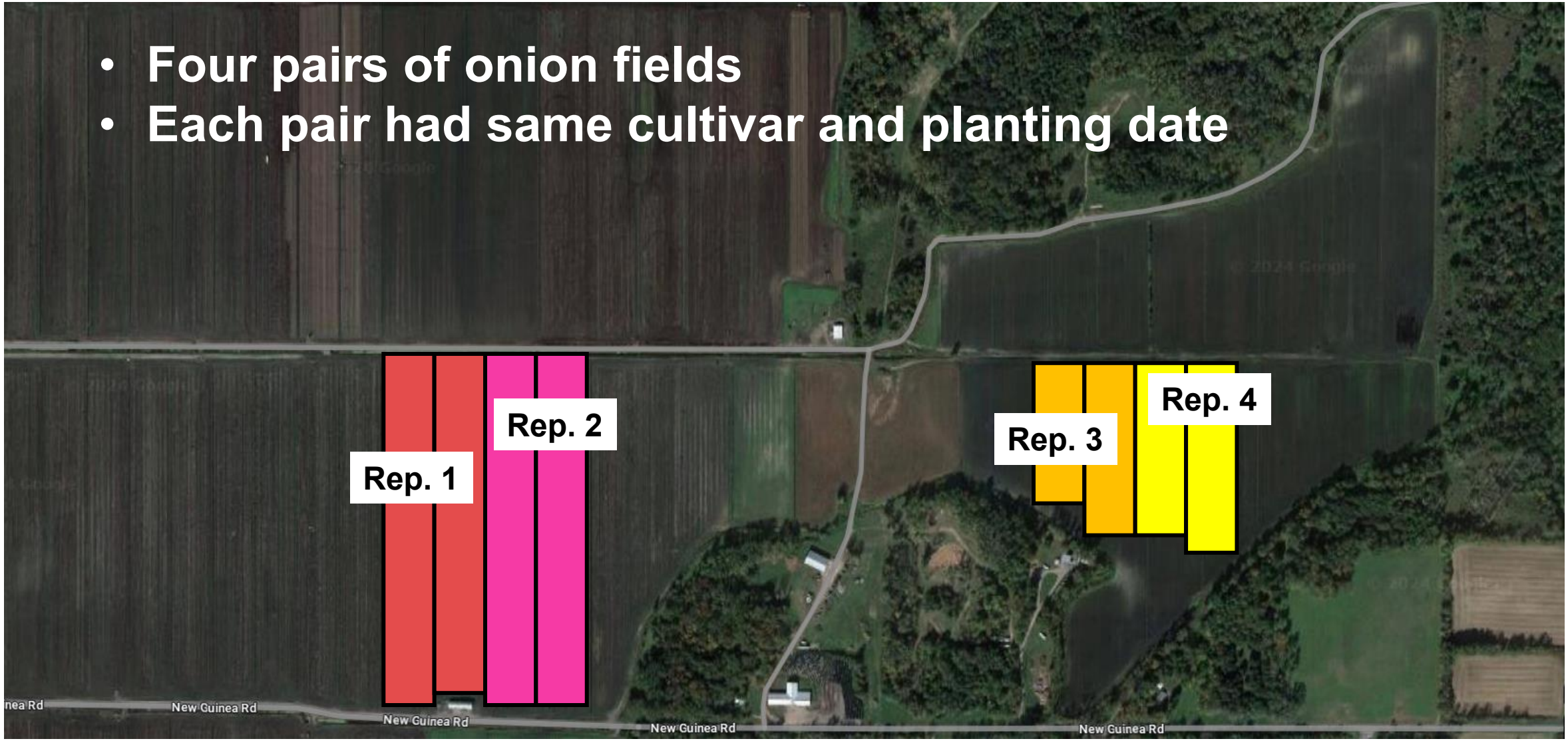
Study site – Elba Muck 2024



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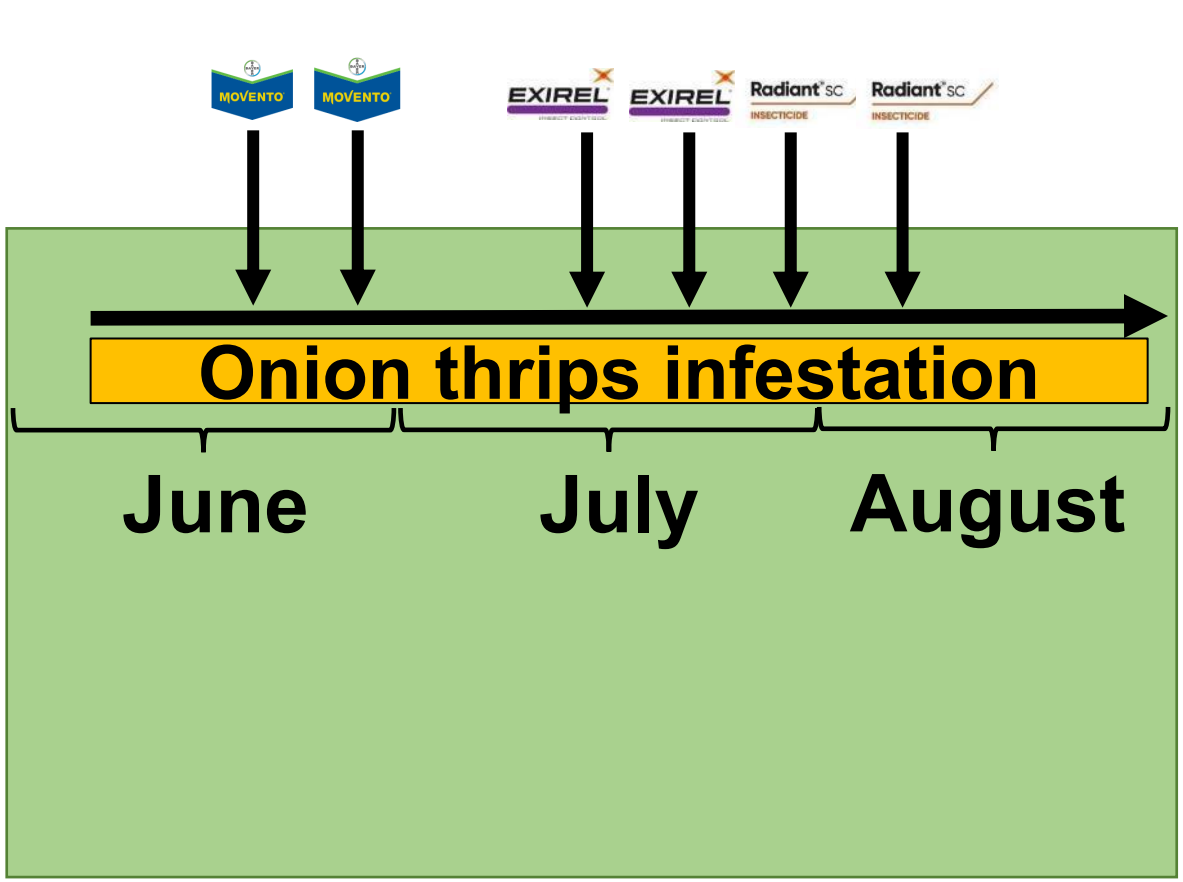
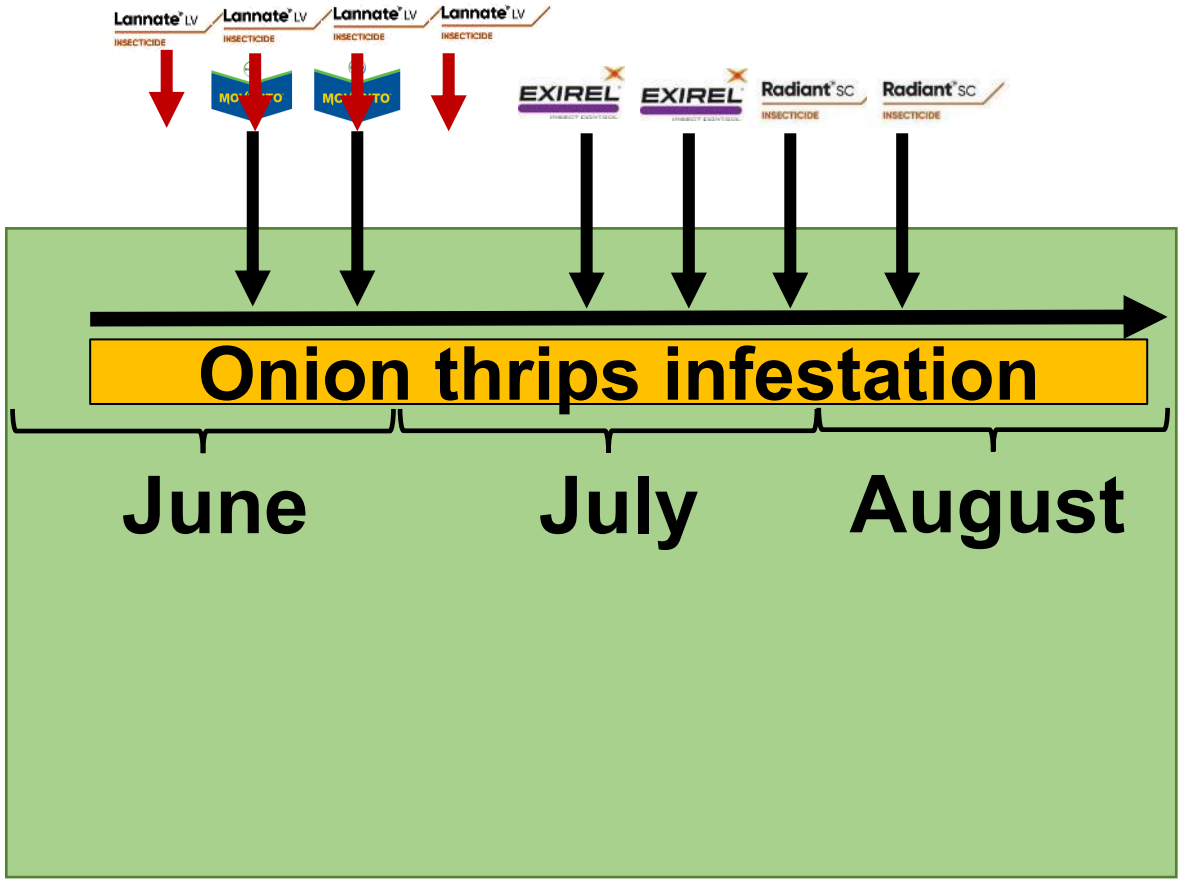
Insecticide program treatments



Standard insecticide program



Intensive insecticide program

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Experimental approach

1. Insecticides applied by onion grower

- 20 gpa before and during Movento sprays; 30 gpa afterward
- 55 psi @ 20 gpa; 40 psi @ 30 gpa
- Twin jet nozzles
- Surfactant – LI700 @ 0.25% v:v
- Application cost – $15 /acre

Experimental approach

1. Insecticides applied by onion grower

2. Fields evaluated
(Thrips, IYS disease, IYSV incidence)

- Thrips: 30 plants/ field in June & July; 50 plants/ field in August
- IYS disease: 30 plants/ field
- IYSV: 50 four-plant composite samples (DAS-ELISA)

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Experimental approach

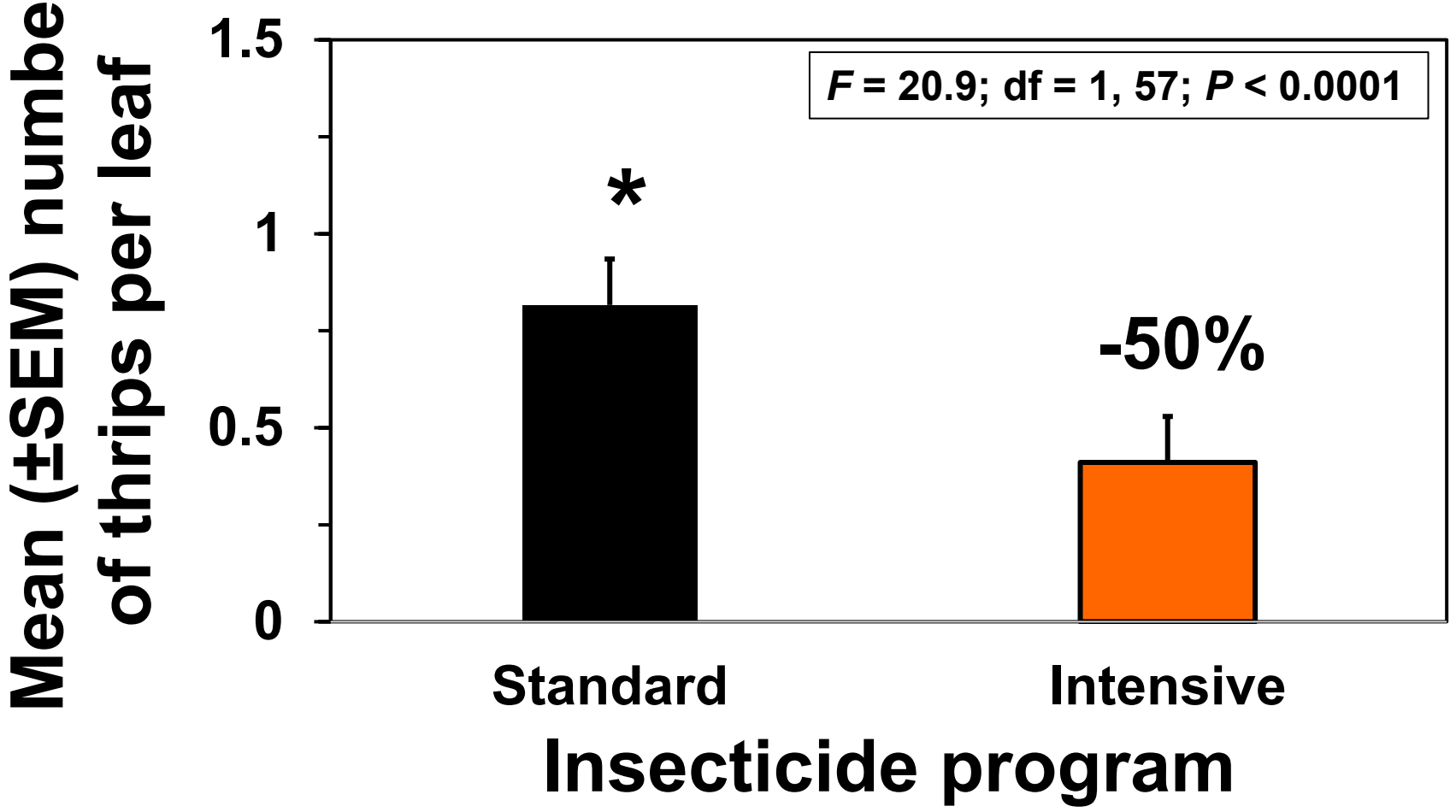
1. Insecticides applied by onion grower

2. Fields evaluated
(Thrips, IYS disease, IYSV incidence)

3. Marketable bulb yield assessed

- 9 bags each 30+ lbs of bulbs graded & weighed

Impact of insecticide program on Thrips densities (adults + larvae)



Economic injury level = 2.2 thrips/ leaf

- All data analyzed using generalized linear mixed models in SAS (GLIMMIX)
- Least squares means compared using Tukey-Kramer Pairwise Comparison Test at $P < 0.05$

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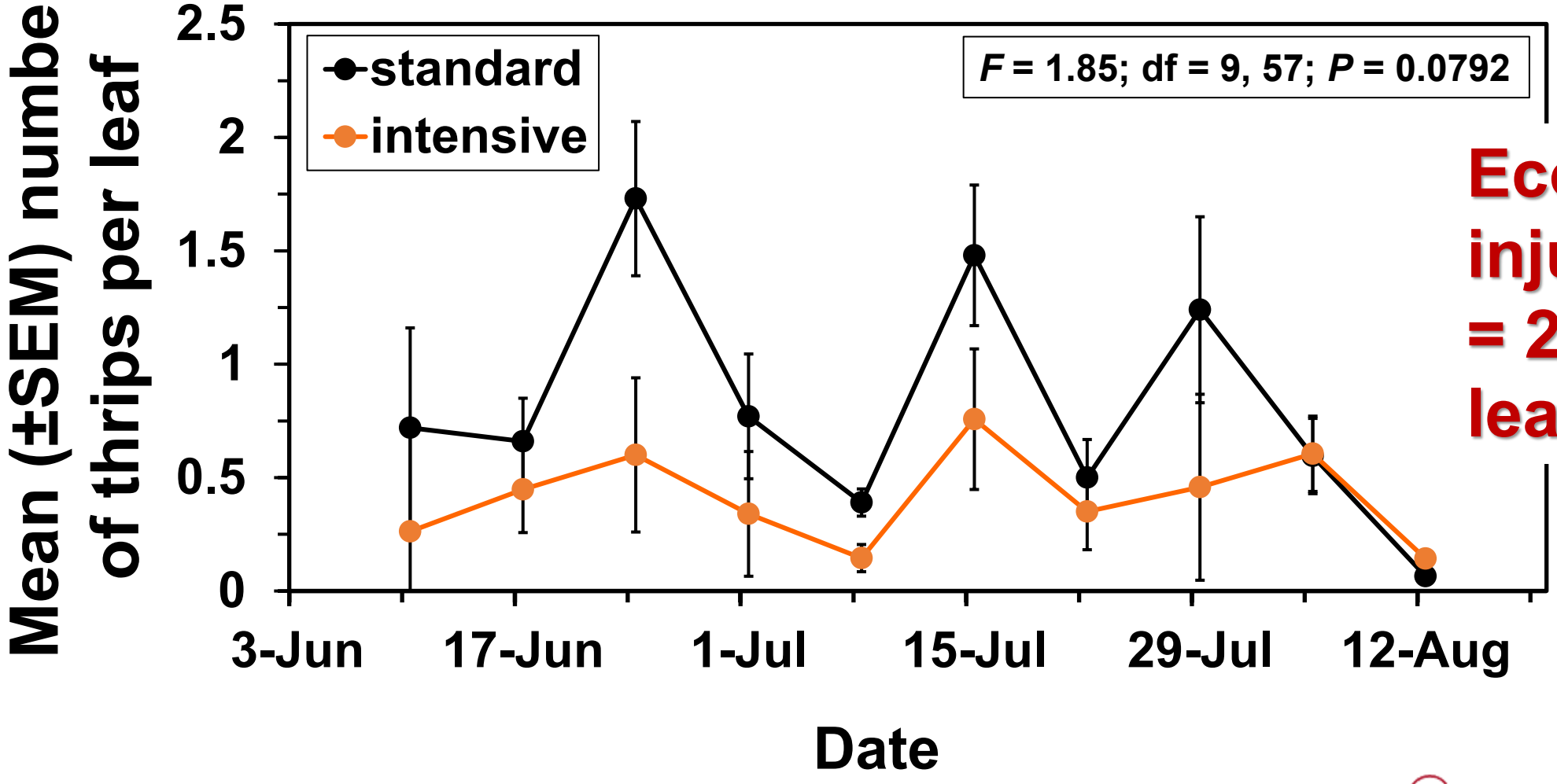

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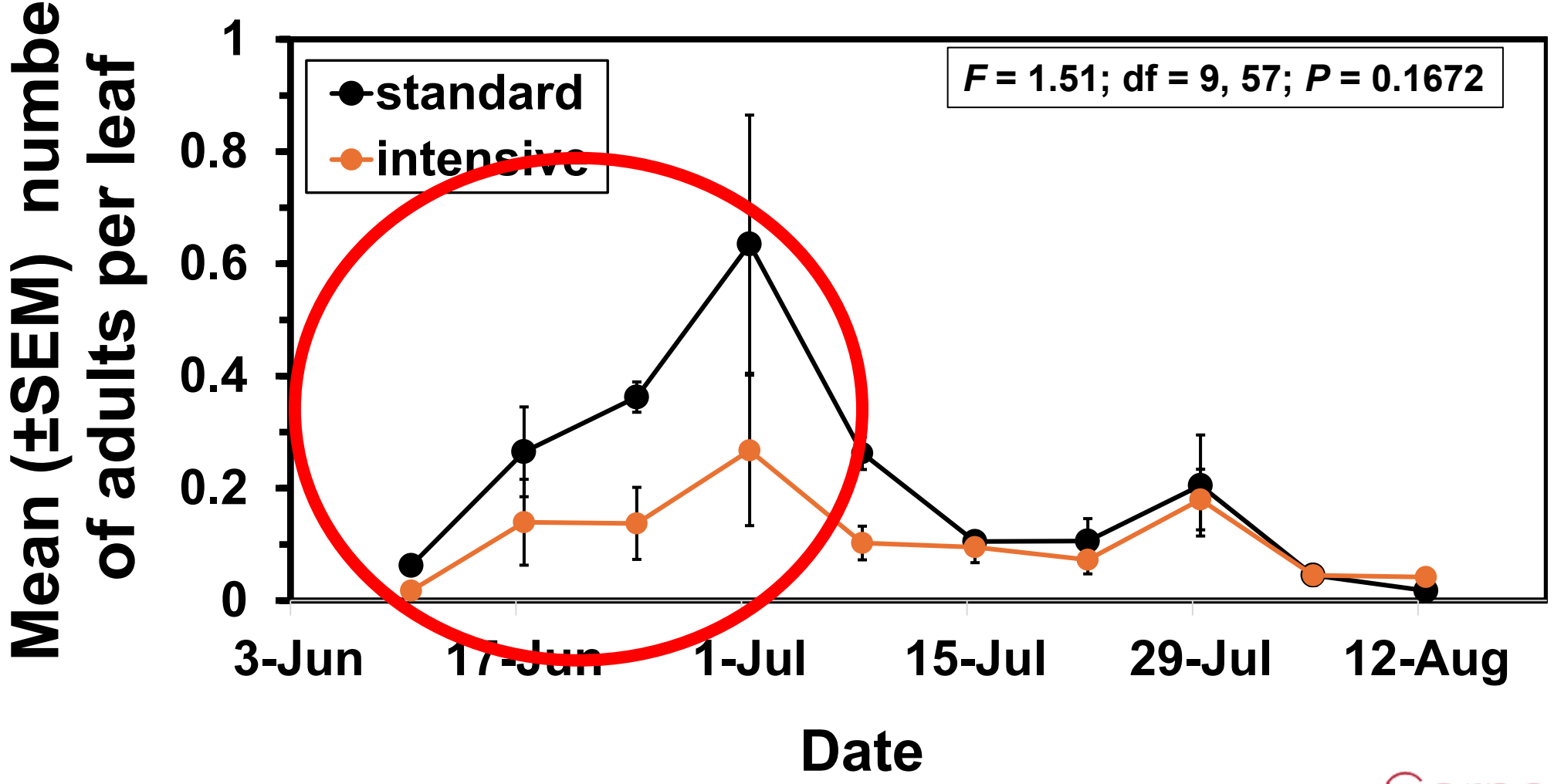
Impact of insecticide program on Thrips densities (adults only)



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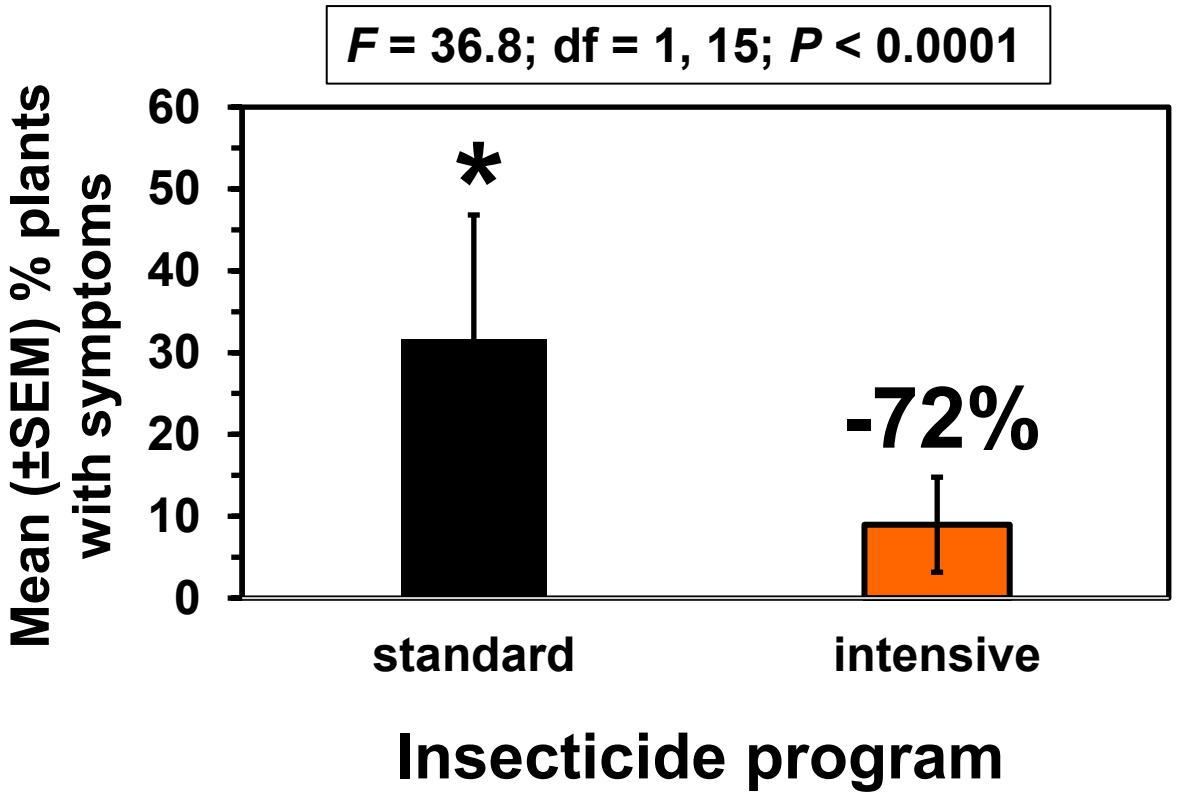
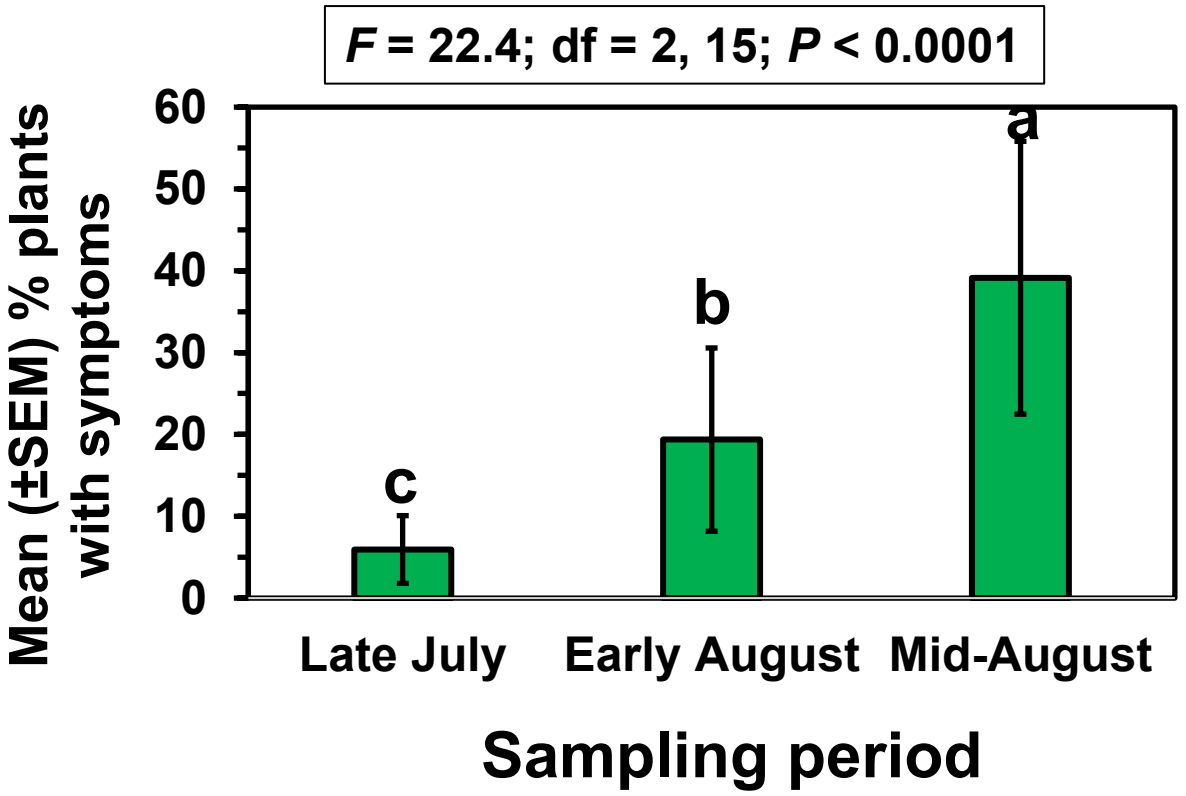
Impact of insecticide program on visual symptoms of IYS disease





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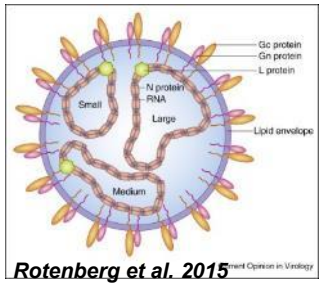
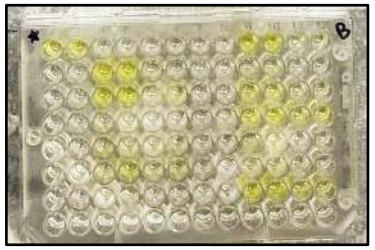
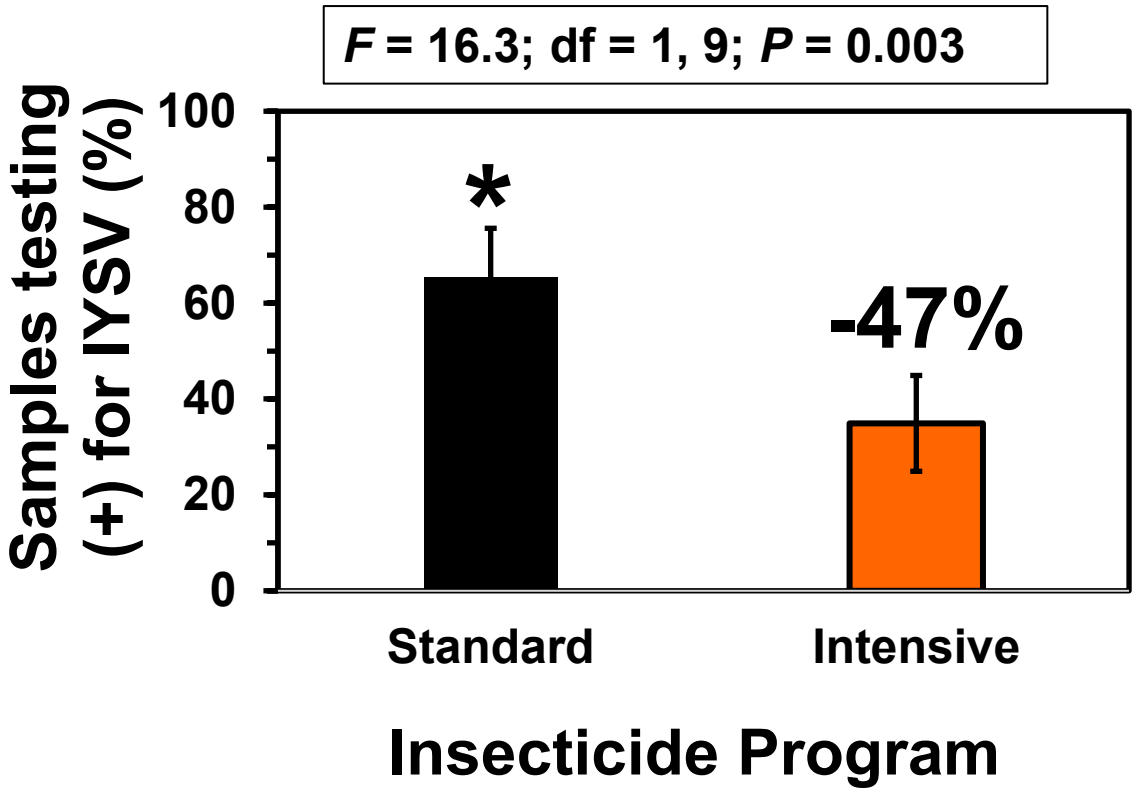
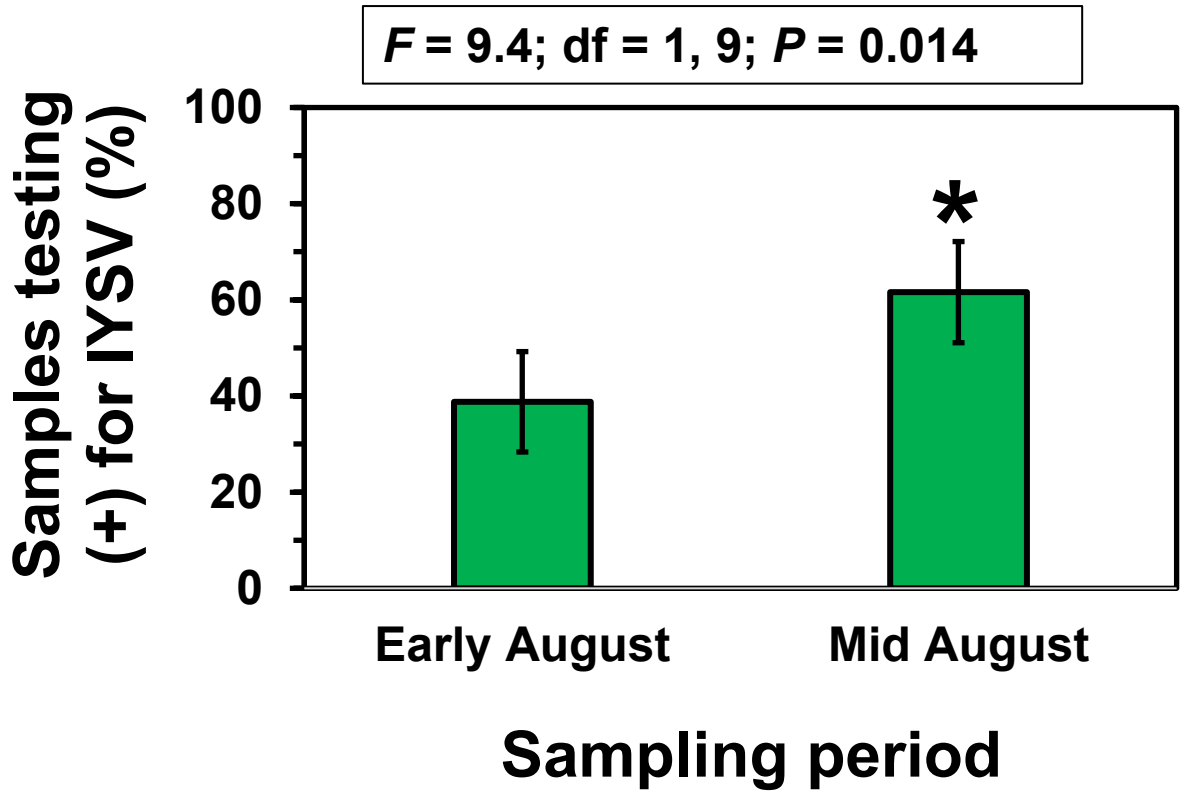


Rotenberg et al. 2015

Impact of insecticide program on samples testing (+) for IYSV







- All data analyzed using generalized linear mixed models in SAS (GLIMMIX)
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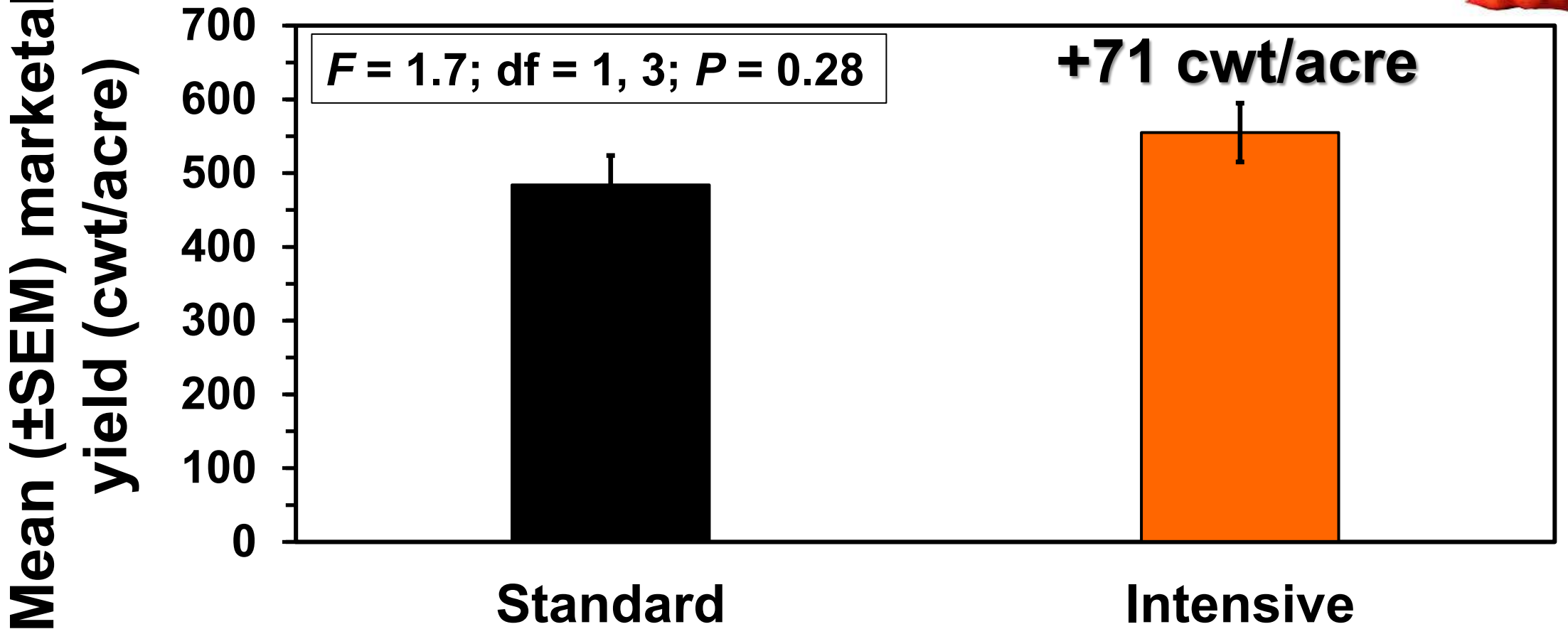
Impact of insecticide program on marketable bulb yield



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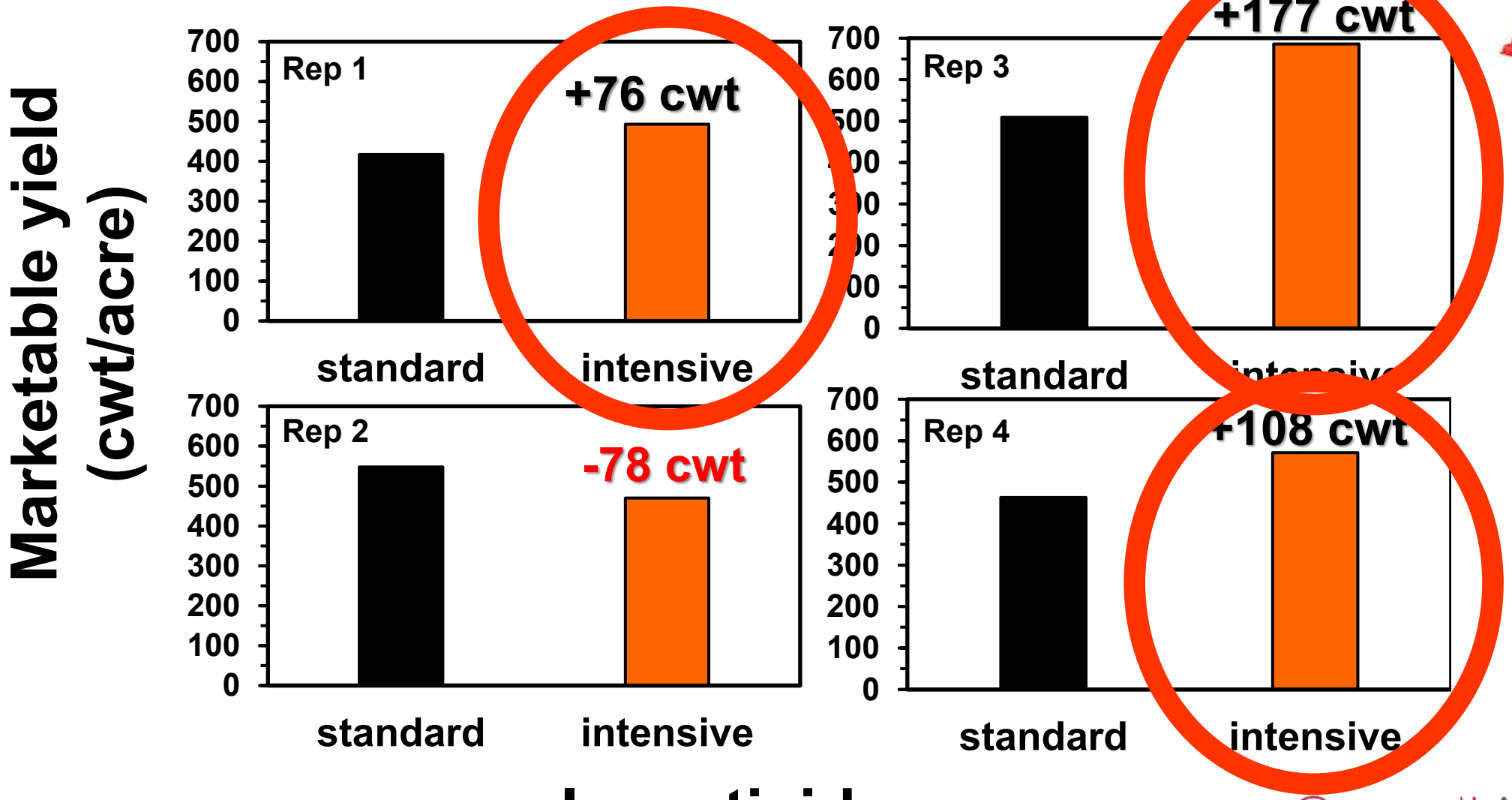

Komondy et al. (unpublished)

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Economics

Expense	Lannate LV	Surfactant LI-700	Application cost	No. of sprays	Total cost
Supplemental insecticide applications	$23.34/ acre	$1.60/ acre	$15/ acre	5	$200/ acre

Income	Mean value of cwt bag	Mean no. of additional cwt bags per acre	Total value
Increased yield	$25.34	71	$1,800/ acre

Economics

Net profit = income – expense

Net profit = $1,800 - $200

$1,600/ acre

Conclusions

- An intensive insecticide program can reduce IYSV incidence and increase marketable bulb yield
- Cost of additional insecticide applications in intensive program will be offset by much greater profits from higher yields

Future Directions

- An insecticide other than methomyl (Lannate LV) should be considered for an intensive program

  - Aza-Direct + M-Pede?

  - Radiant SC + Assail 70WP + Warrior II w/zeon tech?

Future Directions

Treatment	Week 1	2	3	4	5	6	7	8
Untreated	-	-	-	-	-	-	-	-
Standard	-	Movento	Movento	-	Vertento	Vertento	Exirel	Exirel
Intensive 1	**Lannate**	Movento + **Lannate**	Movento + **Lannate**	**Lannate**	Vertento	Vertento	Exirel	Exirel
Intensive 2	**Aza-Direct+ M-Pede**	Movento + **Aza-Direct+ M-Pede**	Movento + **Aza-direct+ M-Pede**	**Aza-Direct+ M-Pede**	Vertento	Vertento	Exirel	Exirel
Intensive 3	**Radiant + Assail + Warrior**	Movento + **Radiant + Assail + Warrior**	Movento + **Radiant + Assail + Warrior**	**Radiant + Assail + Warrior**	Vertento	Vertento	Exirel	Exirel

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