Thrips Management in Onions

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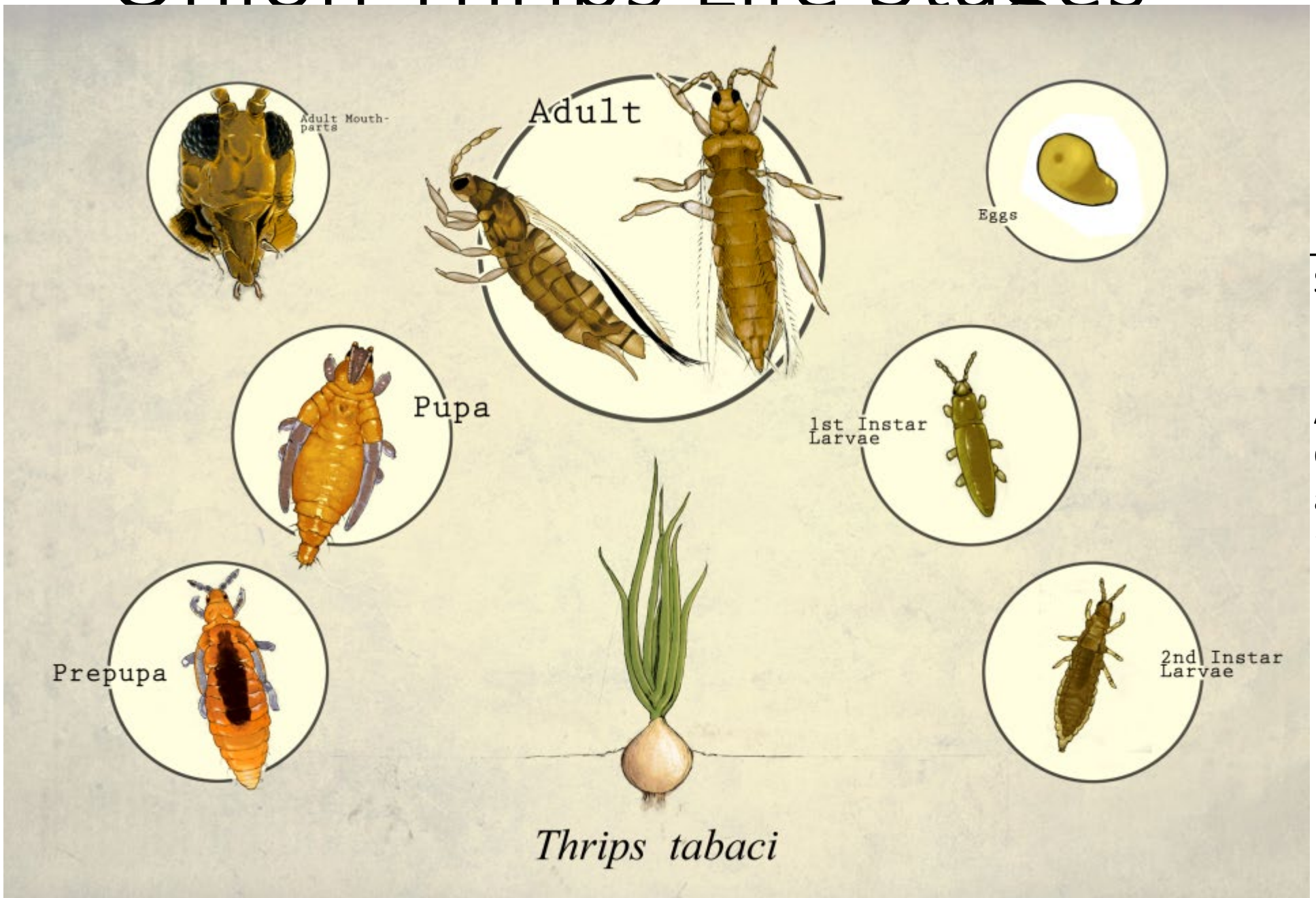
PNVA Onion Session 2025

Wednesday November 19

3:45 PM 30 Minutes

PUBLIC ENEMY NUMBER ONE

Onion Thrips Life Stages



Implications for control

Susceptible Stages

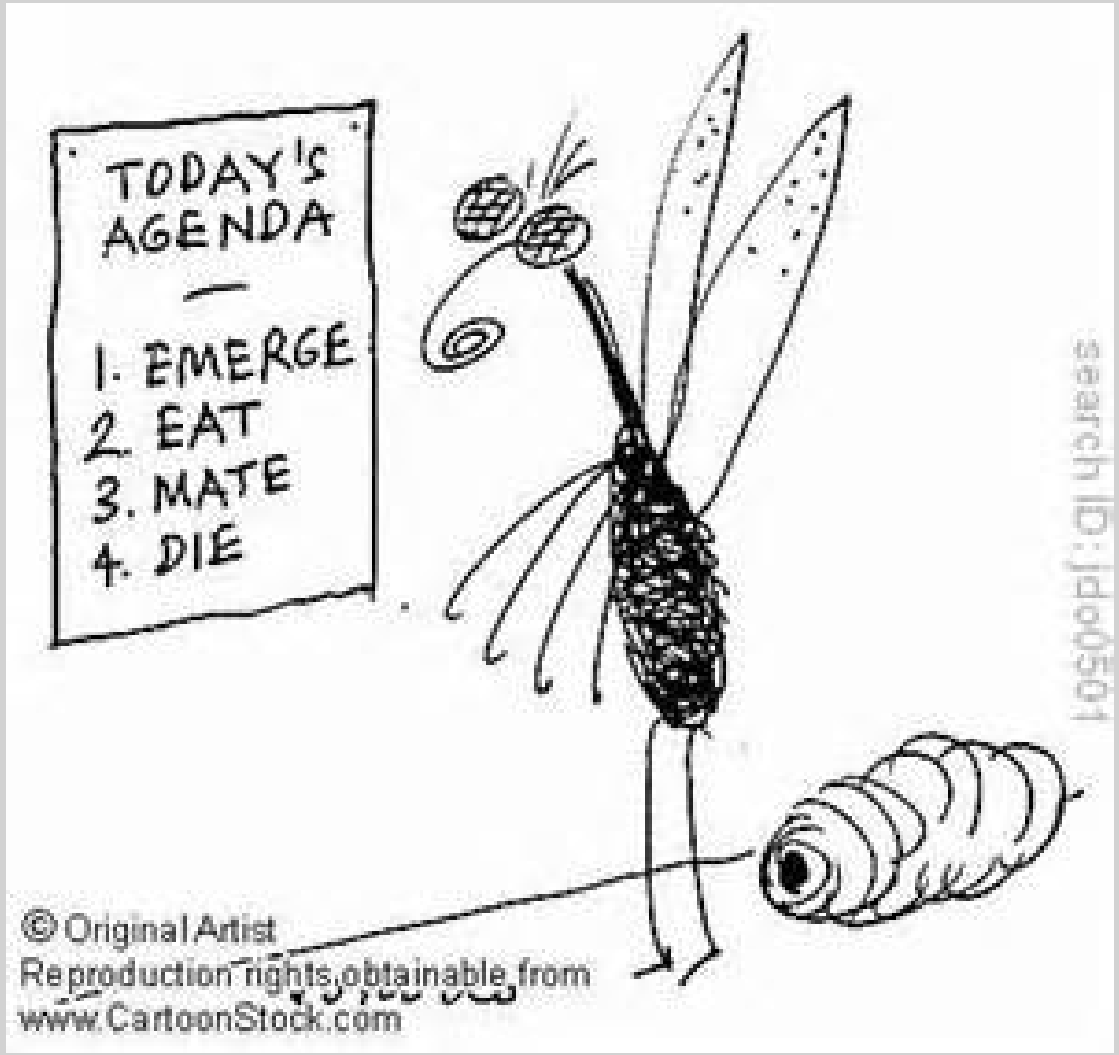
Remember juveniles tend to be more damaging

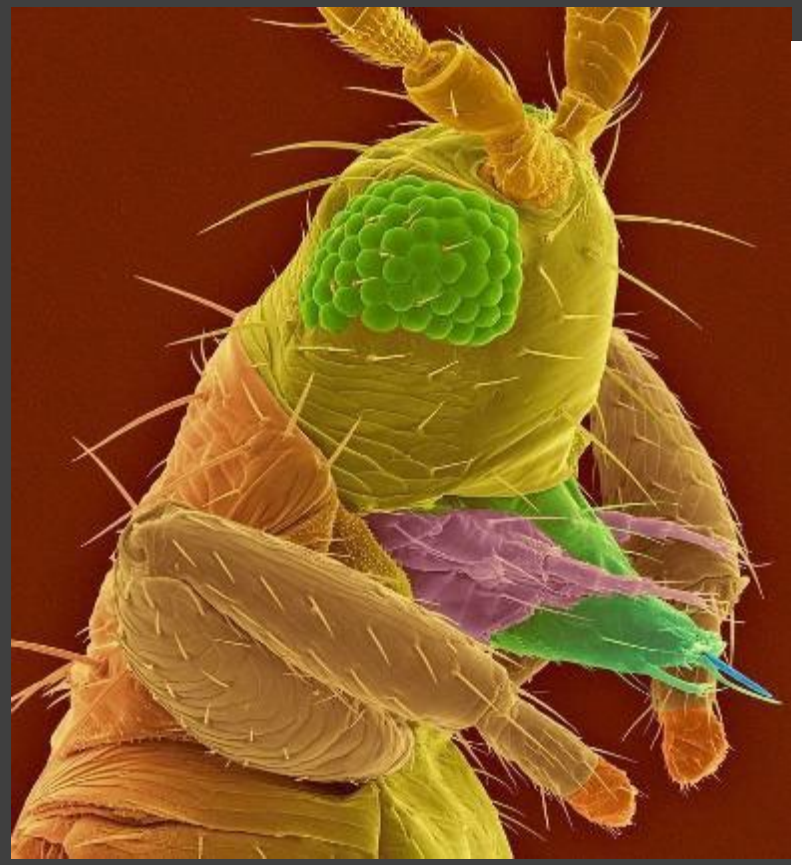
Asynchronous generations

Consider Multiple applications in event of a ‘runaway’ population

Thrips Biology

- Sucking asymmetrical mouthparts (punch and suck)
- Mobility- low (juvenile) and high (adults)
- Damage from feeding, egg laying, virus transmission, and spread bacterial pathogens
- Can also feed on mite eggs, small arthropods and pollen
- Extremely high reproductive potential
- Thrips

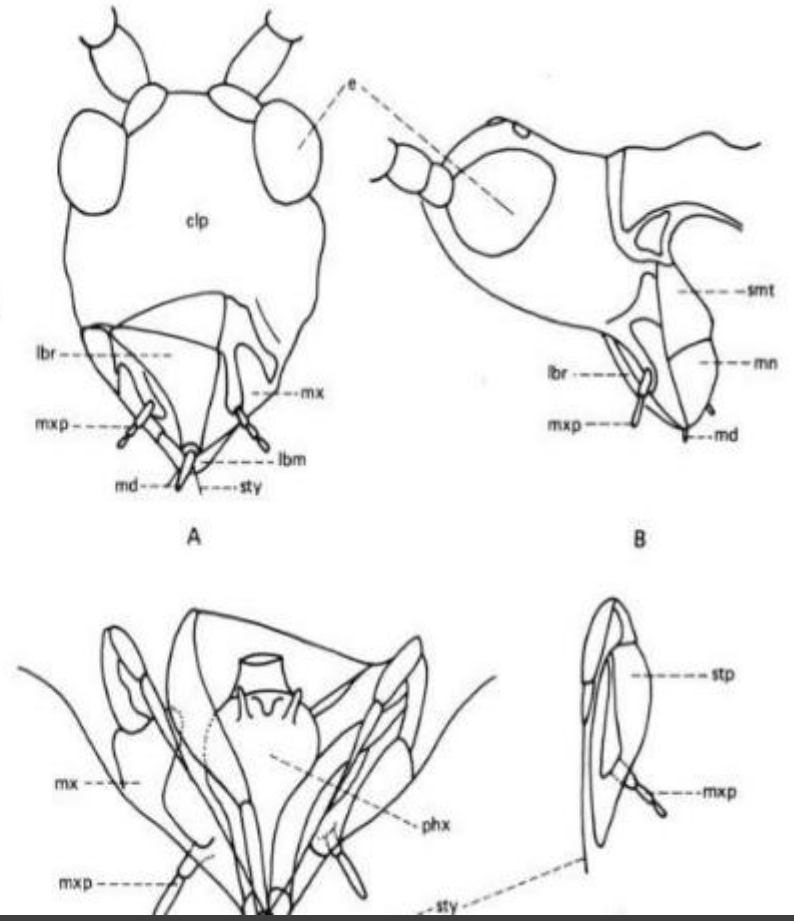




[mouthpart-modification-l.jpg (1024×768) (slideserve.com)]

Mouthpart modification

- Labrum forms front of proboscis
- Basal portion of maxillae form the sides
- Labium forms the rear
- Only one mandible (the left one; right mandible vestigial)
- “punch and suck” mouthparts



Onion Thrips Survival, Fecundity and Generation Times (Days) at Various Temperatures

Modified from Murai 2000

Factor	68 F	77 F	86 F
Survival (Days)	47	25	13
Eggs/Female	210	165	63
Generation time (Days)	48	30	17

Onion Thrips Population Growth

	Number of Females		
Date	**68^0 F**	**77^0 F**	**86^0 F**
July 1	**1**	**1**	**1**
July 8			
July 15			**63**
July 22			
July 29		**165**	**3,969**
August 5			
August 12			**250,047**
August 19	**210**		
August 26			**15,752,961**
September 2		**27,225**	
Number generations	**1**	**2**	**4**

Slide courtesy B. Nault, Cornell

- Thrips are the key pest of onions in most production regions
- They reduce plant productivity (yield losses as high as 40%)
- Can Vector IYSV
- IYSV can reduce bulb crop yields and seed yields by lodging of scapes

Factors affecting thrips pressure

- Temperature
- Irrigation system
- Vigor
- Leaf/fruit color
- Plant structure
- Cultivar
- Nearby crops

Monitoring

- Sticky traps
- Visual inspection- many plants per field, multiple locations
  - Neck of onion
  - Larvae cause more damage than adults as they feed more
  - IYSV lesions

Thrips Damage

An 8 (80% Damage) compared to a 2 (20% or less damage)

Damage by Cultivar 2017 WSU OCT

Enza Zaden	Caoba	1
Crookham	Advantage	1.3
Crookham	Morpheus	2
Enza Zaden	E61L.10043	2.3
Crookham	Scout	2.3
Bayer	Ranchero	2.3
American Takii	Grand Perfection	2.3
Sakata	Dulce Reina	2.3
Sakata	Aruba	2.4
Seminis	XP 07716000	2.6
Sakata	Lasso	2.6
Crookham	Brundage	2.6
Bejo	Calibra	2.6
Bayer	Granero	2.6
Seminis	Tucannon	2.9
Bejo	Legend	2.9
Bayer	Vaquero	2.9
Seminis	SV4058NU	3
Bayer	Oloroso	3
Bayer	Anillo	3
Seminis	SV6672NW	3.2
Hazera	Rhino	3.2
Bejo	Hamilton	3.2
Bejo	Crockett	3.2
Crookham	White Cloud	3.3
Bayer	Arcero	3.3
Seminis	Sw ale	3.6
Crookham	OLYX08-640	3.9
Bejo	Red Carpet	3.9
Bejo	Mondella	3.9
Bejo	Daw son	3.9
American Takii	Centerstone	4.6
Bayer	Montero	4.9
Bayer	Airoso	4.9
Seminis	Red Nugent	5.2
Crookham	Red Devil	5.2
Seminis	SV4643NT	5.3
Hazera	Cruiser	5.3
Enza Zaden	Monastrell	5.6
Crookham	Red Beret	5.6
Crookham	Purple Haze	5.6
Bejo	Tamara	5.6
Bejo	Talon	5.6
American Takii	Milestone	5.6
Enza Zaden	E61L.10058	6.1
American Takii	Ridge Line	6.2
American Takii	Traverse	6.3
American Takii	Frontier	7.3
Hazera	Ceresco	7.7
American Takii	Trekker	7.7
American Takii	Highlander	9

Onion cvs. were visually inspected for thrips damage and rated on a scale of 0 to 10, with 0 indicating no damage and 10 denoting complete foliar destruction.

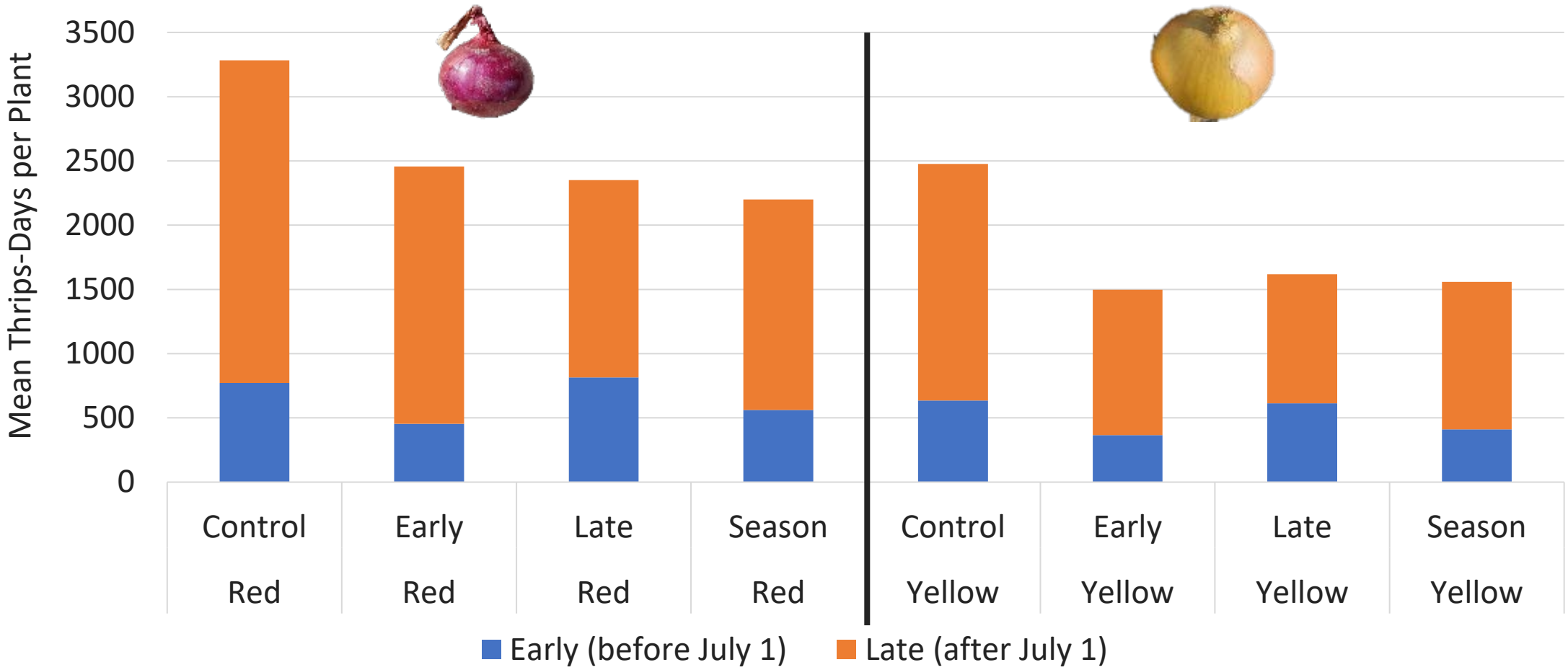
Seasonal Timing of Applications

- Full Season
  - Weekly after threshold
  - (1 per leaf – 4 per plant @ 4 leaf)
  - 8 applications (June 3 – July 22)
- Early Season
  - Weekly after threshold to bulb initiation
  - 4 applications (June 3 – June 24)
- Late Season
  - Weekly after bulb initiation
  - 4 applications (July 1 – July 22)
- Red & Yellow
  - SV4643NT & Vaquero

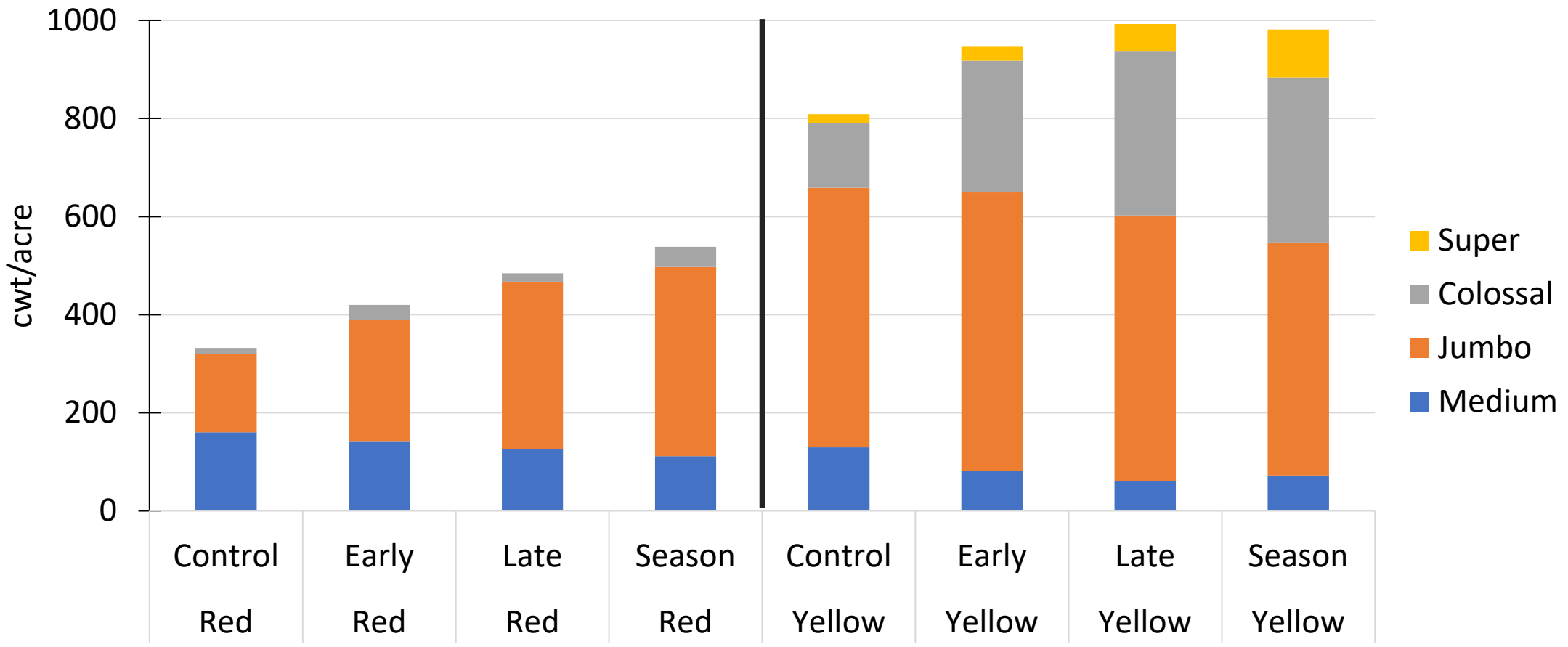
Treatment Programs

Program	3-June	10-June	17-June	24-Jun	1-July	8-July	15-July	22-July
Full Season	Movento + Azadirect	Movento + Azadirect	Agrimek	Agrimek	Exirel	Exirel	Radiant	Radiant
Early Season	Movento + Azadirect	Movento + Azadirect	Agrimek	Agrimek	--	--	--	--
Late Season	--	--	--	--	Movento + Azadirect	Movento + Azadirect	Radiant	Radiant
Untreated	--	--	--	--	--	--	--	--

Red Yellow Timing Trial
Cumulative Thrips



Red Yellow Timing Trial
Marketable Yield



- Reds more thrips than yellows
- Applications when thrips populations peak (July) are critical
- Late season applications increase yield and size profile
- Don’t end thrips program too early

Tank Mix Treatments

- Lannate
- Agrimek
- Radiant

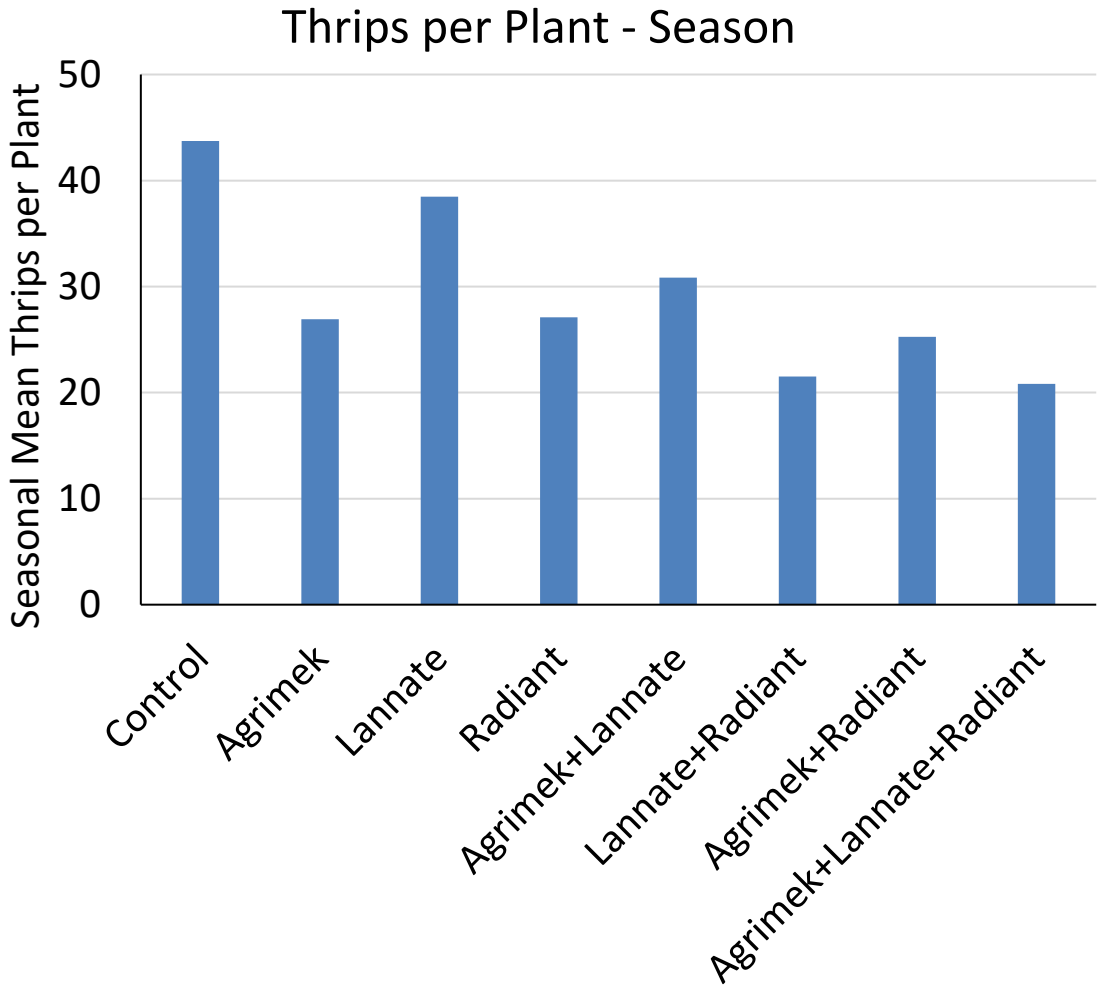
- Lannate + Agrimek
- Lannate + Radiant
- Radiant + Agrimek

- Agrimek + Lannate + Radiant

- Full season (8 weekly applications)
- Don’t do this at home!!!

Tank Mix Trial

- Over season, Lannate no better than control*
- Agrimek and Radiant best individual treatments
- Agrimek + Lannate worse than Agrimek alone
- Agrimek + Radiant no better than individuals
- Agrimek + Lannate + Radiant no better than Agrimek + Radiant



Tank Mixing Insecticides?

- Tank mixing does not increase residual activity
- Shorter spray intervals

- Tank mixing reduces options over the season

- Increases insecticide resistance pressure

- Is the increased cost worthwhile?

Conventional Thrips Control

- Products Tested
  - Movento
  - Agrimek
  - Lannate
  - Radiant
  - Exirel
  - MinectoPro
  - Warrior
  - Torac
  - Beleaf
  - Plinazolin

Methods-Insecticide Efficacy

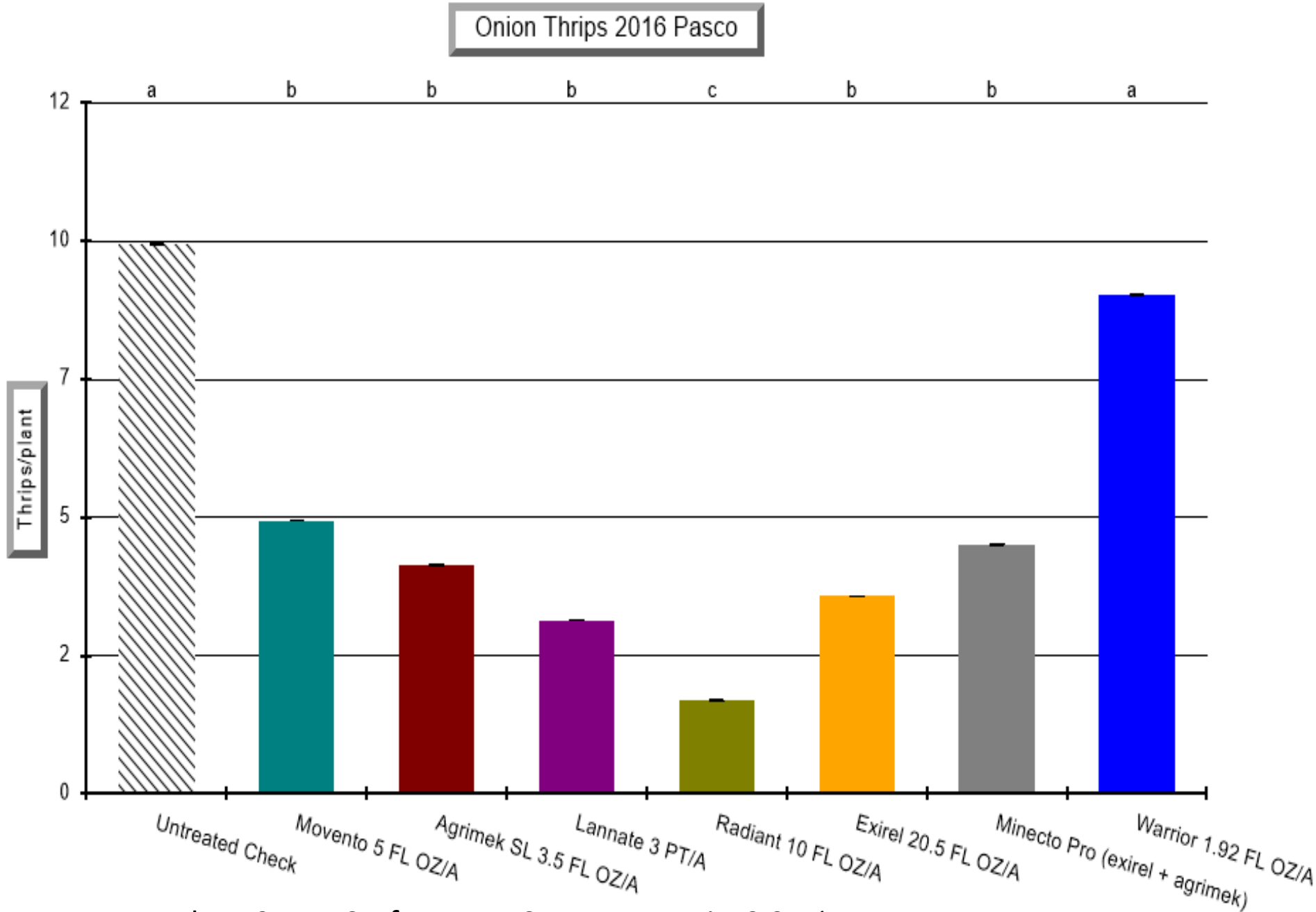
- Location: Pasco, WA
- 4 replications RCBD

- Plots typically reach treatment threshold toward the end of June (3-4 leaf onions)
- 10 plants counted per plot (7.5 x 30 feet)
- Yield and grade assessed on 5 foot of bed at crop maturity

Foliar Applications

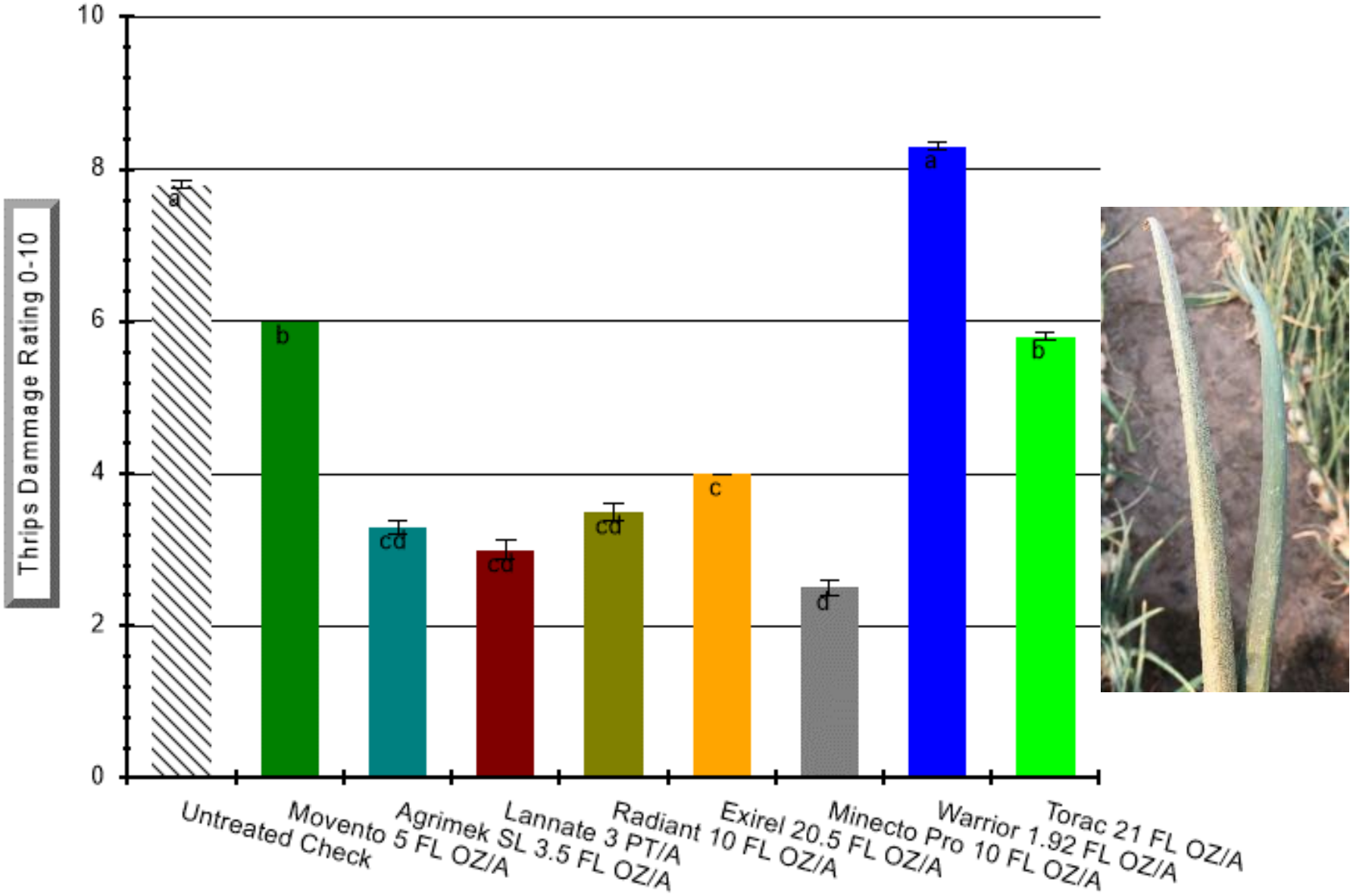
30 GPA 25 PSI

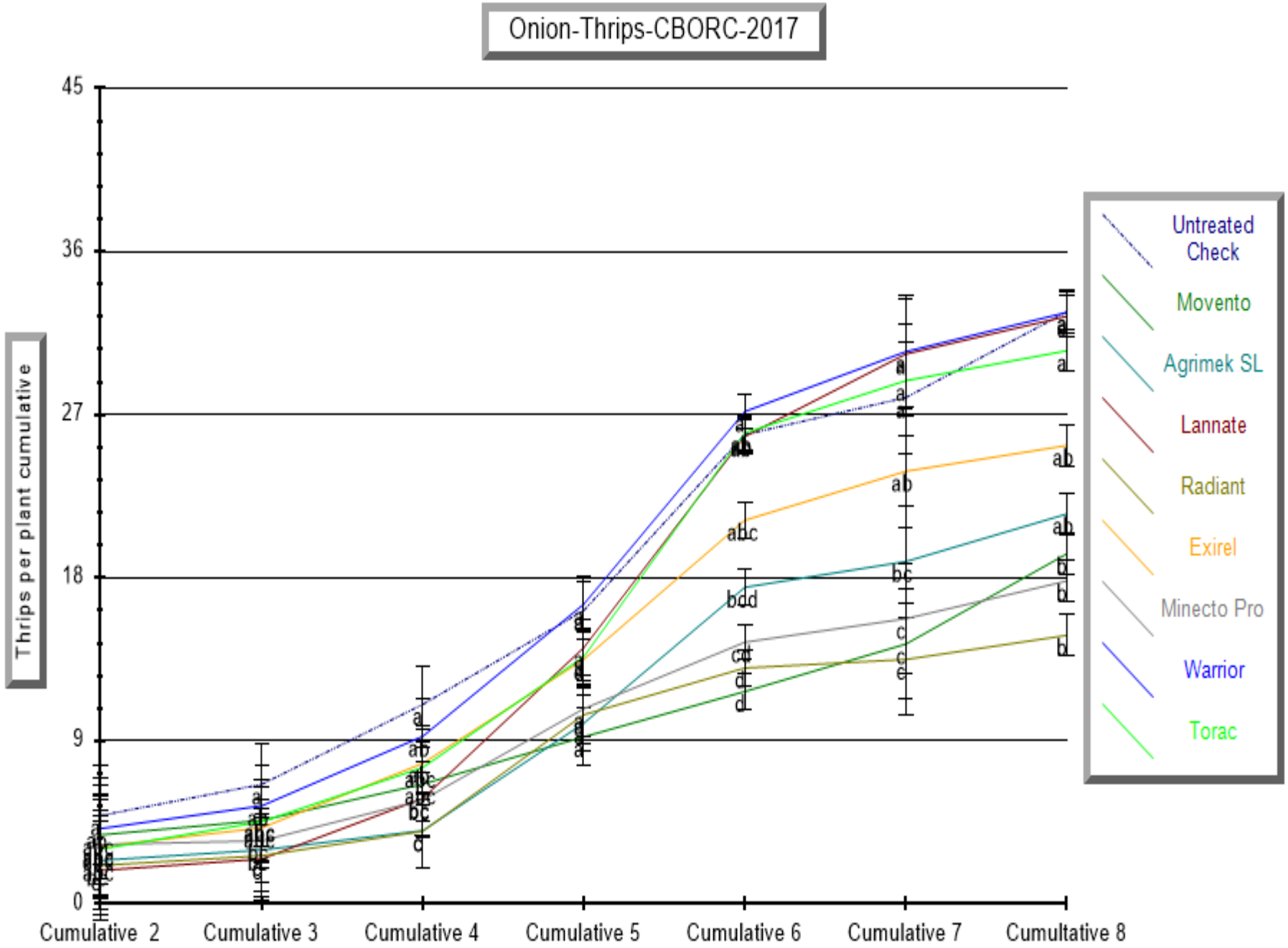
Surfactant 0.25 %

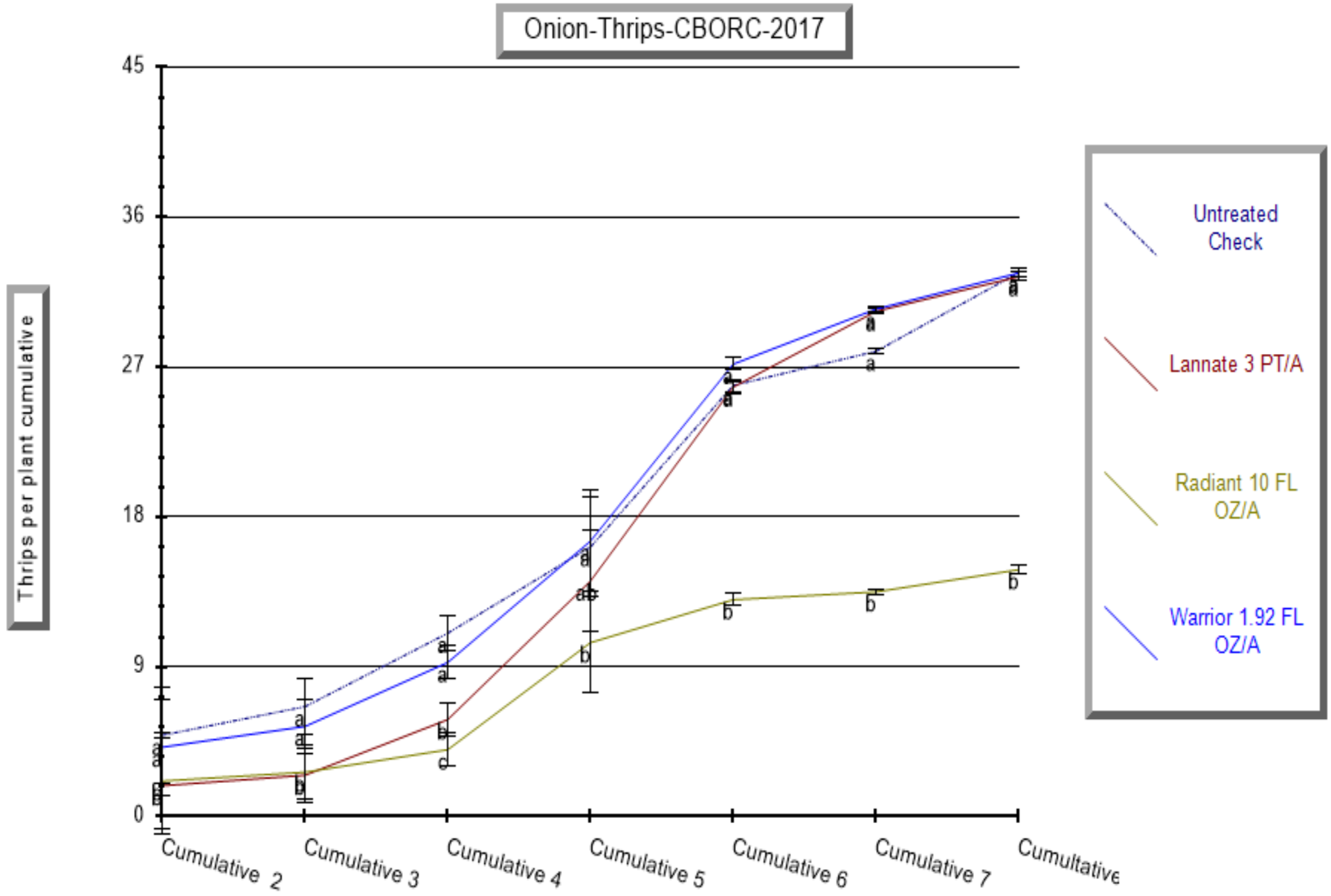


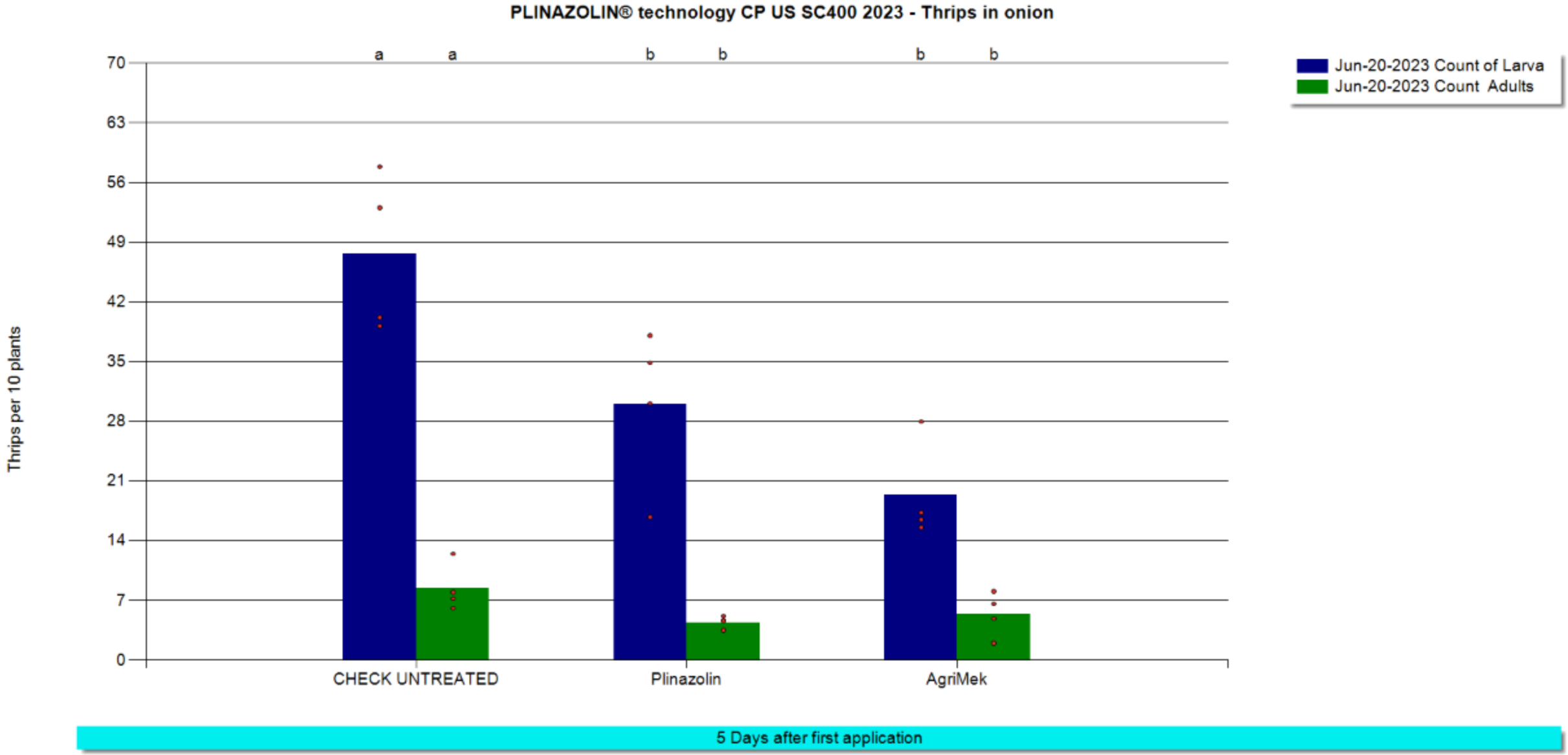
July 7, 9 DAT, Surfactant NIS or Dyne-Amic 0.25%

Onion-Thrips-CBORC-2017




Onion-Thrips-CBORC-2017
Thrips per plant cumulative
45
36
27
18
9
0
Cumulative 2
Cumulative 3
Cumulative 4
Cumulative 5
Cumulative 6
Cumulative 7
Cumultative 8
Untreated Check
Movento
Agrimek SL
Lannate
Radiant
Exirel
Minecto Pro
Warrior
Torac

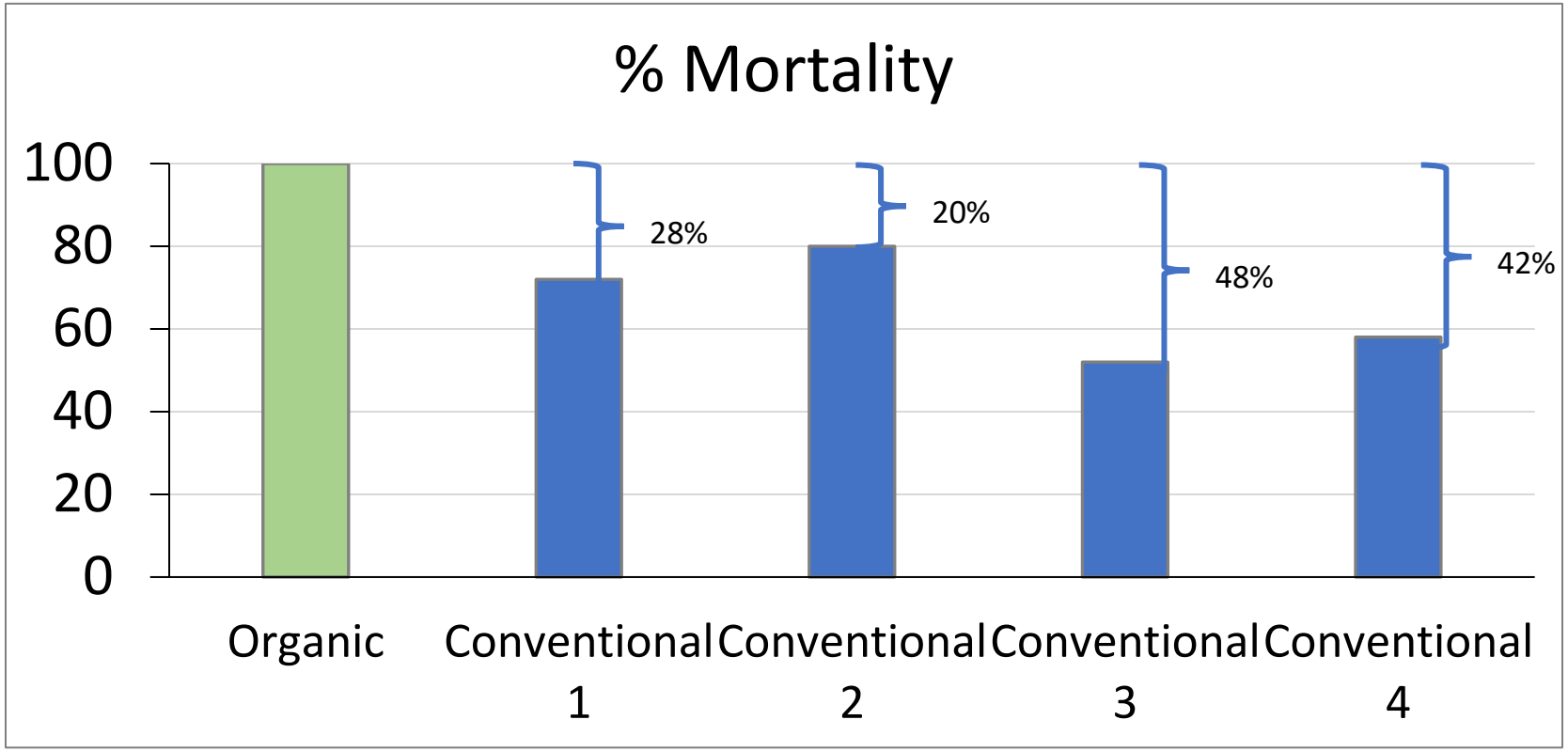

Onion-Thrips-CBORC-2017
Thrips per plant cumulative
45
36
27
18
9
0
Cumulative 2
Cumulative 3
Cumulative 4
Cumulative 5
Cumulative 6
Cumulative 7
Cumultative
Untreated Check
Lannate 3 PT/A
Radiant 10 FL OZ/A
Warrior 1.92 FL OZ/A


PLINAZOLIN® technology CP US SC400 2023 - Thrips in onion
a
a
b
b
b
b
70
63
56
49
42
35
28
21
14
7
0
Thrips per 10 plants
Jun-20-2023 Count of Larva
Jun-20-2023 Count Adults
CHECK UNTREATED
Plinazolin
AgriMek
5 Days after first application

Insecticide Resistance

- *r*-selected Life History
  - Each female has many offspring
- Parthenogenesis (virgin birth)
  - Rapid fixation of resistance alleles
- Polyphagous
  - Multiple metabolic detoxification pathways
  - As a pest of many crops, it is under constant insecticide pressure

Percent mortality at labeled field rate of methomyl



Values on top represent % reduction in the efficacy of methomyl at the labeled field rate

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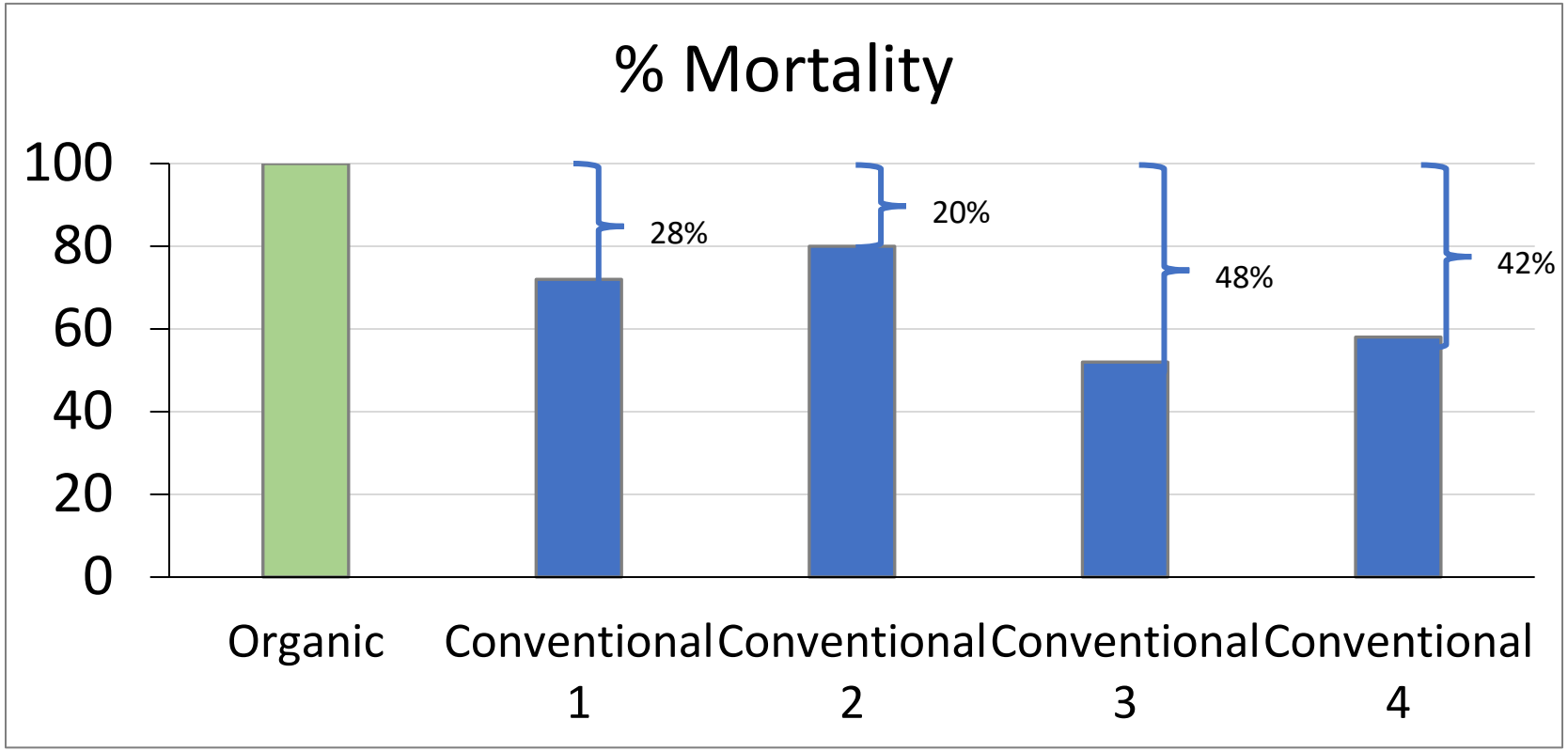


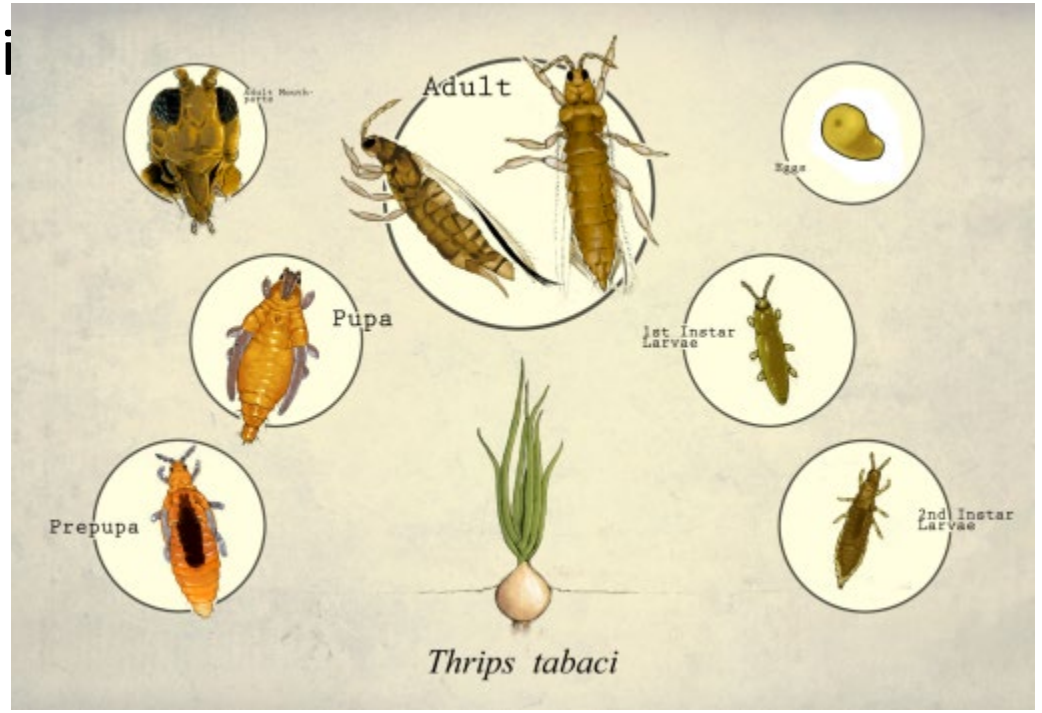
Values on top represent % reduction in the efficacy of methomyl at the labeled field rate

Take Home

- Radiant (5)- Good early and late season choice. Expensive
- Lannate (1A)- Best used later in season. (resistance concerns)
- Vydate (1A)-Nematicide with some thrips activity. Use as a nematicide not insecticide
- Movento (23)-Good early season choice, slow acting (MSO)-Expensive
- AgriMek (6)-Good early or late season choice. Inexpensive.
- Exirel/Verimark (cyazypyr)(28)-good activity, early or late season-Expensive.
- Minecto Pro (AgriMek + Exirel ai)- Numerically better than the two actives alone, good if pressure is high
- AzaDirect-Can provide benefit as additive with some ins.
- ~~Pyrethroids (3A)-not effective in most areas.~~
- Torac(tolfenpyrad) (21A) -good activity, late season choice, Mid-price
- Vertento (Plinazolin) (30) New mode of action for thrips. Middle of road for conventional products. Can be water run.

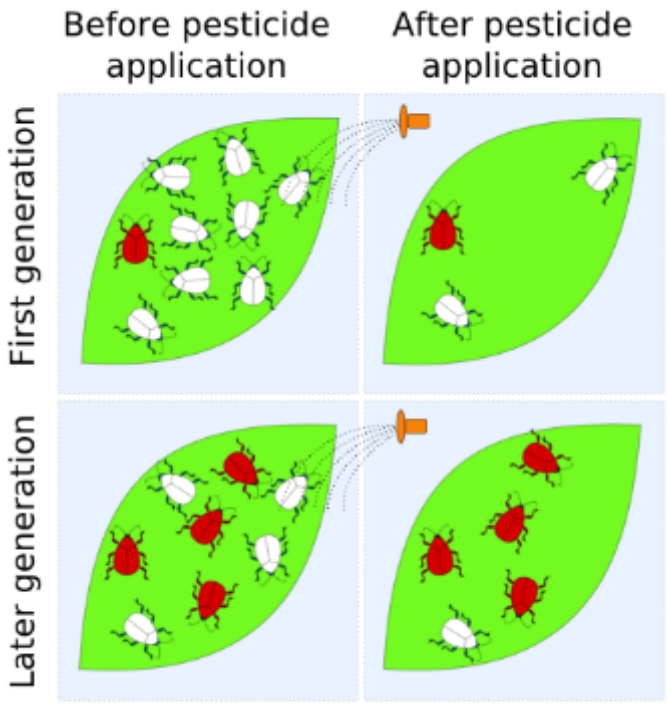
Things to consider

- Effective insecticides can preserve plant health and yield
- Use good surfactants (NIS or MSO)
- Scout fields often, begin applications before thrips populations are on quick incline
- Buffer spray solution when recommended by label
- Factors affecting thri
  - Temperature
  - Irrigation system
  - Onion vigor
  - Leaf color
  - Plant structure
  - Cultivar
  - Nearby crops



Resistance Management

- Rotate Chemistries w/Different modes of Action.
- We have 6
- Know IRAC Codes
  - Insecticide Resistance Action Committee
- Many Factors make thrips likely to develop resistance
- Identification of Knockdown Resistance Mutations in Onion Thrips M. Wu, H. Gotoh, T. Waters, D. Walsh, & L Corley Lavine



Disclaimer

- Not all compounds tested are currently registered for use on onions
- Do not use unregistered compounds
- Consult your local Extension office and read and follow label directions.
- Oregon and Washington labels (PICOL):

  http://cru66.cahe.wsu.edu/LabelTolerance.html

Acknowledgements

- Crew
- Collaborators
- Funding
  - WSCPR, CBORC, Dow, DuPont, Syngenta, Gowan, and Nichino
  - Two Rivers Terminal, Keithly Williams Seed

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Strategy going forward…

Do not use	Do not use Lannate more than 2x per growing season on each field
Apply	Apply back to back Lannate applications
Apply	Regionally apply Lannate
Use	Use more modes of action