



University of
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Amherst

Research Update Meeting 2009 - Insect Update

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Insect update

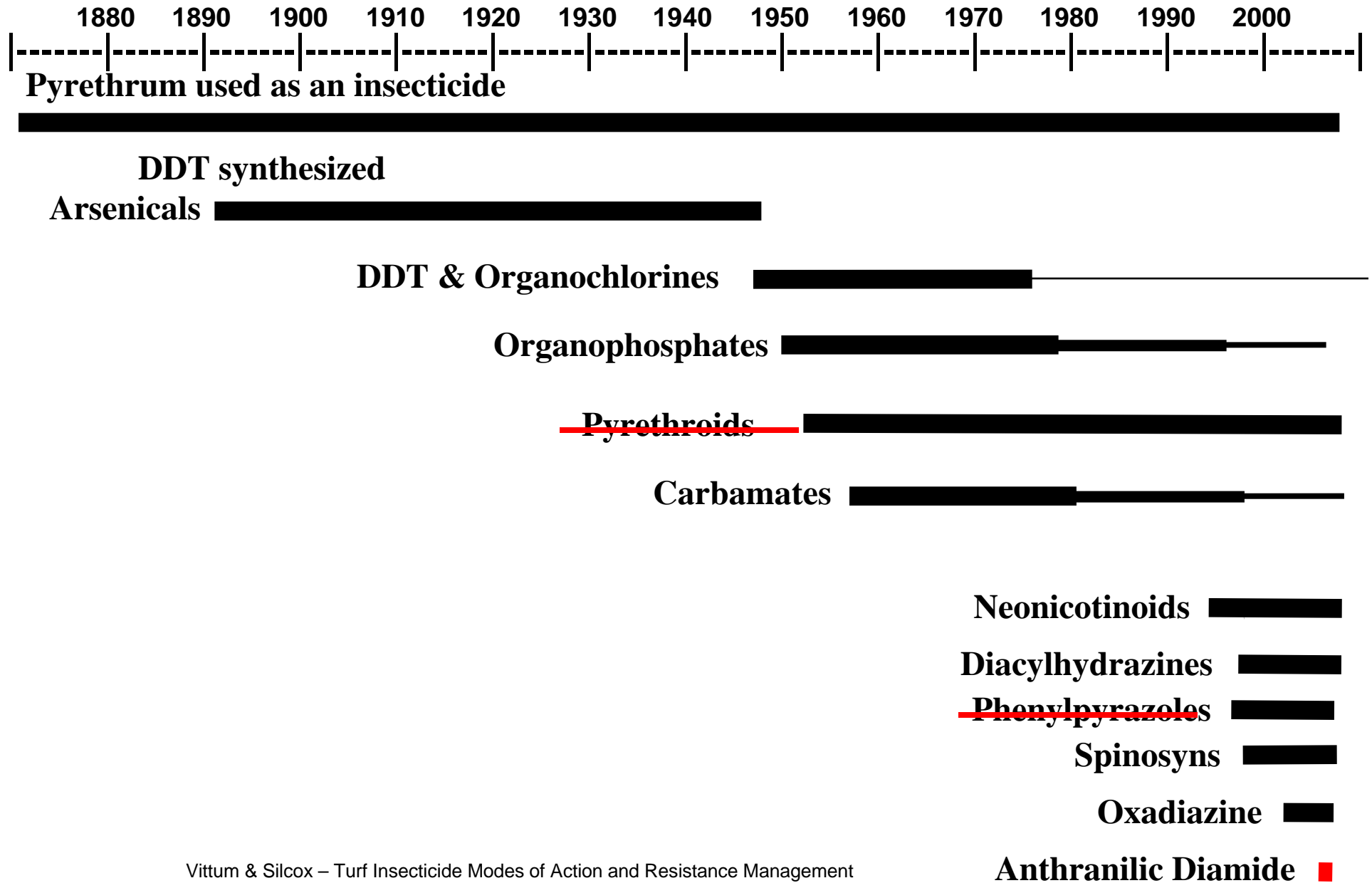
MA cranberry insect management

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University of Massachusetts

Outline

- New insecticide chemistries
- Screening trials
 - Cranberry fruitwor
- Fruitworm spray-timing issues for
 - Ben Lear, Stevens
- Status of honey bees and CCD

Insecticide Development History —cranberry view



Neonicotinoids

- Fairly new class of insecticides similar to nicotine
- Widely adopted
- “Systemic” --move into plant
- Often long residual

Neonicotinoids in cranberry

- Already labelled
 - Actara (thiamethoxam)
 - Admire (imidacloprid)
 - Assail (acetimidiprid)
- Neo 1
 - moving along, our work done, residue analysis ongoing. Likely Zone II restrictions
- Neo 2
 - registration pending
 - post-bloom application only

Molting hormone mimic--Intrepid

- Insects molt to grow
- Coordinated by hormones
- Intrepid interferes with process by mimicking action of molting hormone



Spinosyns

- **Delegate**—spinetoram
 - Derived from fermentation of soil bacterium
 - Longer residual than SpinTor

Anthranilic diamides

- Rytania (plant extract) has been used as an insecticide for about 50 years
- The extract contains several structurally-related compounds, including ryanodine
- Ryanodine causes paralysis in insects by sustained contraction of muscles
- targets the calcium channel
- Ryanodine activates the calcium release channel of the sarcoplasmic reticulum

Anthranilic diamides

- Three possibilities in cranberry
 - one moving through registration process
 - one stalled (indefinitely?)
 - one just started to move through registration process

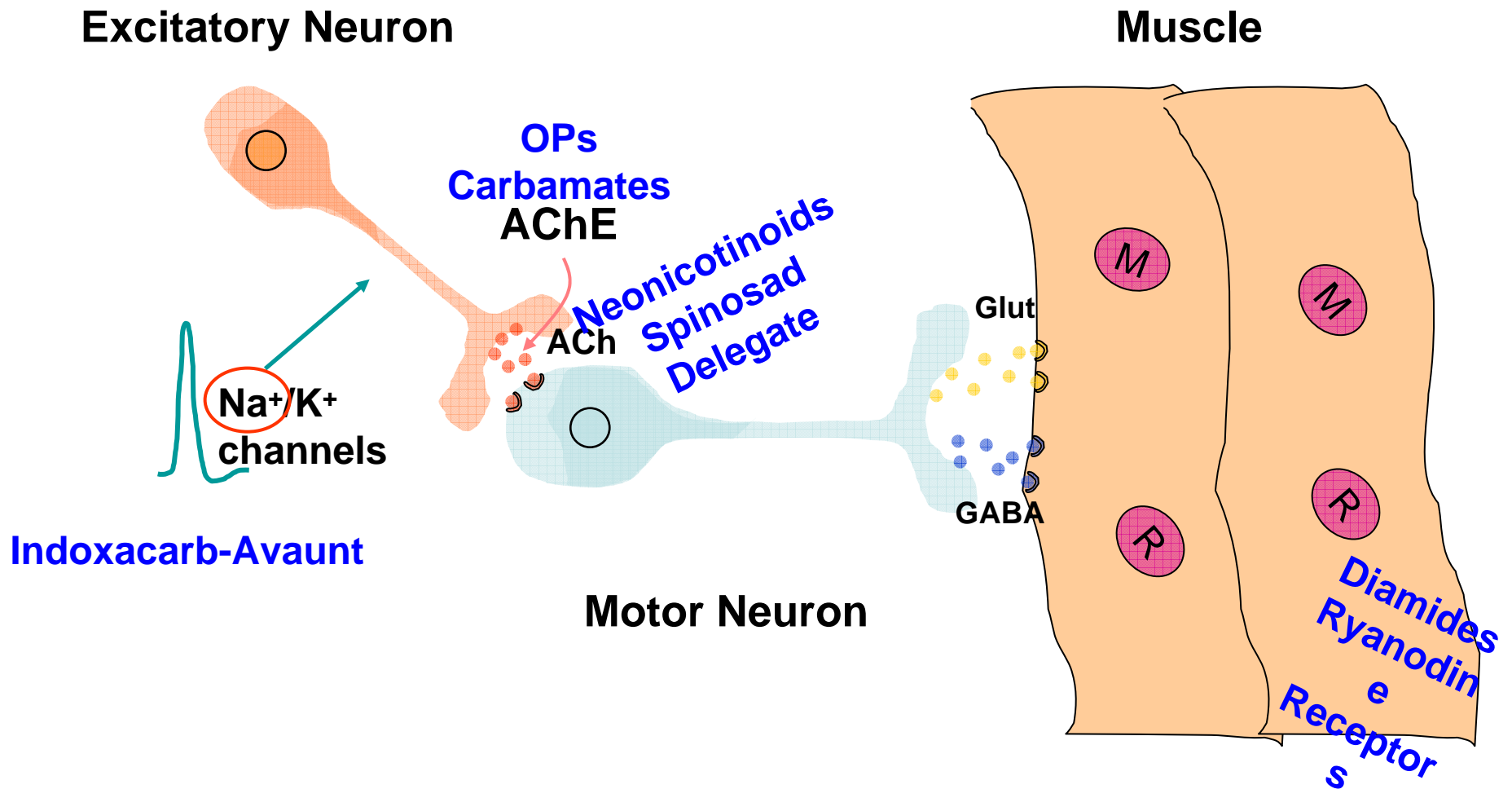
Overview, new compounds

- Some v. good options
- Usually reduced risk
 - Very low mammalian toxicity
 - Low ecotoxicity
 - Low application rate
 - Selectivity
- Often good residual, often systemic

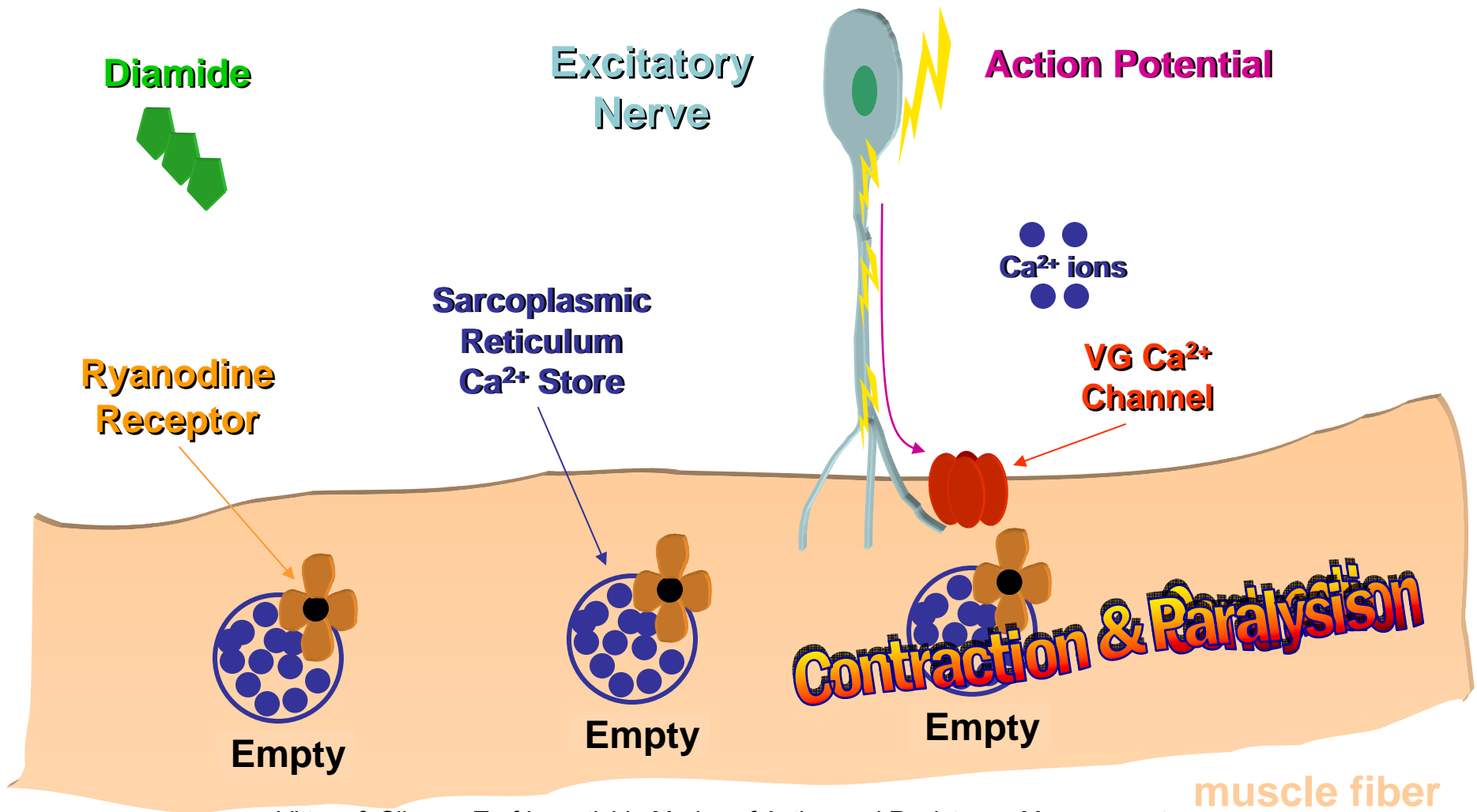
Overview

- Activity!
- Mode of action >> target site in pest
- Nerve/muscle systems targeted by most of the new compounds we're looking at:
 - Nervous
 - Neonicotinoids
 - Avaunt
 - Spinosyns (Delegate)
 - Muscular
 - Diamides (newer chemistry)

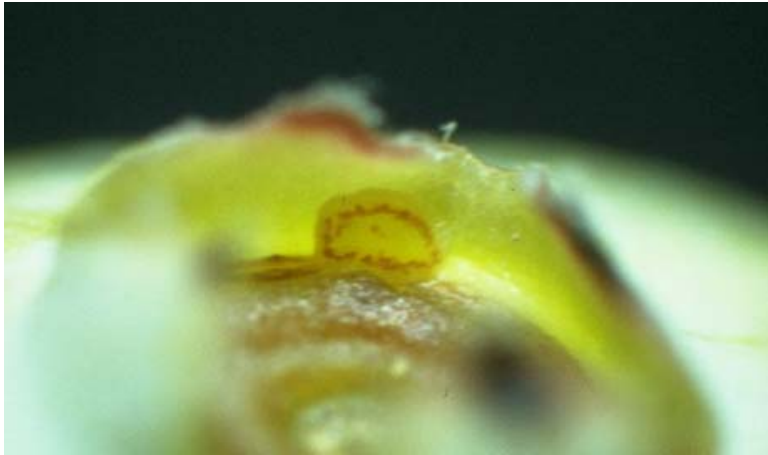
Insecticide Neuromuscular Targets



Anthranilic diamide----mode of action



1. Screening program:cranberry fruitworm and new insecticides



Worked at EB abandoned bed with mega-infestation of fruitworm



Field trial: methods

- 5 replicates/treatment
- 150 gal/A with CO₂ backpack sprayer
- Two applications
 - 7/10 and 7/19
- Fruit randomly sampled after second spray

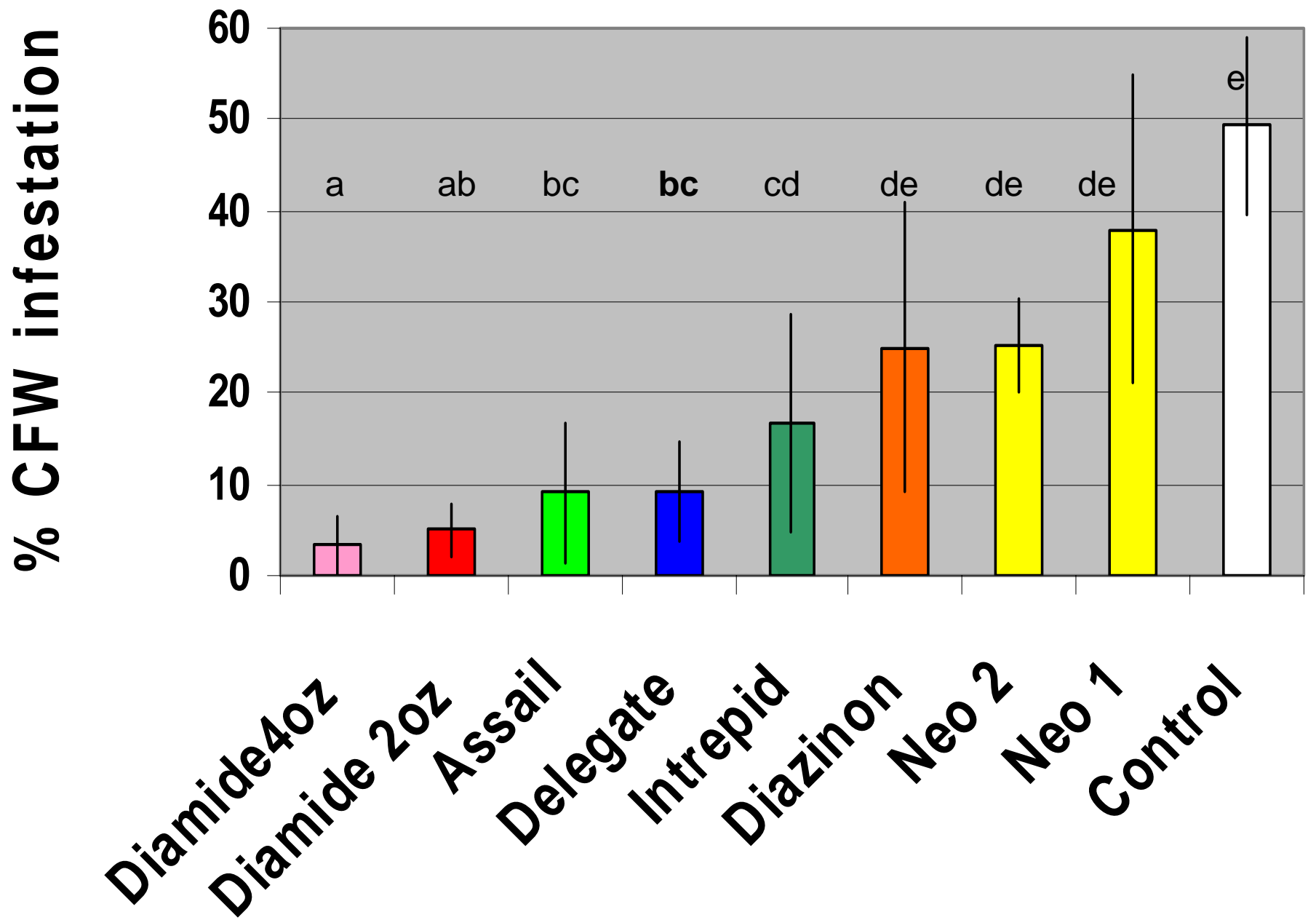


First spray: timing based on out-of-bloom counts
Second spray: 9 days later

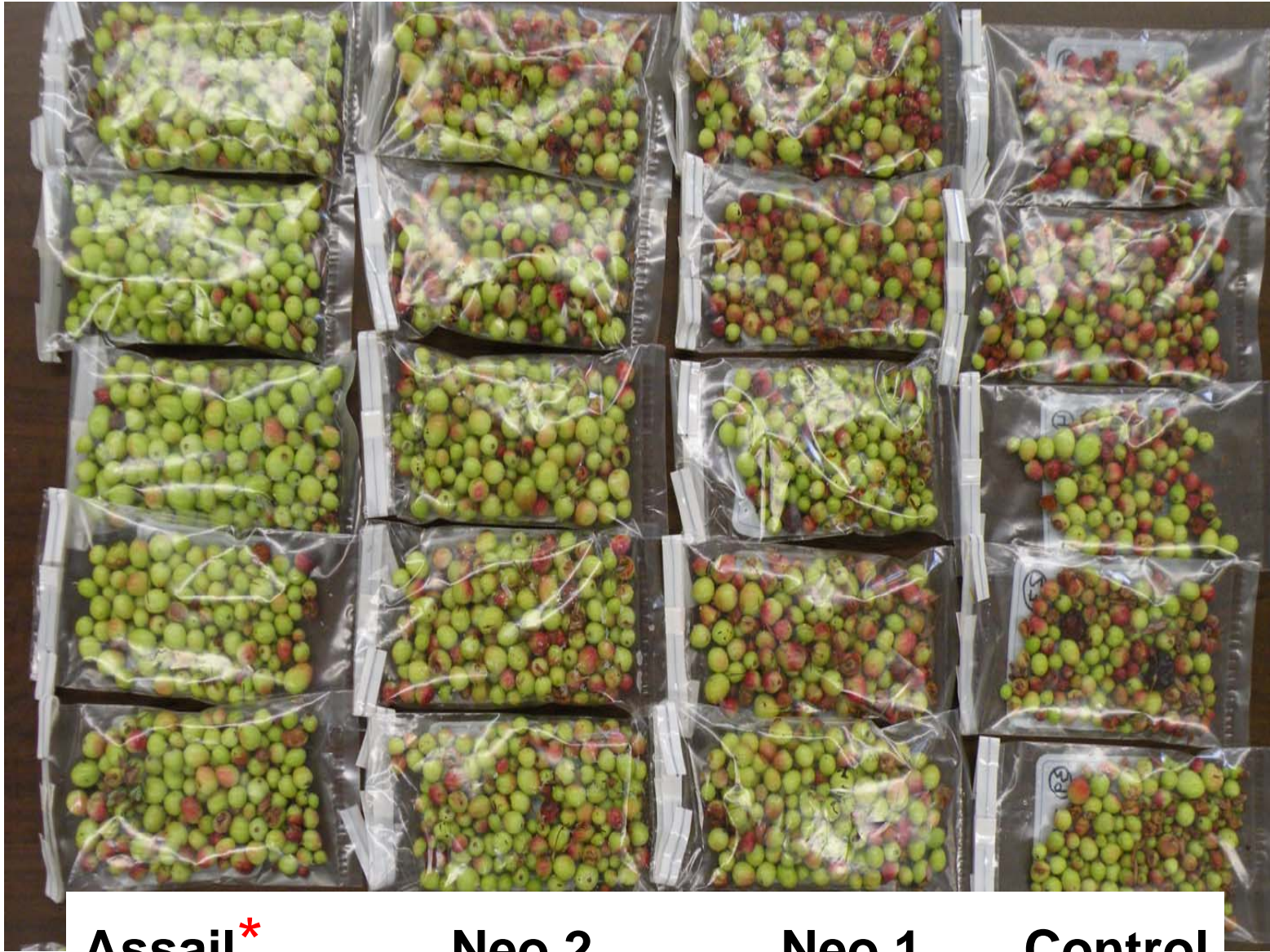


Treatments

- 3 neonicotinoids
 - **Assail, Neo 1, Neo 2**
- Molting hormone mimic
 - **Intrepid**
- 1 anthranilic diamide
 - 2 rates: **Diamide 2 oz** and **Diamide 4 oz**
- New spinosyn
 - **Delegate**
- Industry standard
 - **Diazinon**
- Control--untreated



Comparison of neonicotinoids



Assail*

Neo 2

Neo 1

Control



Delegate

**Diamide
4 oz**

Intrepid

**Diamide
2 oz**

Diazinon

6 DAT



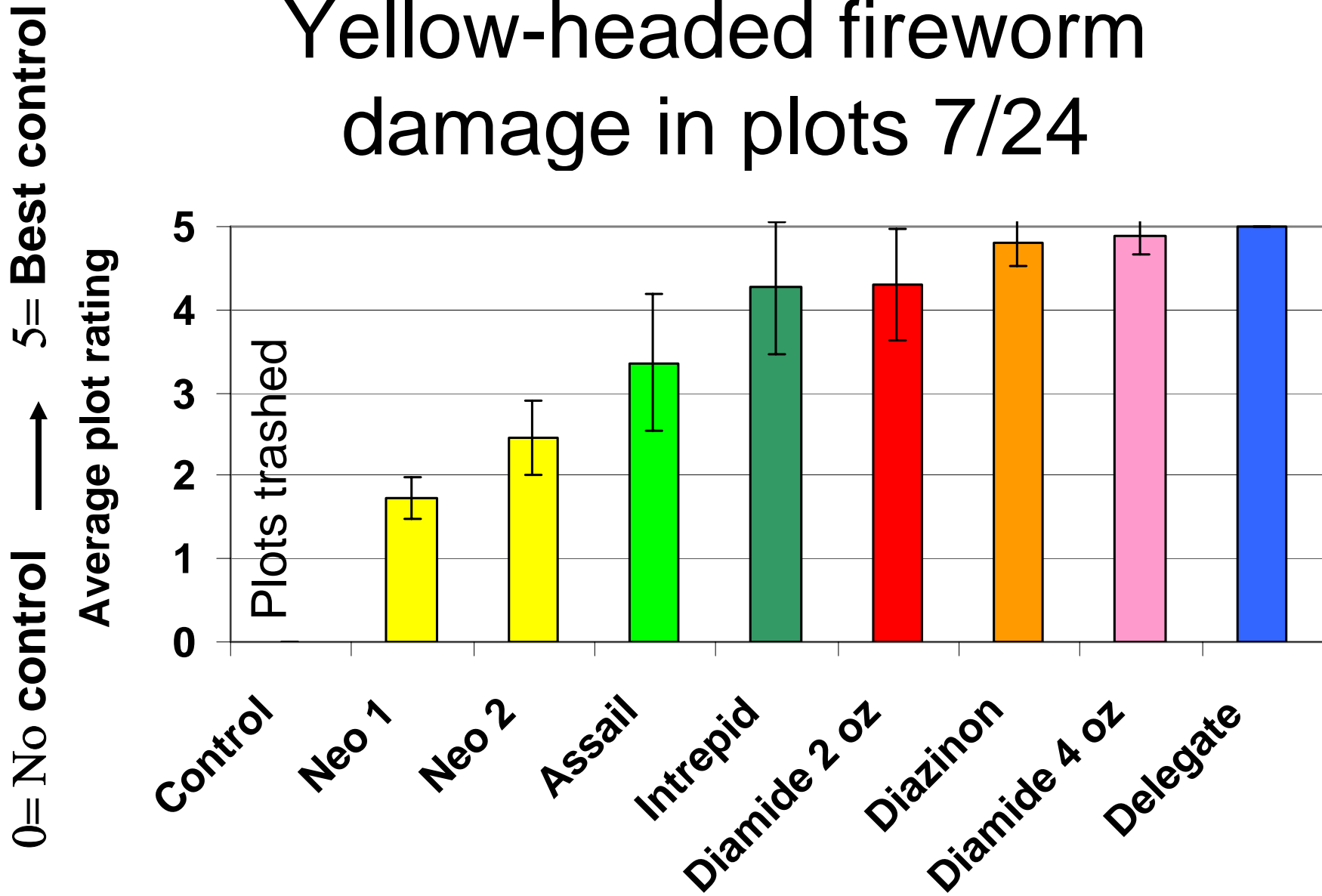
Yellow-headed fireworm raging on plots



Yellow headed fireworm damage

- Visual assessment of plots
- 6 days after second spray
- Rating system from 0 to 5
 - 0 = no control
 - 5 = good control

Yellow-headed fireworm damage in plots 7/24



Control



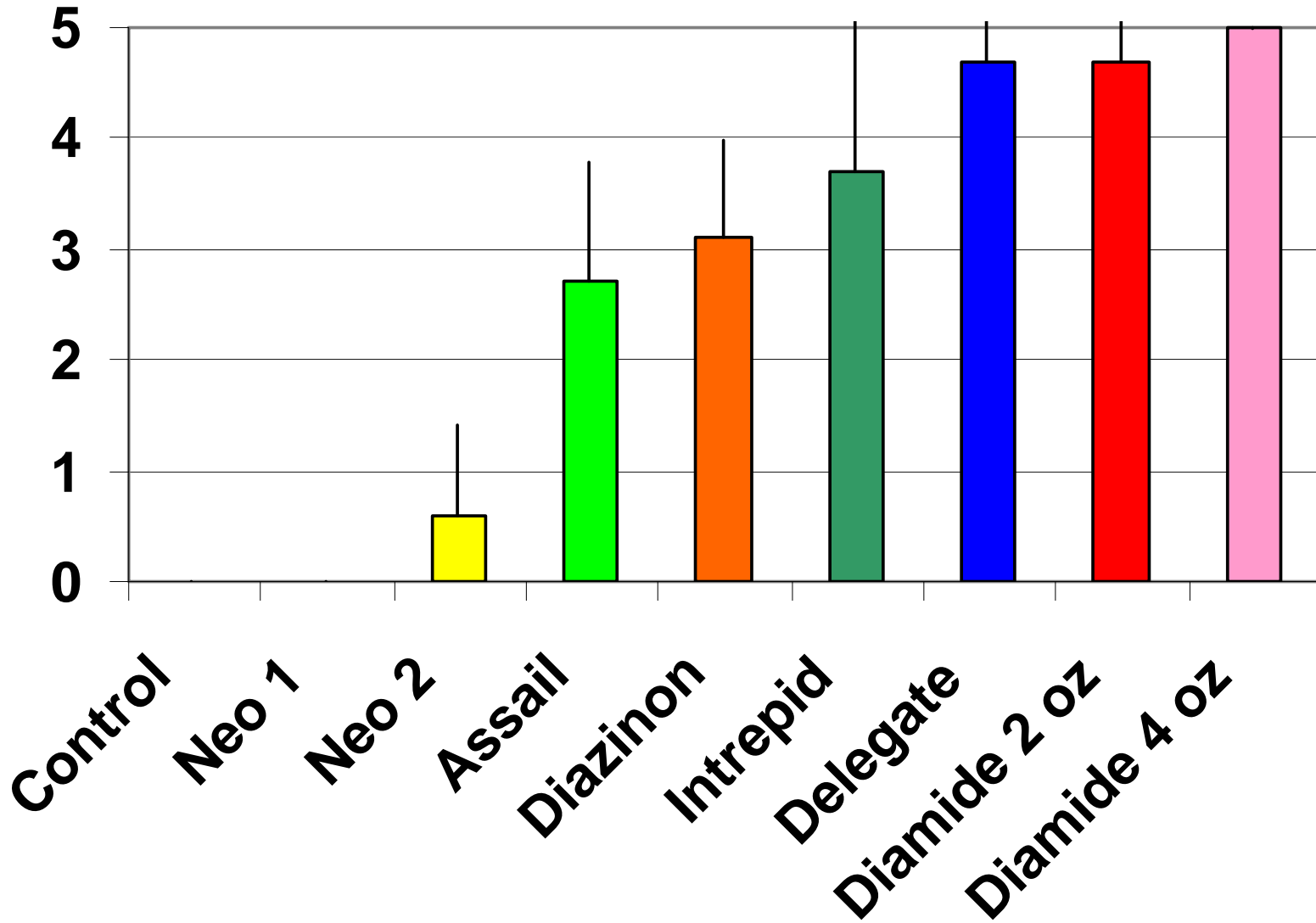
Diamide 4 oz



Plot assessment 8/21

Long residual

0=No control → 5= Best control
Average plot rating



Delegate 8/21



8/21

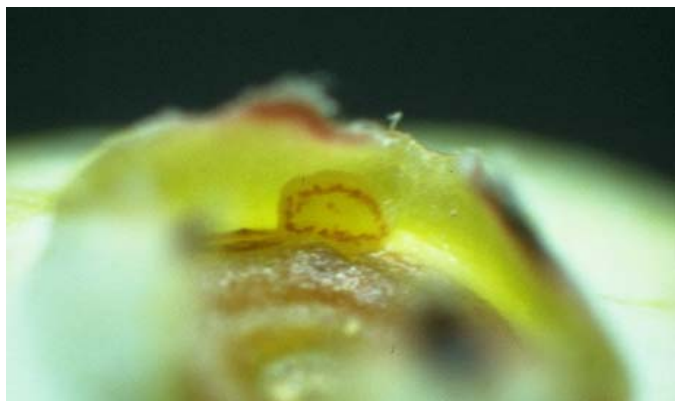
Diamide 4 oz. 8/21



Overview

- diamide, Delegate, Assail active against CFW
- Intrepid, diamide, Delegate active against yellow-headed fireworm
 - With luck, same results seen with key pest, black-headed fireworm
- High residual >> diamide, Delegate, Intrepid

2. Cranberry fruitworm: management on Ben Lears and Stevens

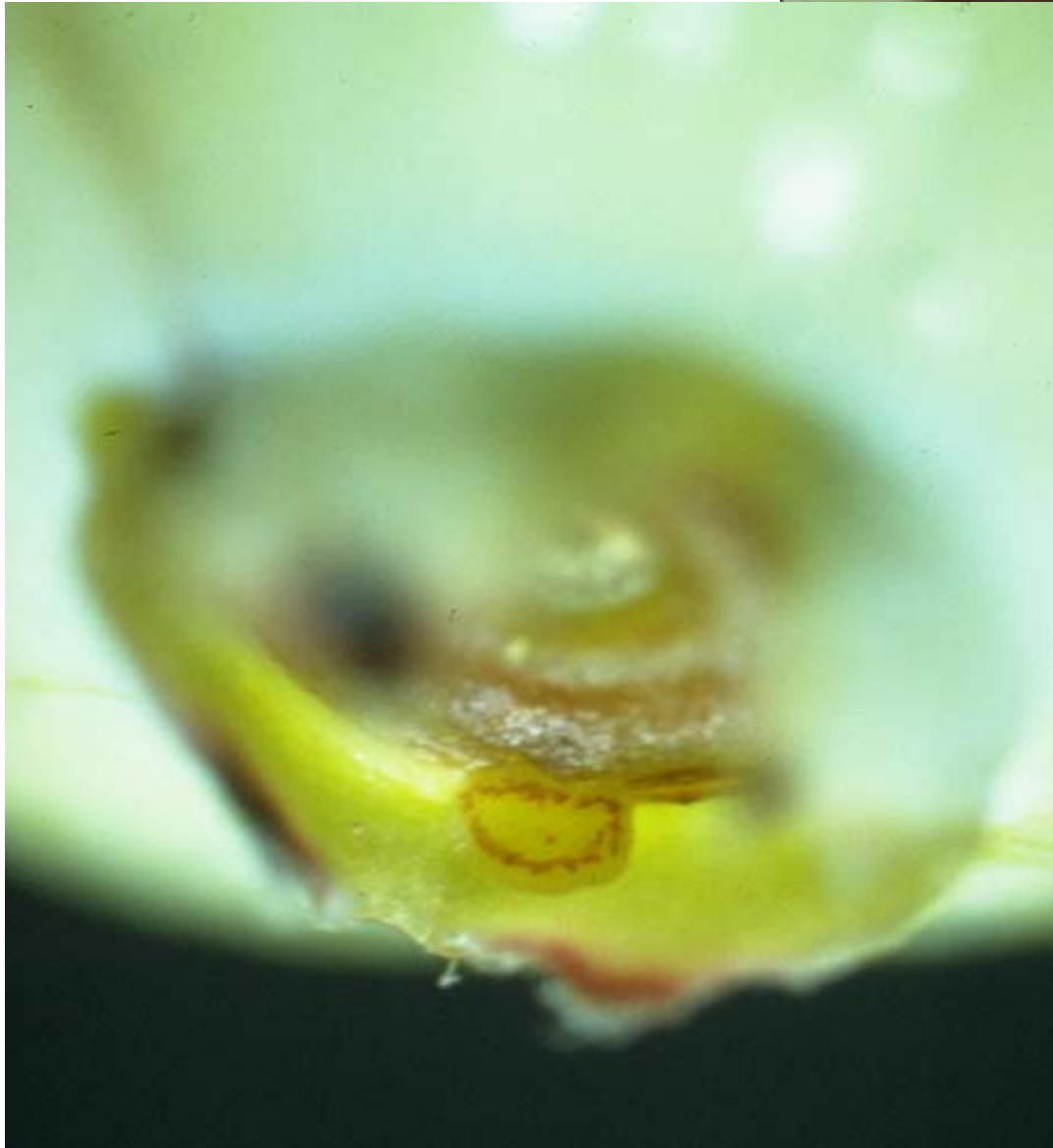


CFW on BL and ST beds

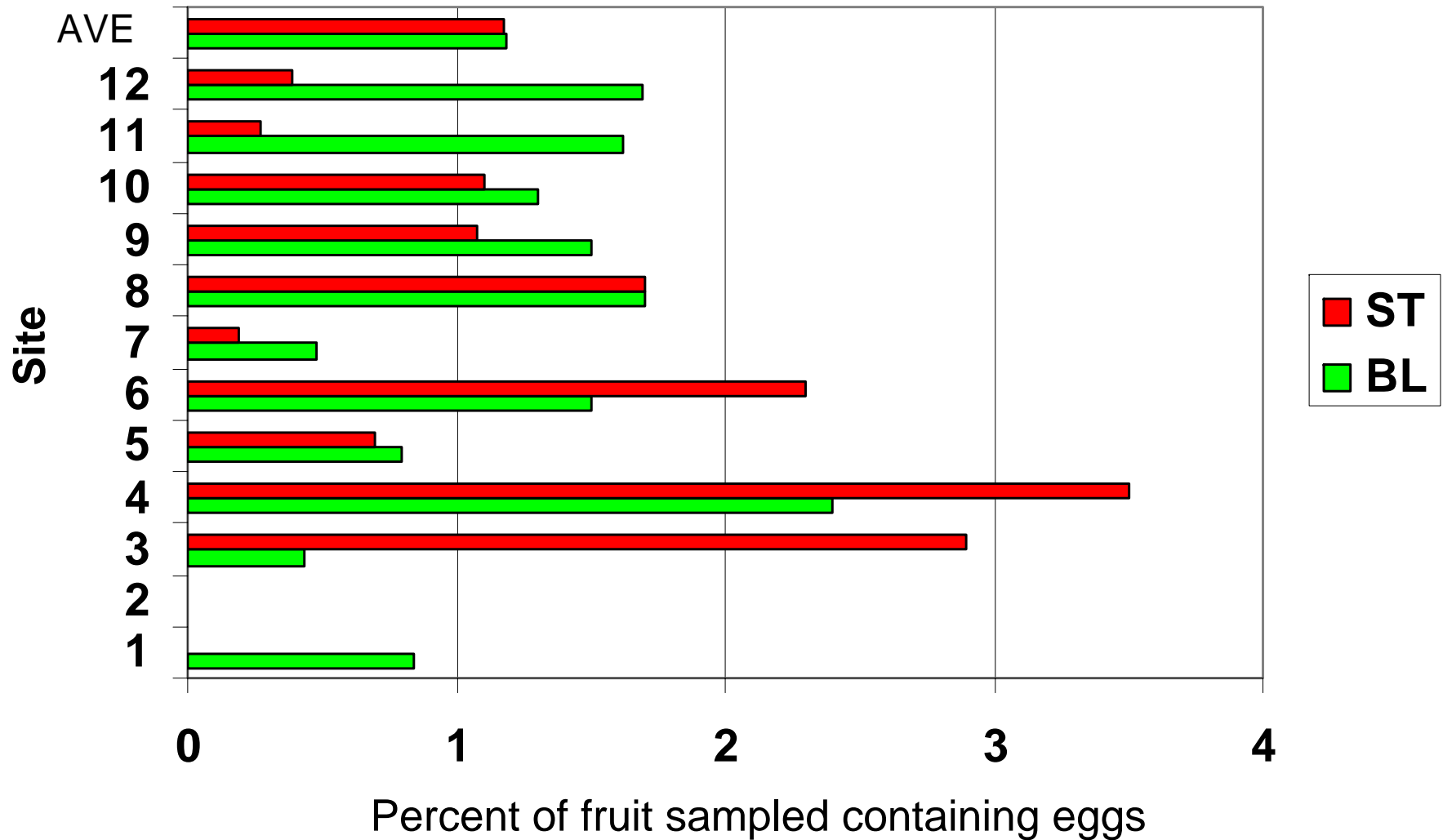
- Chose 12 sites with beds of both cultivars
- Visited three times, start mid June
- For each bed, calculated
 - Egg infestation over early season
 - Levels of damage in August
 - % out of bloom
- Goal: improve management of CFW
 - spray timing
 - compound selection

BL/ST site locations

Carver	3
Plymouth	3
Wareham	3
Plympton	2
Rochester	1



Site comparisons egg infestation





Cranberry fruitworm damage

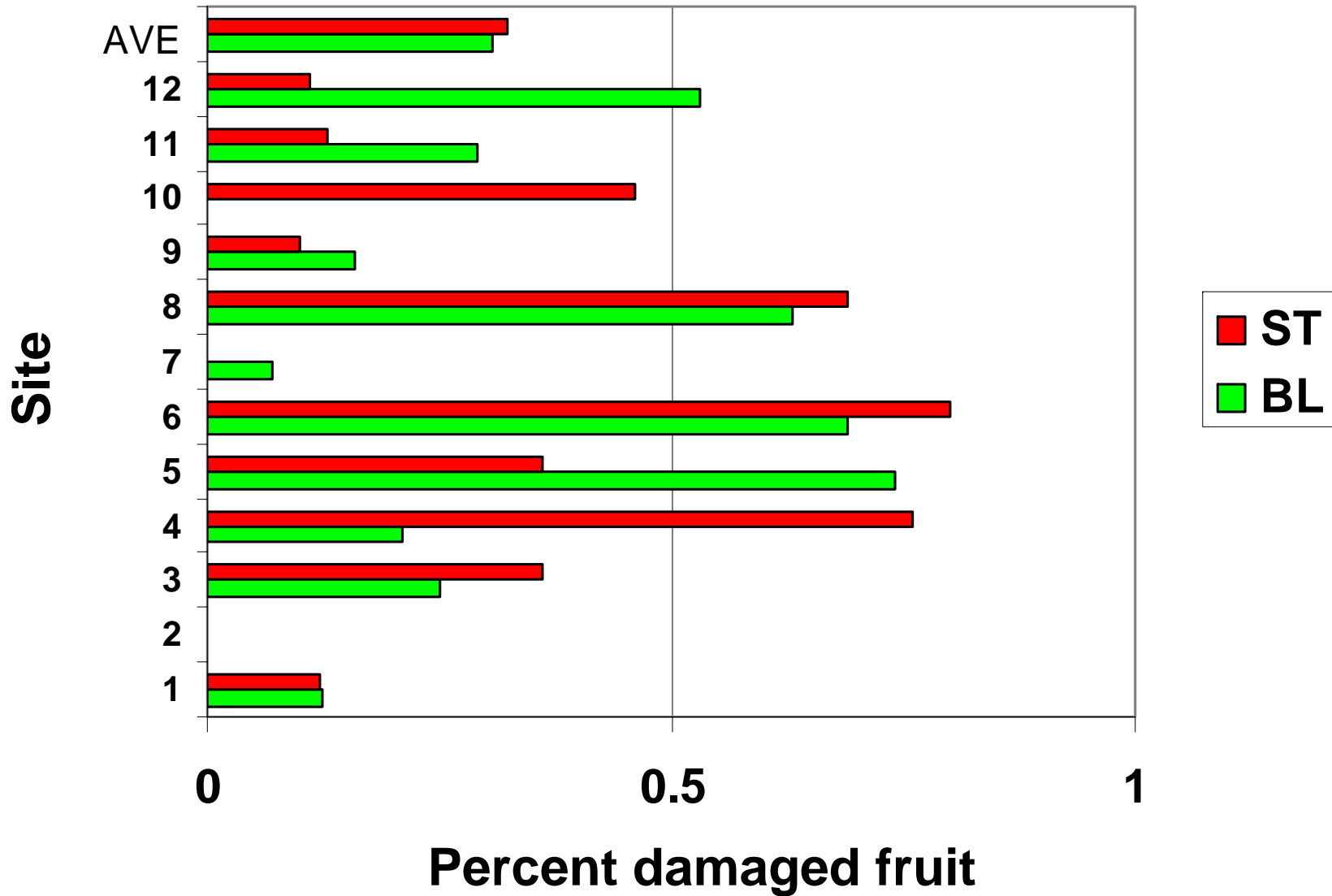


0

CFW

SFW

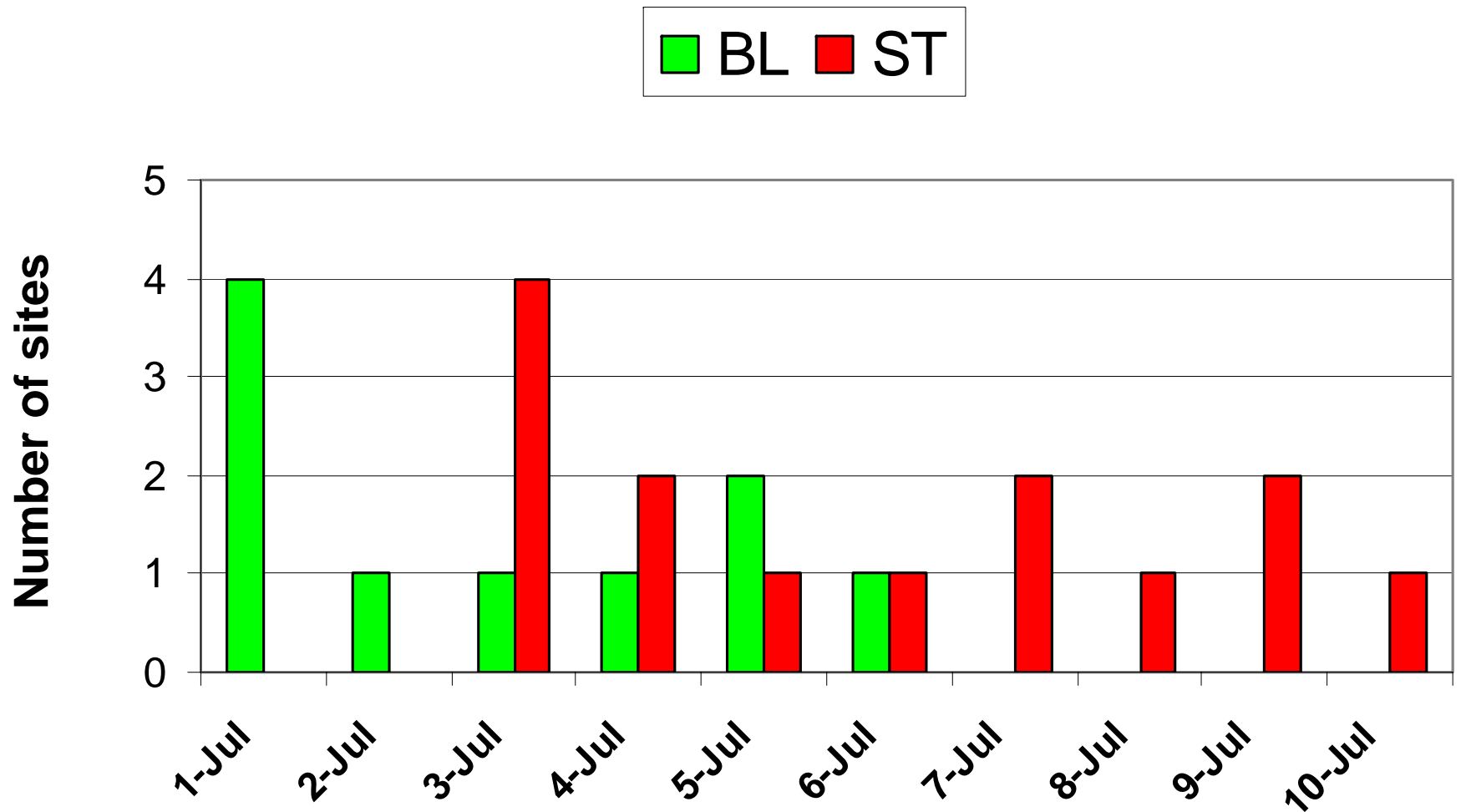
% CFW fruit infestation in August



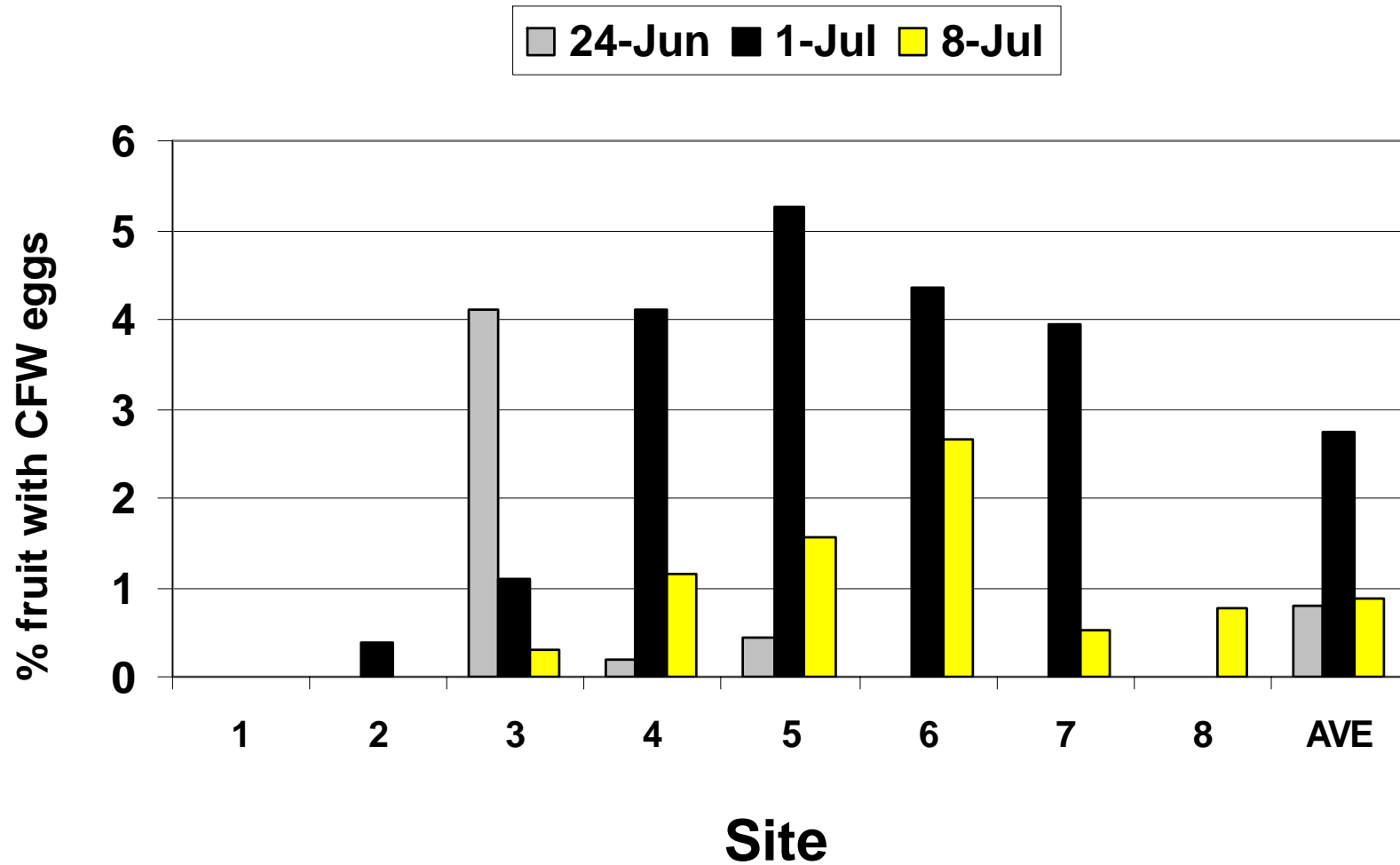
Overview

- 9,335 fruit inspected
- Egg infestation very low in 2008, did not exceed 3.5% at any site
 - Some samples contained no eggs
- Damage estimates <1% on all beds in Aug
- No clear pattern of cultivar preference or infestation level
- If started with higher egg level, more damage noted in August

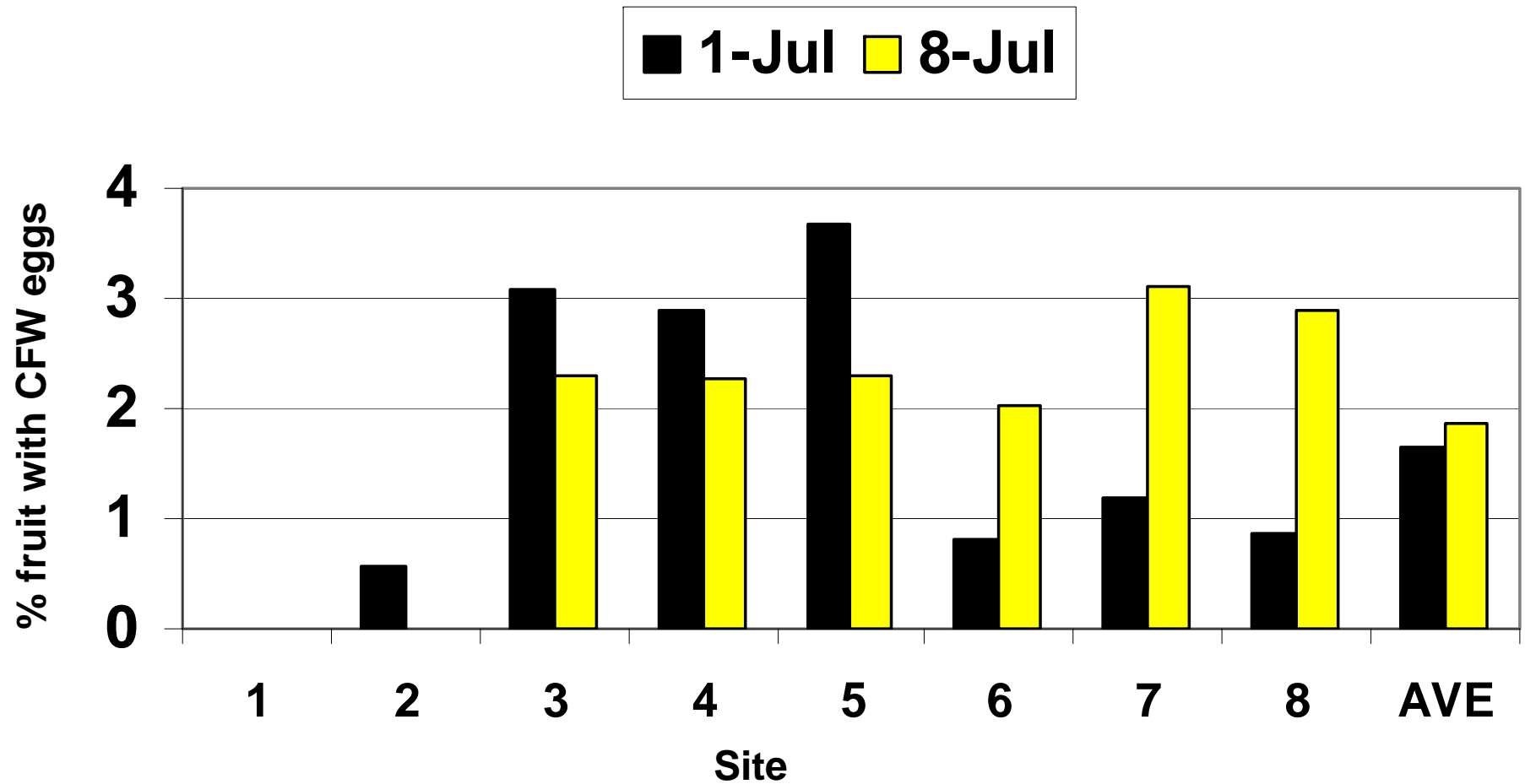
50% out of bloom
number of sites by date
BL ranged between July 1 and 6
ST ranged between July 3 and 10



Ben Lear infestation pattern:
peak occurred ca. 7/1 at most infested sites



Stevens infestation pattern:
activity July 1 through July 8
and before 50%OOB



Conclusions

- Although OOB typically occurred later on ST than BL, egg laying not delayed on ST
- Subsequent years' data required:
 - Revisit spray timing recommendations based on percent out of bloom, particularly for Stevens

3. CCD status

