

Addressing the threat of the Q biotype whitefly to Florida's tomato industry

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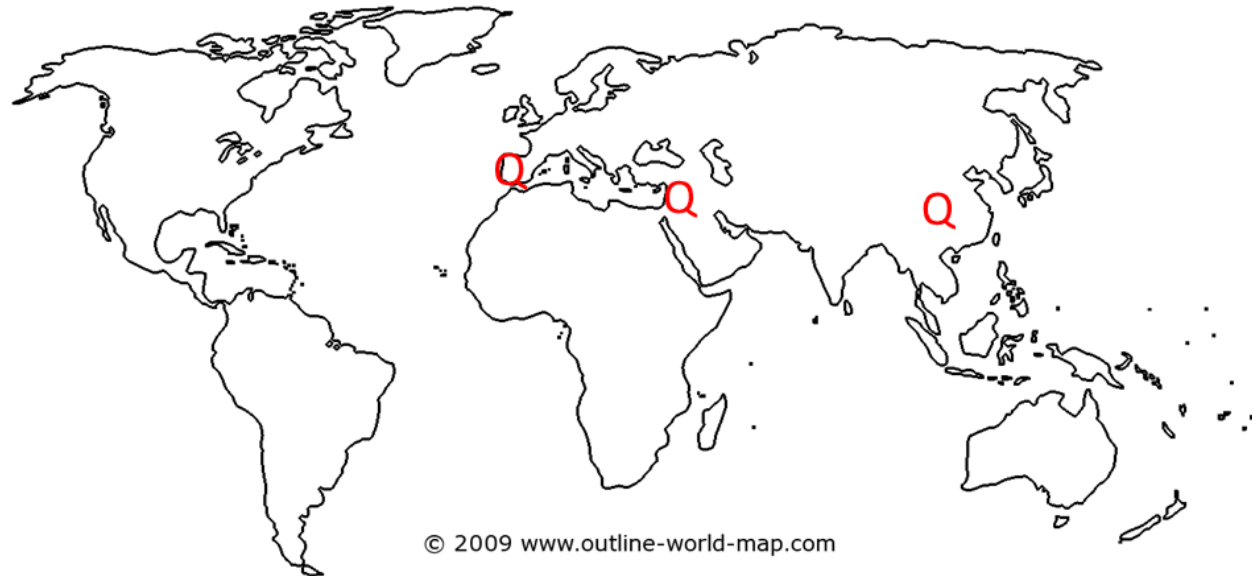
Wimauma FL 33598

Q vs B

Q biotype whitefly:

= ability to develop exponentially higher levels of insecticide resistance than B.

- When insecticide resistance management is not practiced, highly resistant populations of Q can displace B.



In mixed populations:

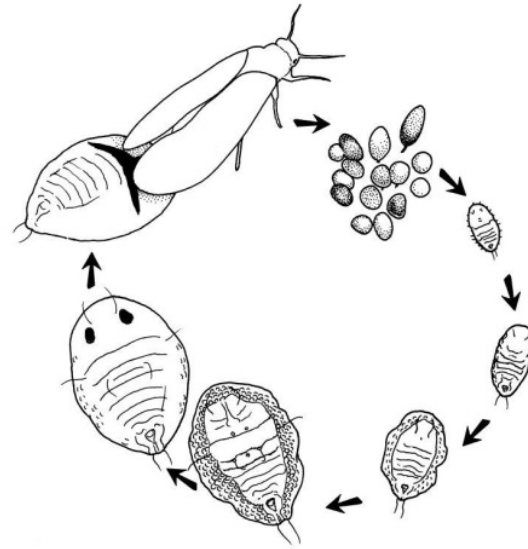
- B males are better able to find females of their own group than Q.
- Q males will spend more time mating (unsuccessfully) with B females.
- Unmated whitefly females produce only males.
- Q populations will go locally extinct if males cannot find females for mating.
- Improper insecticide use can reverse natural predominance of B, allow Q to displace it.





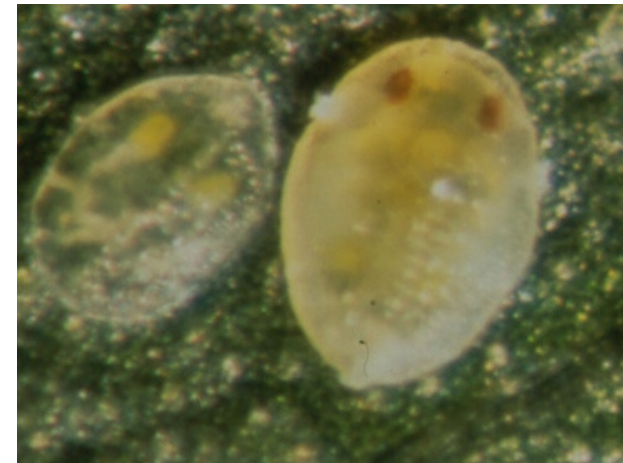
Adult

Sweetpotato or silverleaf whitefly *Bemisia tabaci* biotype B MEAM 1



Life cycle

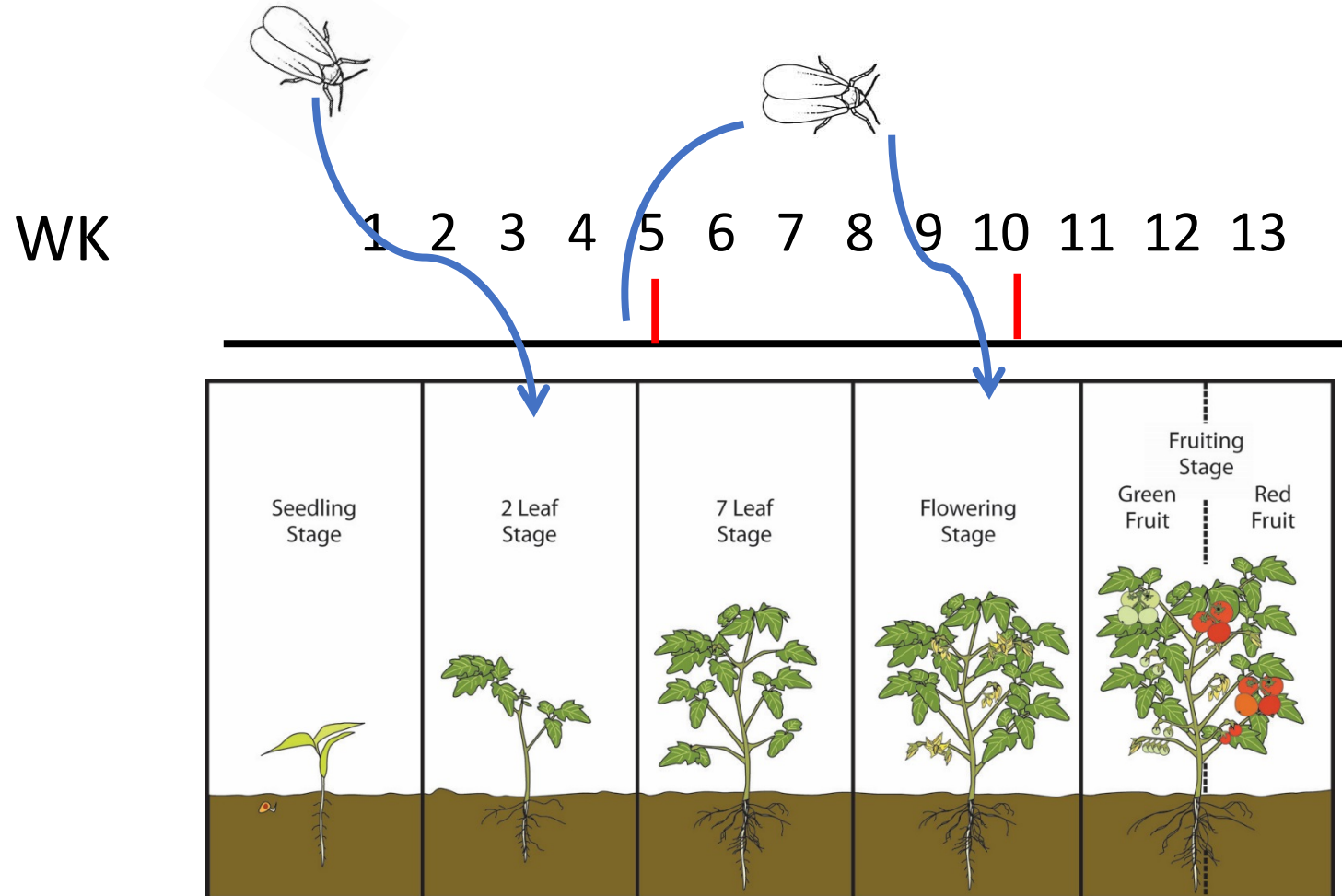
- ~ 3 wks from egg to adult
- adults live ~2 wks
- ~ 5 wks per generation



Nymphs

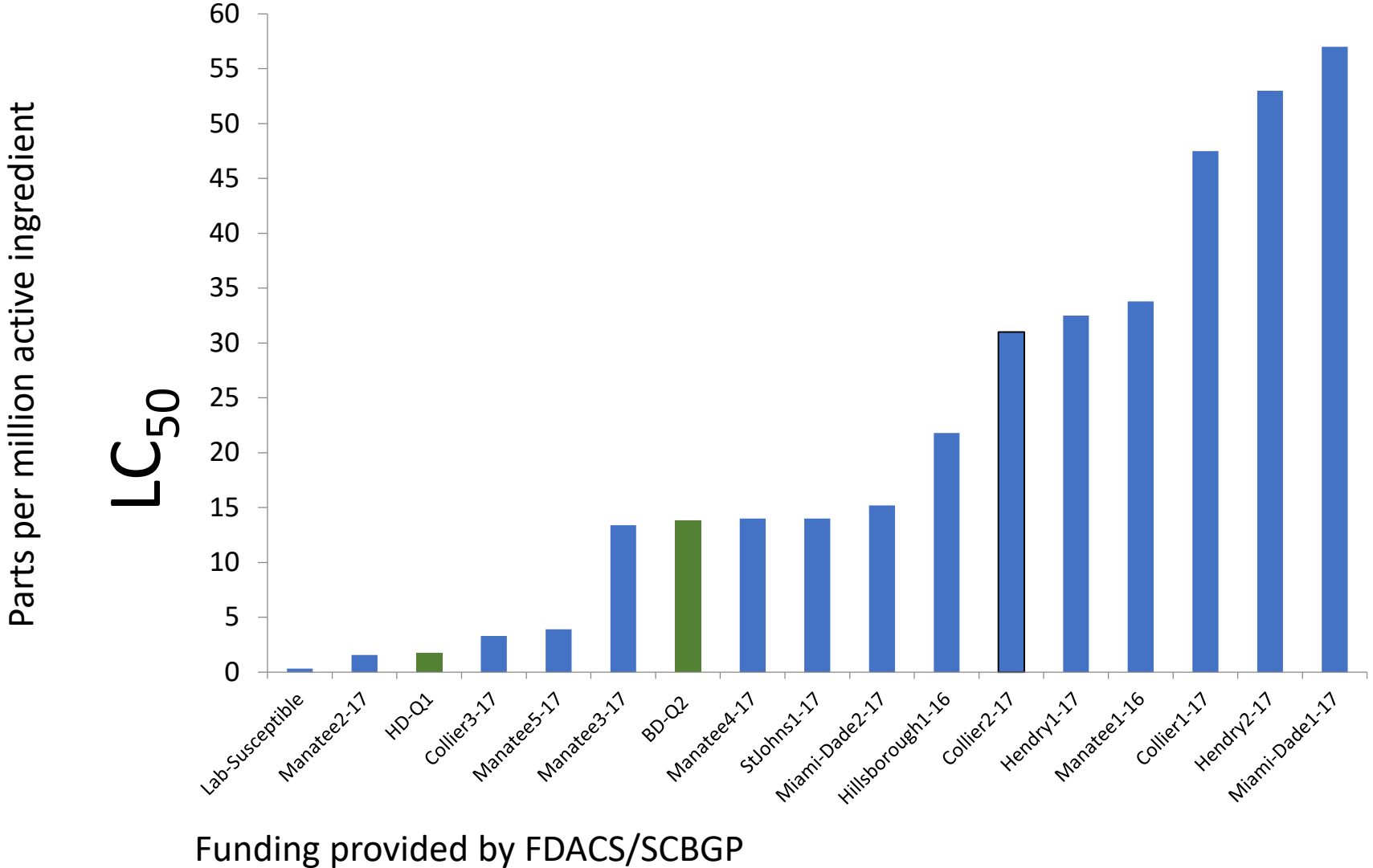
1st 5-Wk Treatment Window:
Primary Transmission of TYLCV
Colonization of crop
(Whiteflies migrating into field)

2nd 5-Wk Treatment Window:
Secondary Transmission
(Whiteflies developing in field)
Irregular Ripening

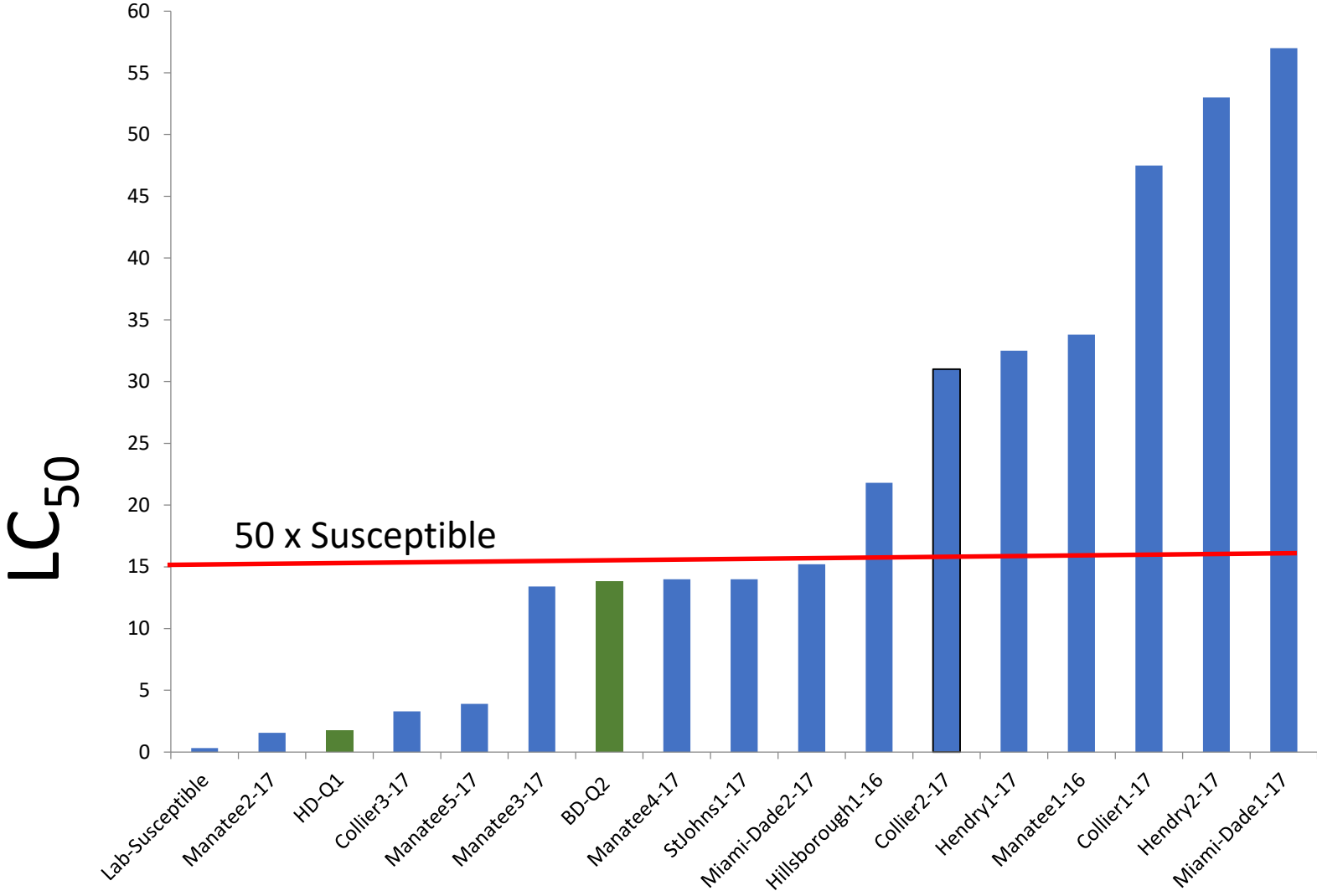


Whitefly Resistance Monitoring 2016-17

Admire (imidacloprid)

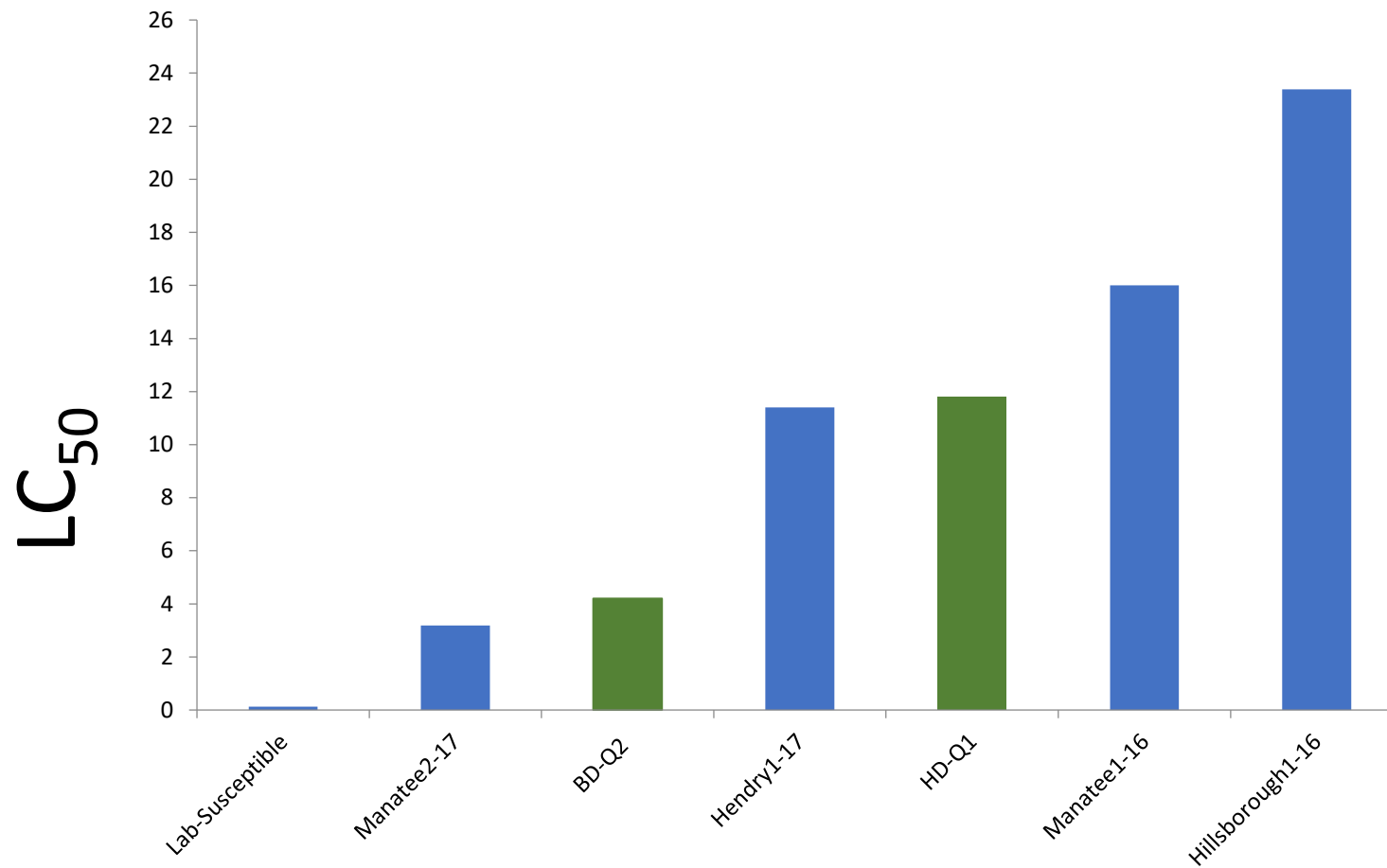


Admire (imidacloprid)



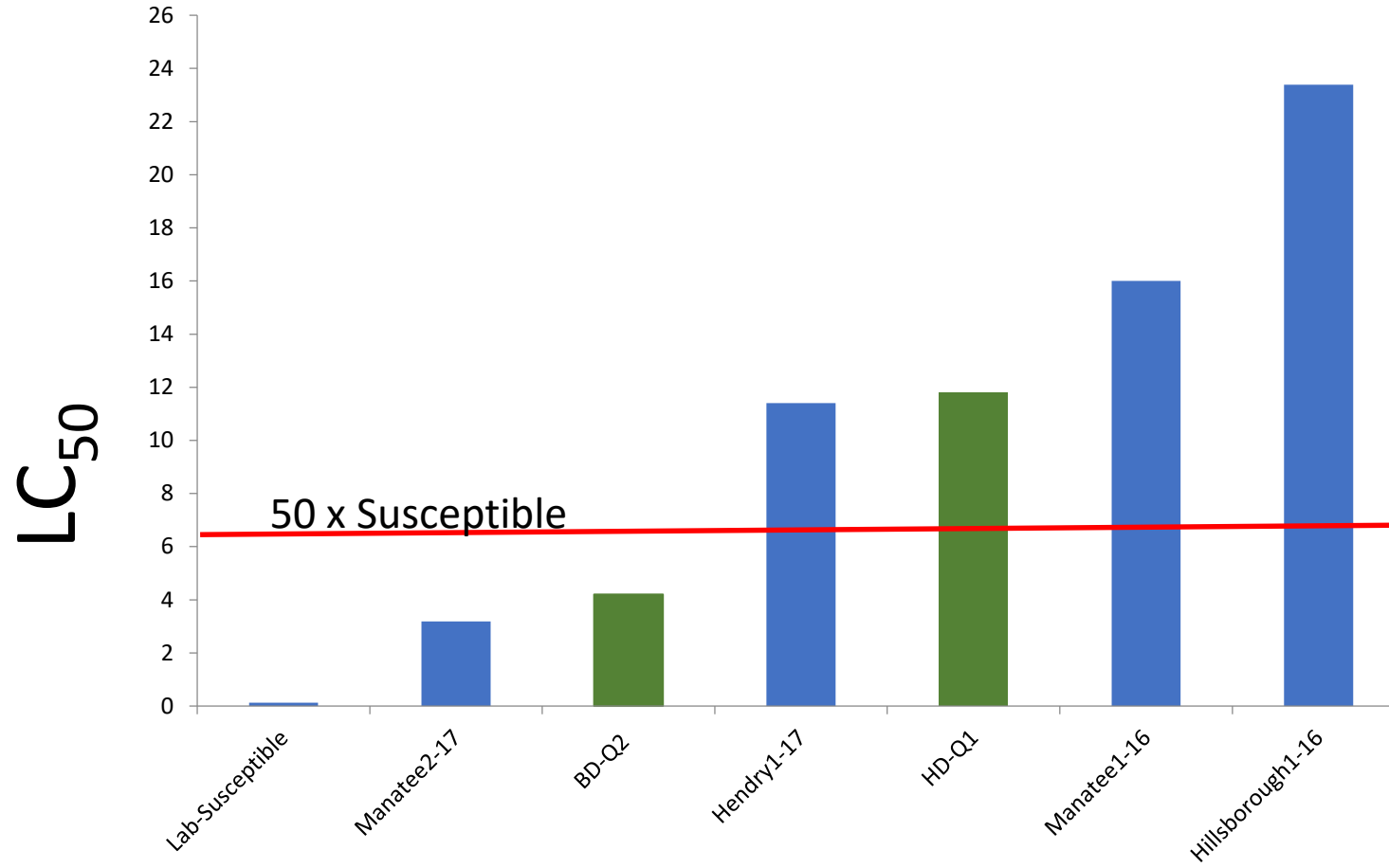
Funding provided by FDACS/SCBGP

Platinum (thiamethoxam)



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Funding provided by FDACS/SCBGP

Biopesticides

- Low risk for resistance (No IRAC MoA)
- Pollinator compatible
- Biocontrol compatible
- Most have 4 hour REI
- Most have 0 day PHI
- Many are OMRI approved

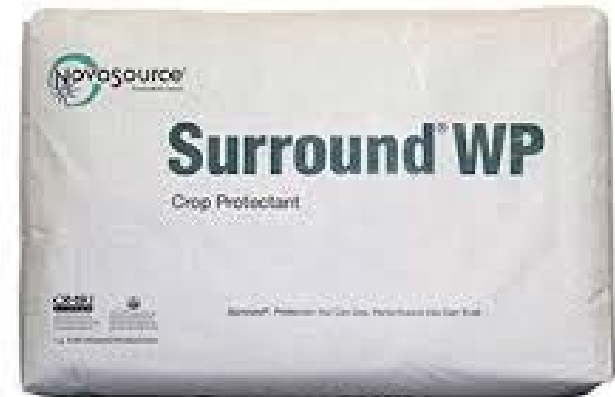
Biopesticides that kill mechanically



Insecticidal soap



Mineral oil

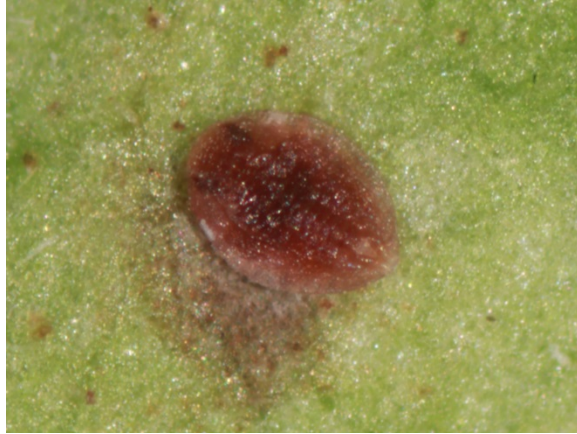


Kaolin clay

Biopesticides: Fungal Entomopathogens

Effects on Whitefly Nymphs

BotaniGard/Mycotrol
(*Beauveria bassiana*)



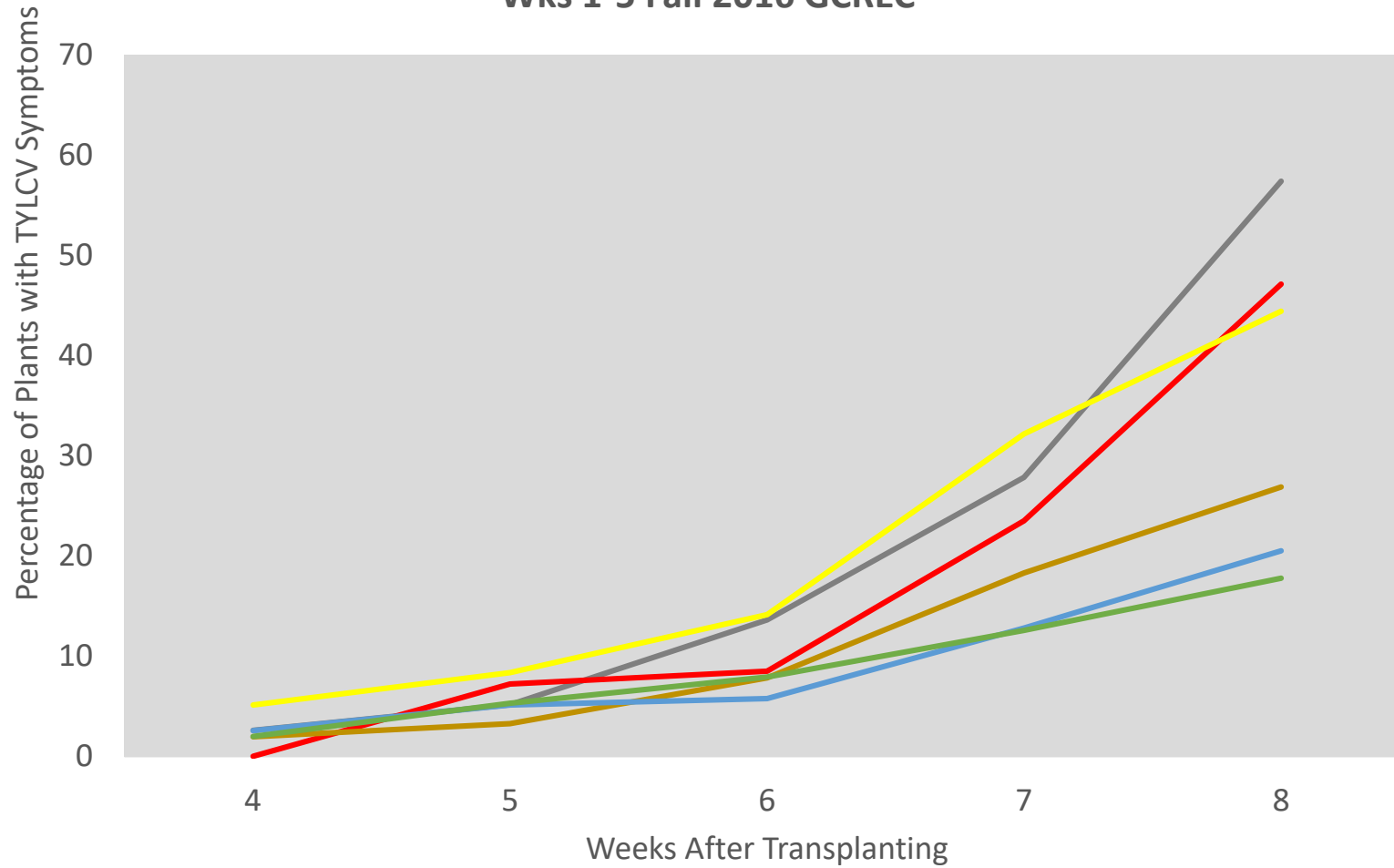
PFR-97
(*Paecilomyces fumosoroseus*)



First 5 Wk Treatment Window: Biopesticides vs Neonicotinoids, GCREC Fall 2016



Percentage of Tomato Plants with TYLCV Biopesticides vs Neonicotinoids Wks 1-5 Fall 2016 GCREC



Funding:
FDACS/SCBGP

- Surround (kaolin clay)
- SuffoilX (mineral oil)
- M-Pede (insecticidal soap)
- UTC
- Imidacloprid/thiamethoxam
- Dinotefuran

Fall 2017 GCREC Conventional vs Biopesticides

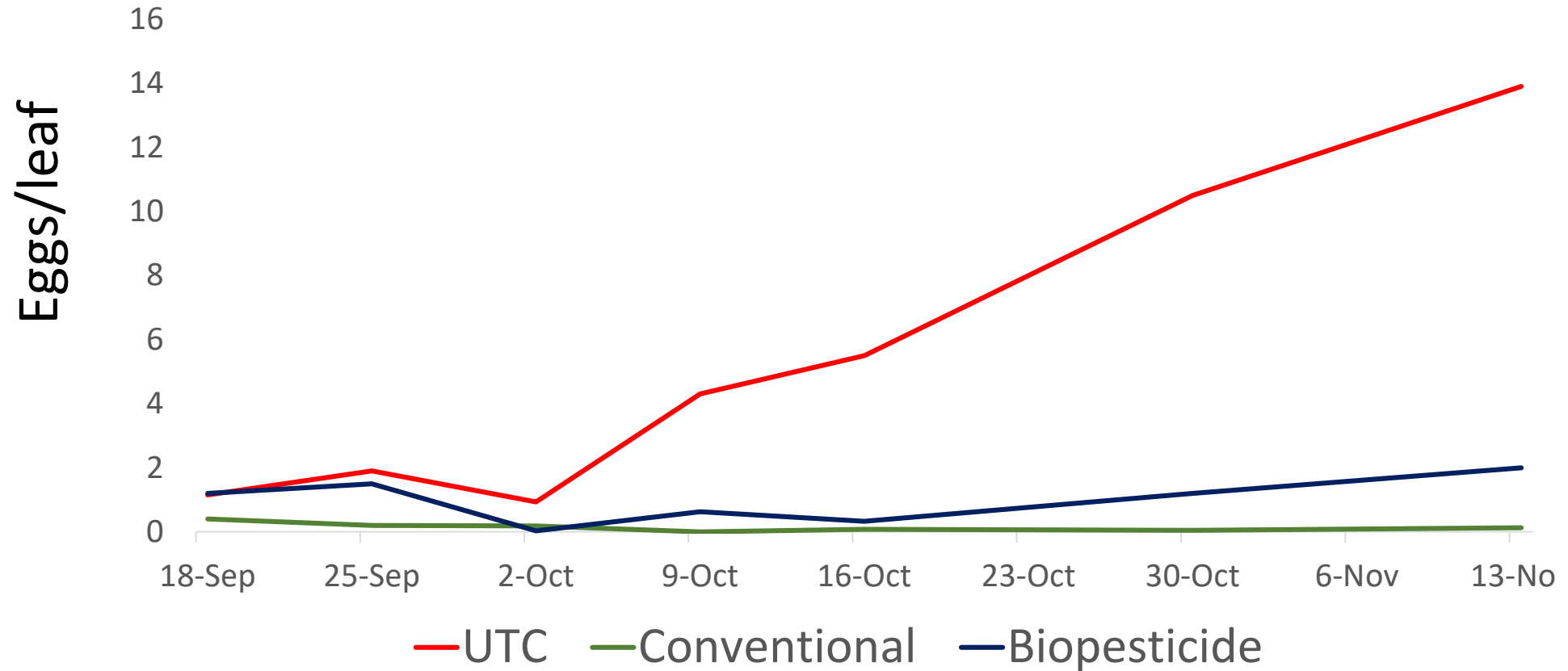
Conventional

Wk	Product	Rate
1, 3	Venom 70 SG	5 oz, 7 oz
5, 7	Movento 2SC	5 floz
6, 8	Exirel	20.5 fl oz
9, 11	Hero EC	10.3 fl oz
10	Courier SC	13.6 fl oz

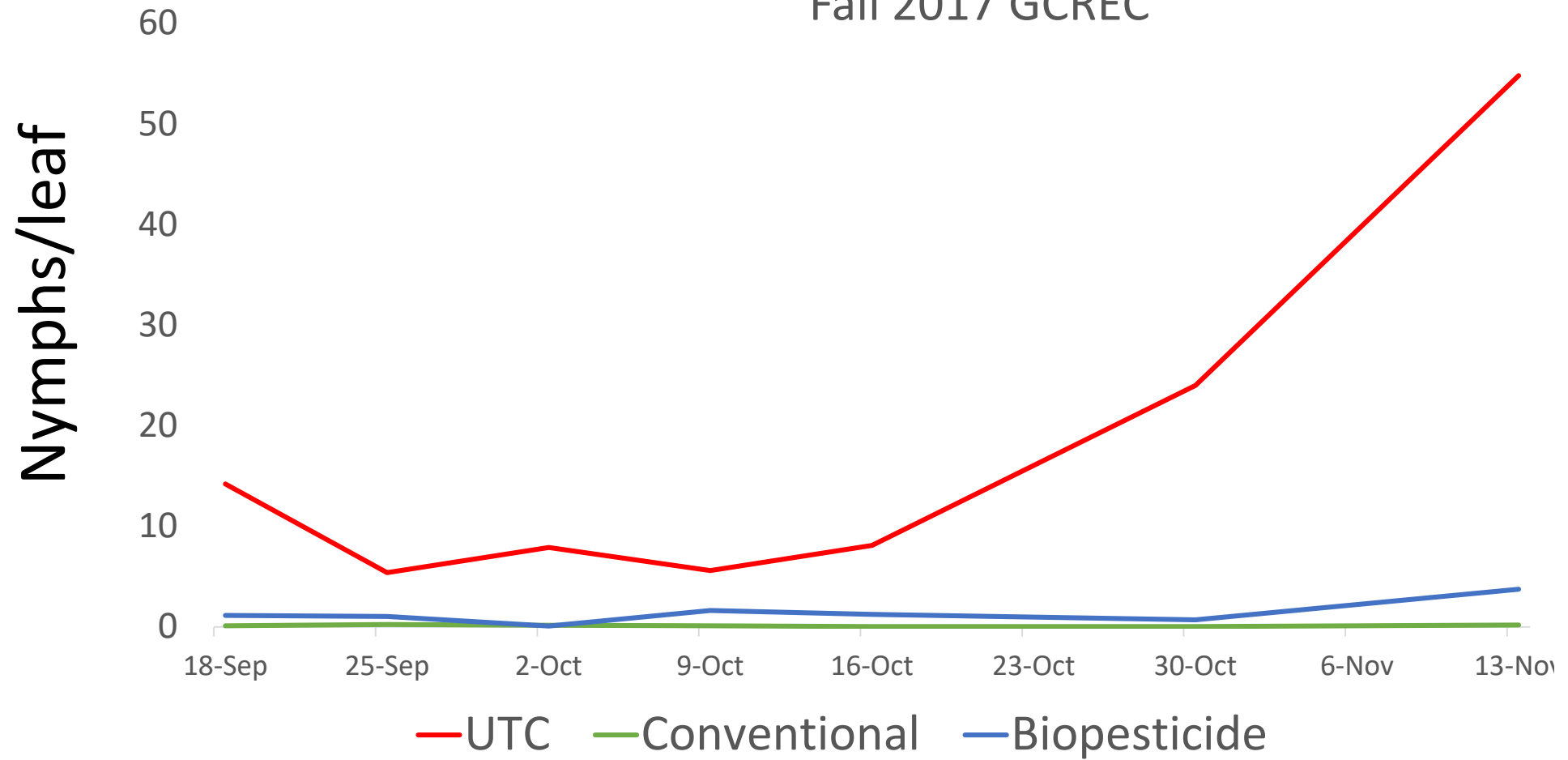
Biopesticide

Wk	Product	Rate
1,2,3	M-Pede	2%
4,5	Suffoil-X	2%
6,7	Mycotrol	9.5 oz
8,9	M-Pede	2%
10,11	Aza-Direct	47.7 fl. oz

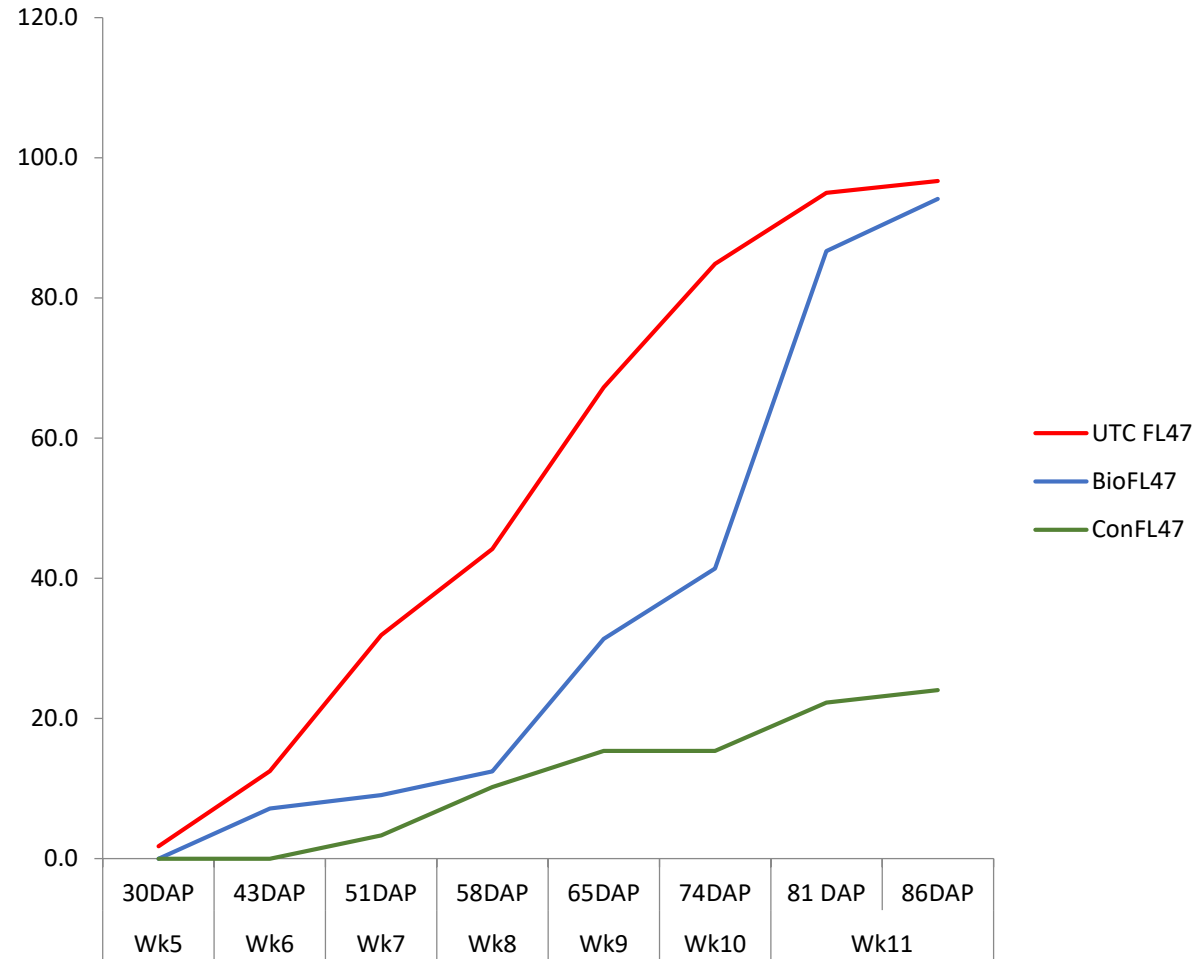
Whitefly eggs per leaf wks 3-11 after planting Fall 2017, GCREC; Florida-47



Nymphs per leaf wks 3-11 after planting, Florida 47
Fall 2017 GCREC



Virus Incidence Wks 5-11 Florida-47 Tomato Conventional vs Biopesticide Insecticide Rotations GCREC Fall 2017



Conventional: Venom x 2 > Movento fb Exirel x 2 > Hero x 2 > Courier

Biopesticide: M-Pede x 3 > SuffoilX x 2 > Mycotrol x 2 > M-Pede x 2 > Azadirect x 3

Competition between B and Q on Tomato (cv Florida 91)

Three Treatments:

1. 6 male + 6 female B (12 adults/plant)
2. 6 male + 6 female Q (12 adults/plant)
3. 6 male + 6 female B + Q (24 adults/plant)

80 degrees F

Funding provided
by Florida Tomato
Committee



Plants 70 days after
inoculation

Competition between B and Q on tomato

Three collection dates:

1. 30 days after inoculation (1st generation)
2. 45 days after inoculation (2nd generation)
3. 70 days after inoculation (3rd generation)

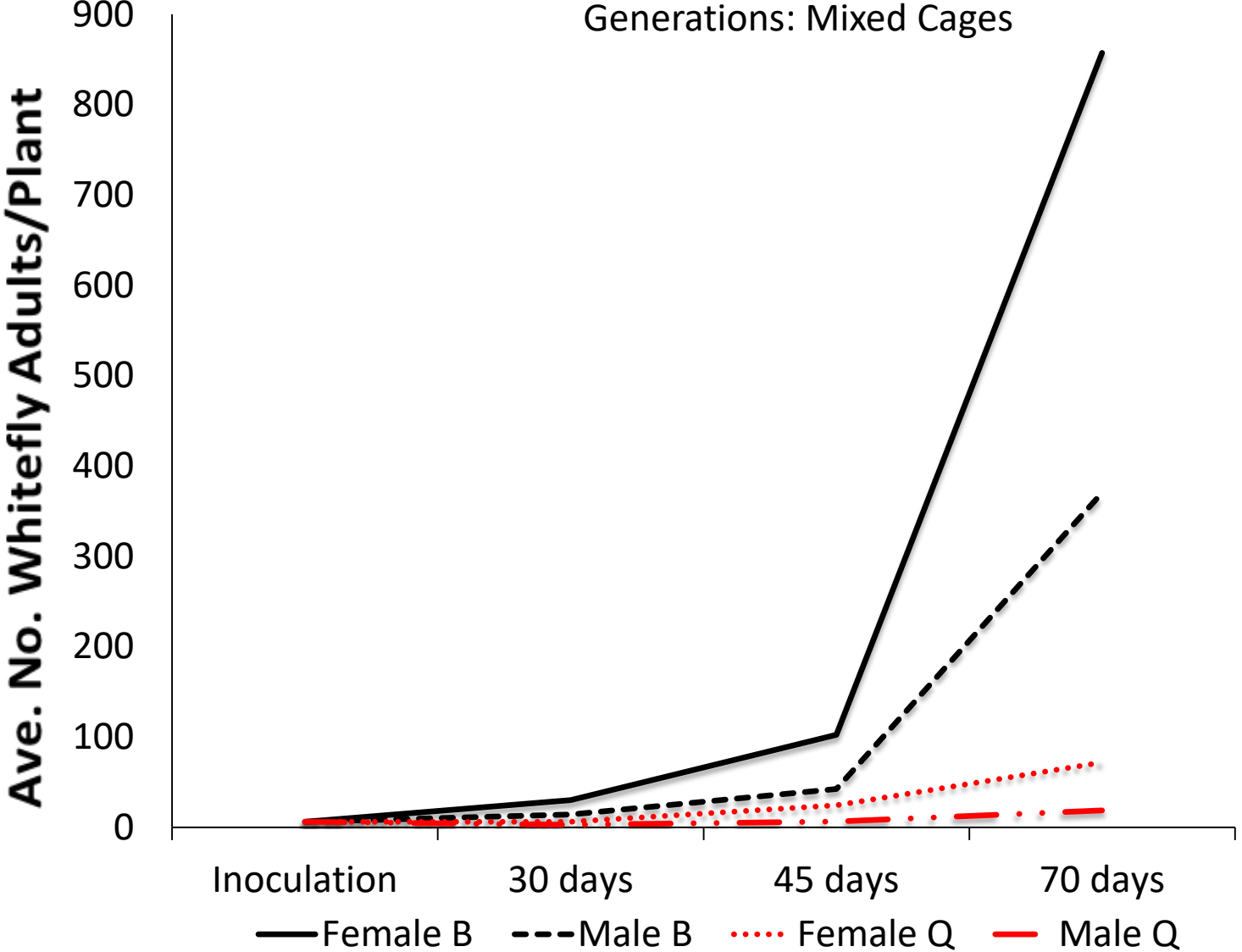
All adults in each cage were collected.

Number, gender and biotype were recorded.



Collecting whiteflies at 39 degrees F.

Male and Female B and Q Whiteflies Per Tomato Plant over 3 Generations: Mixed Cages



Funding provided by the Florida Tomato Committee

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Florida Department of Agriculture and
Consumer Services

Florida Tomato Committee