

A PRIMER ON HIGH TUNNEL CUCUMBER PRODUCTION

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New England Vegetable and Fruit
Conference— December 2022



College of Agriculture



General production considerations

Warm Season Crop

- Transplant should be used. Spring and fall
- Cucumber plants are very sensitive to low temperatures
- Plant growth is suppressed when temperatures are above 95°F



Cultivar Selection

Parthenocarpic cultivars should be used

Mini or Beit Alpha: labor intensive, a lot of fruit

- Katrina
- Socrates
- Manny
- Manar
- Jawell
- Picolino



Cultivar Selection

Parthenocarpic cultivars should be used

Dutch greenhouse: misshapen fruit, expensive seed

- Camaro
- Kalunga
- Tyria
- Poniente



Cultivar Selection

Parthenocarpic cultivars should be used

American slicer: thick skin, similar to field varieties

- Corinto
- Lisboa
- Alcazar



Cultivar Selection

Parthenocarpic cultivars should be used

Japanese/Asian cucumber: later to produce fruit, male and female flowers

- Taurus
- Tasty Jade
- Tasty Green
- China Long
- Itachi (white)



Cultivar Selection

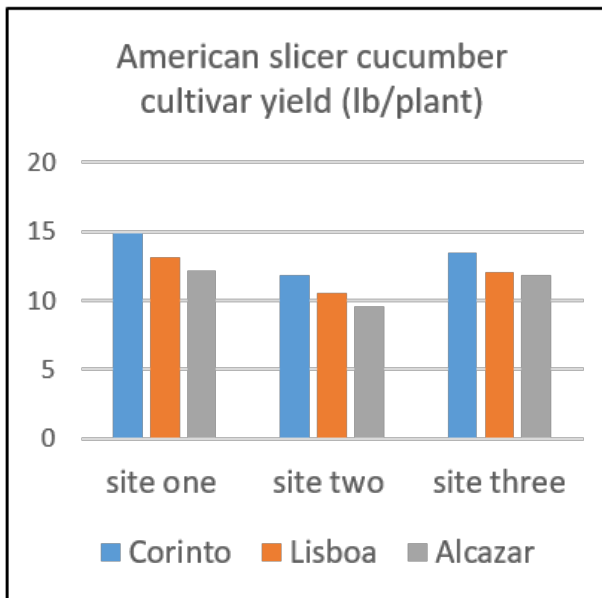
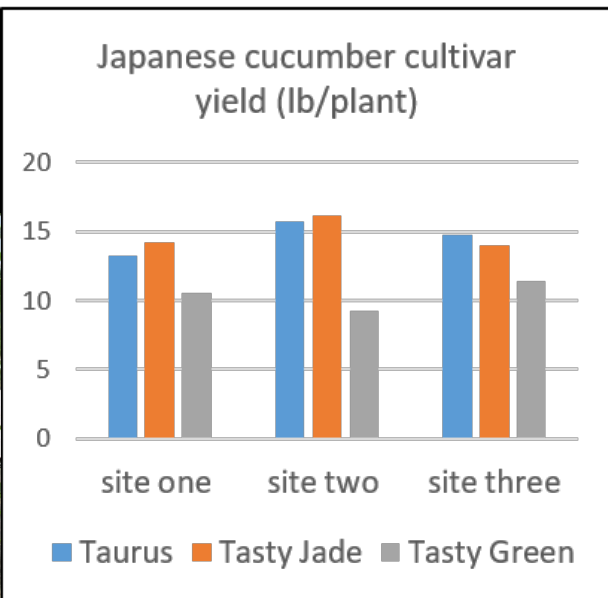
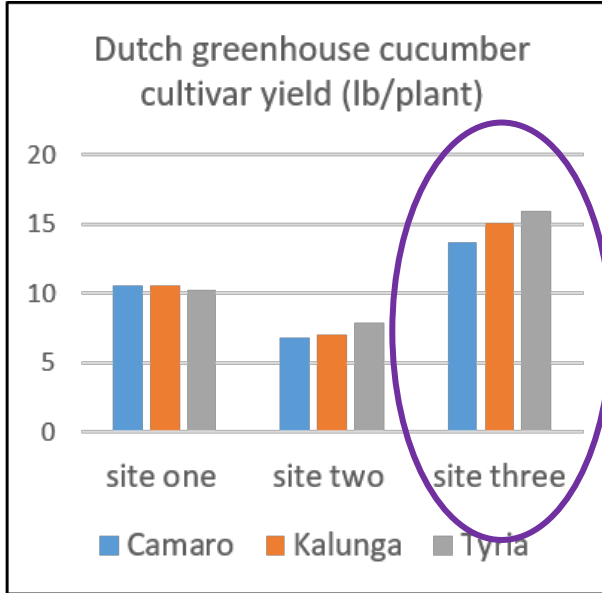
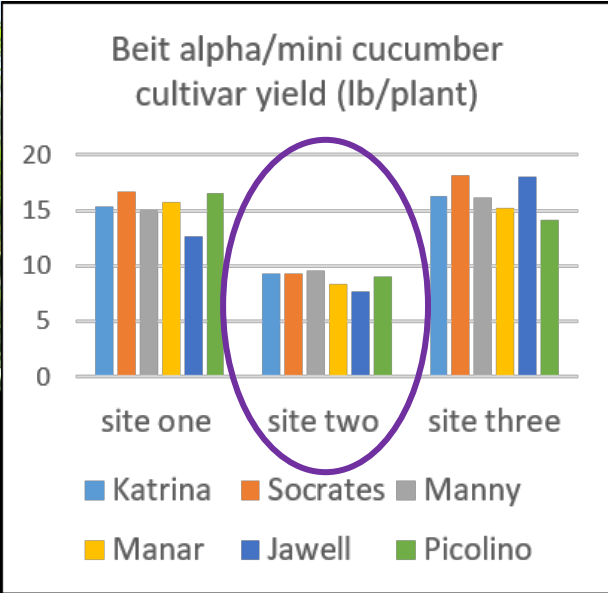
Parthenocarpic cultivars should be used

Pickling cucumbers

- Adam Gherkin
- Quirk
- Excelsior



Cultivar selection

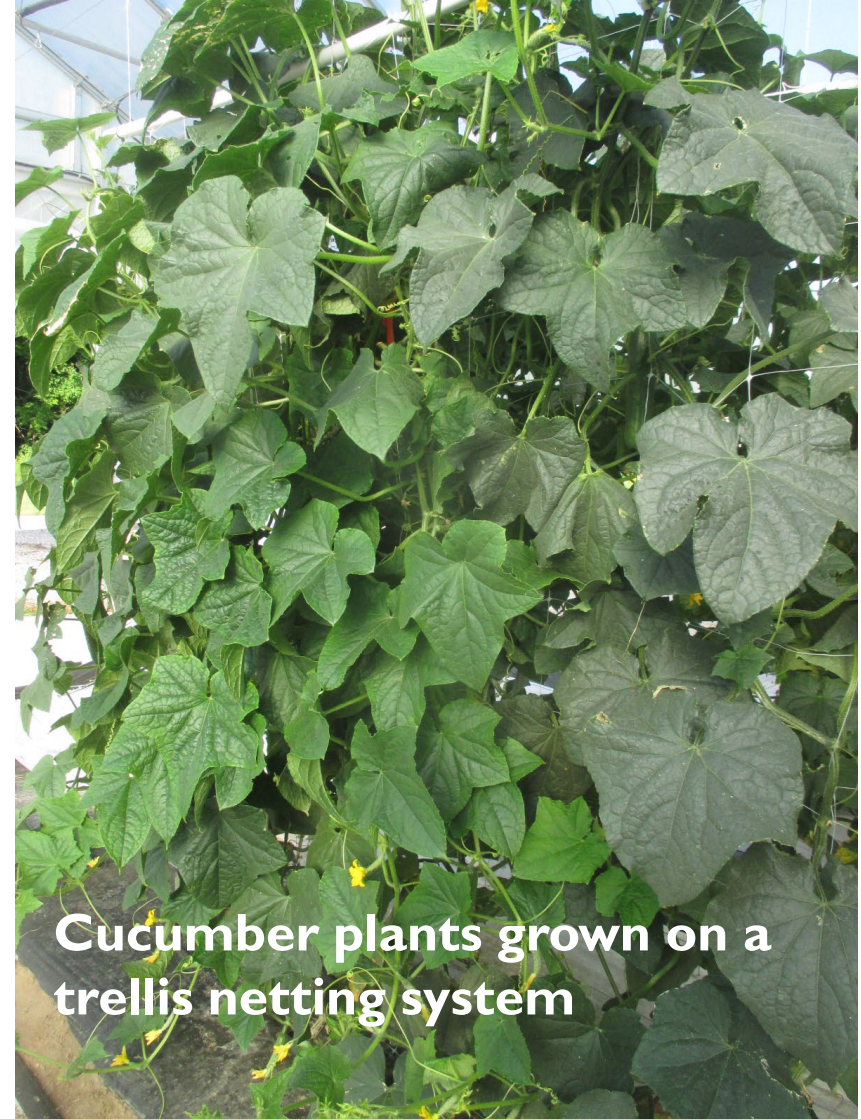


Liz Maynard
Pinney Purdue Ag Center
Bronwyn Aly
University of Illinois,
Dixon Springs Ag Center

Pruning and trellising systems



Cucumber plants grown with a one-leader system



Cucumber plants grown on a trellis netting system

Grafting

Cucumbers are very sensitive to low temperatures



Grafting

Cucumber is widely grown in solar greenhouses in winter in northern China



Grafting

Grafting cucumbers onto cold tolerant rootstocks is key for winter production

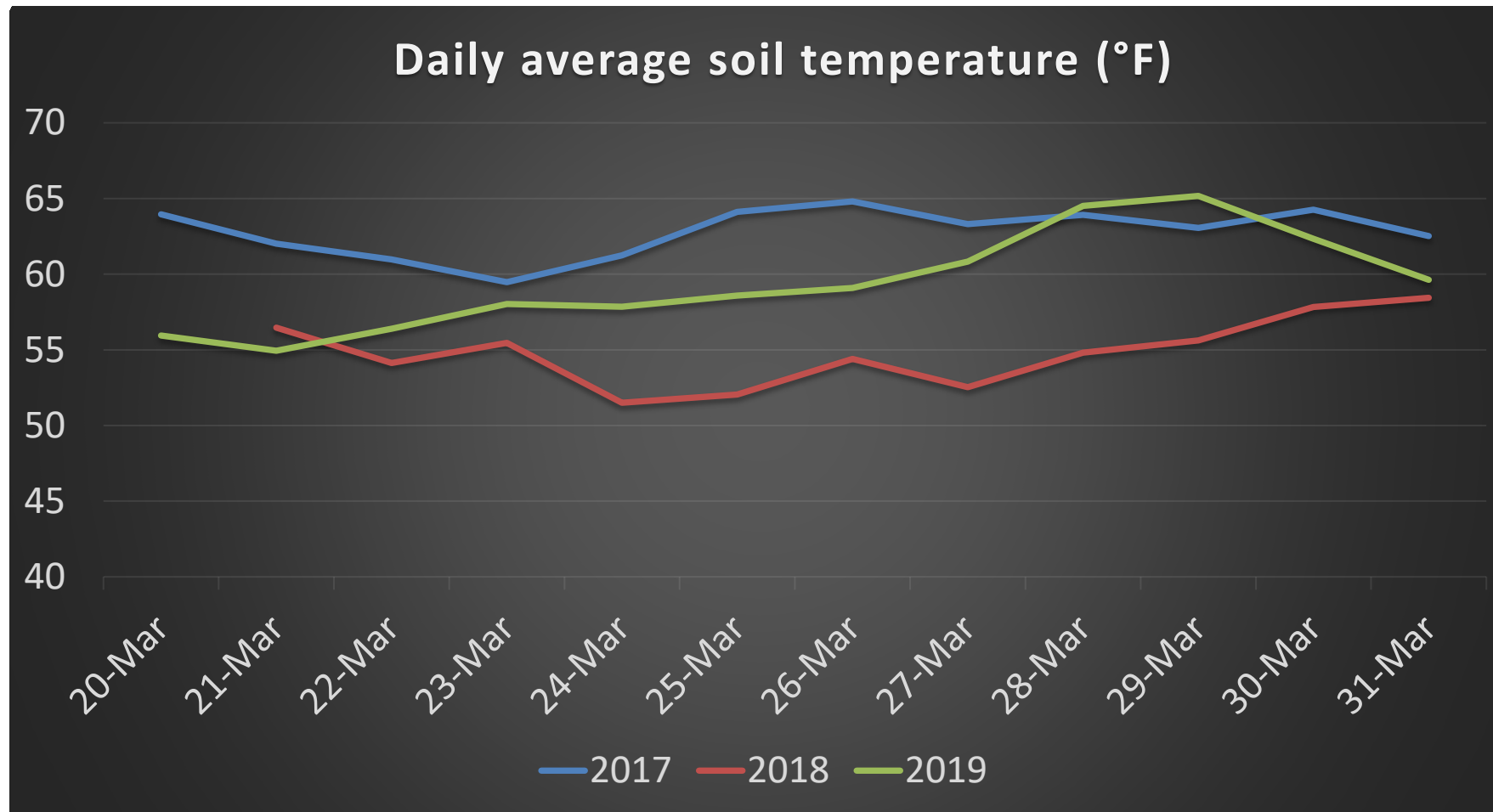


Grafting

- Cucumbers are typically grafted onto **squash interspecific hybrid** (*Cucurbita maxima* × *C. moschata*), **squash** (*C. moschata*) and **figleaf gourd** (*Cucurbita fixifolia*) rootstock



Grafting trials at SWPAC 2016-2019



	2016	2017	2018	2019
Replant rate	44.4%	0	91.7%	77.7%



Non-grafted 'Socrates'



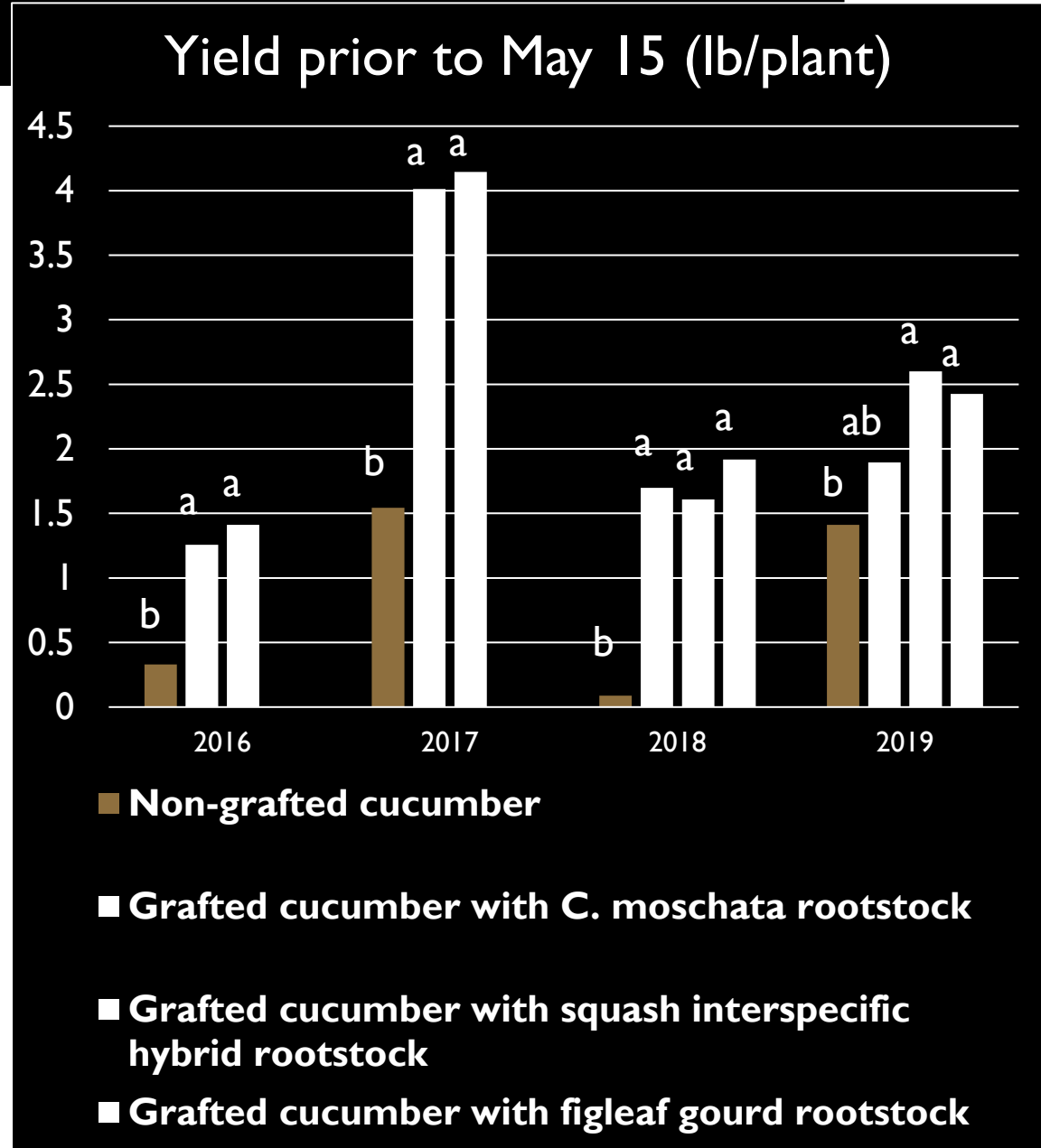
Grafted 'Socrates'

All the grafted plants survived, replant rate for non-grafted cucumbers is above.

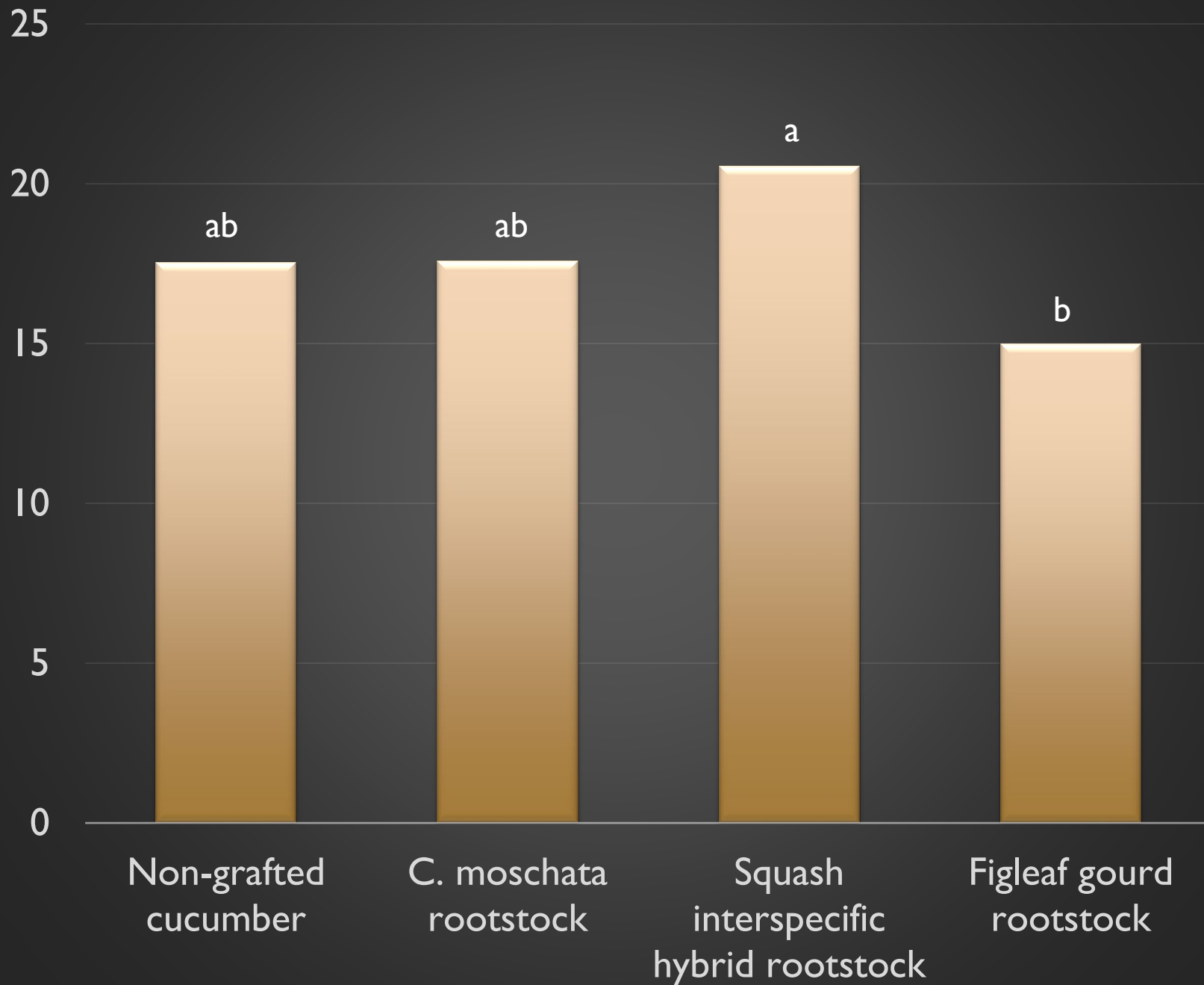
Grafting



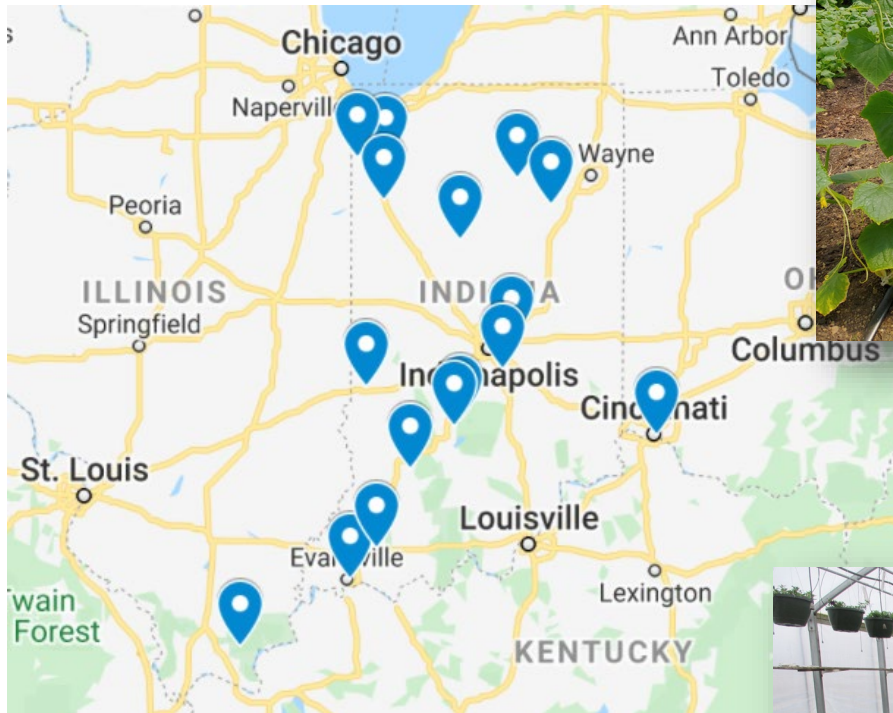
“We are first at market with cucumbers by three weeks. It makes a difference, sales wise. It gets us ahead of the game quickly. It paid off very well.”



Yield after May 15 (lb/plant)

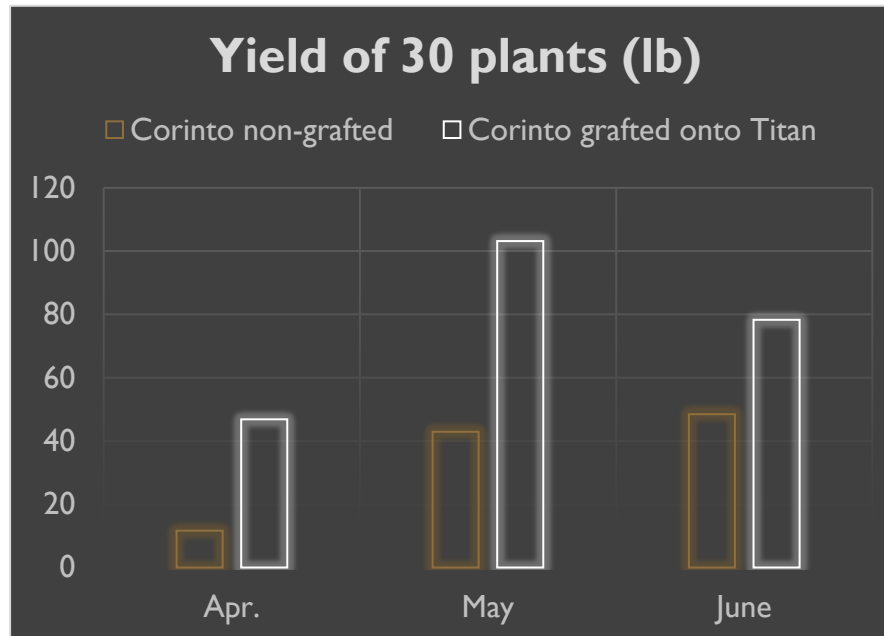


Grafting on-farm trials

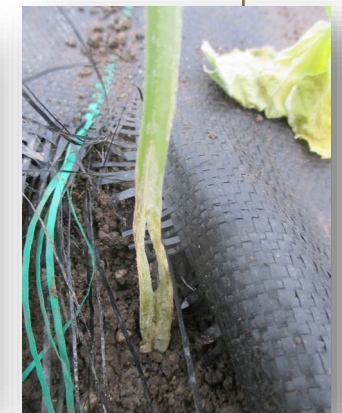


Grafting Case Study Lafayette, IN

- Planted on Feb. 22, 2018 in a heated tunnel.
- Harvested from Apr. 4 to June 30, 2018.
- Lost 6 out of 30 non-grafted plants early in the season due to stem split.
- No grafted plants lost in early season



Dead plants had damaged stem, likely caused by insects damage





How to Splice Graft Cucumber Plants

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Disease



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Disease Management

Powdery mildew



Downy mildew



Disease Management

White mold



Charcoal rot

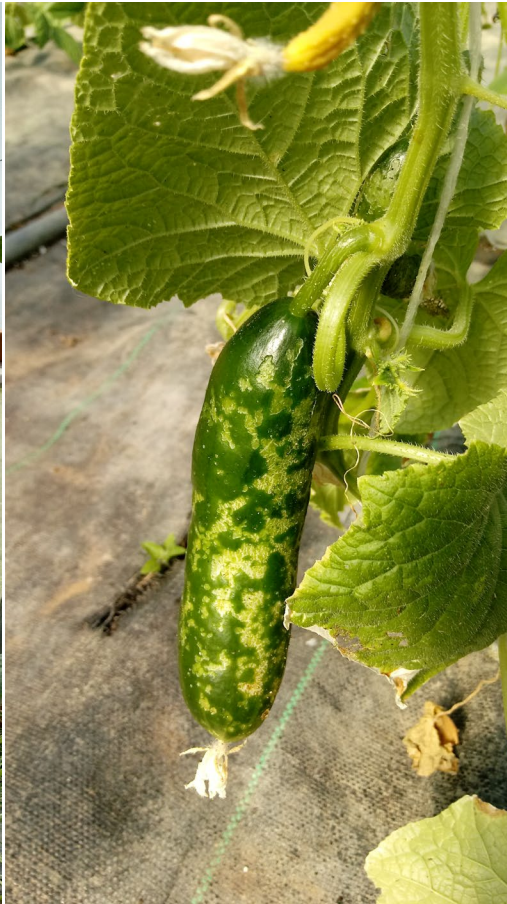


Insects & Mites



Insect Management

Cucumber beetles and bacterial wilt



Squash bugs



Insect Management

Two-spotted spider mites



Aphids







Augmentation BioControl

- Successful in greenhouse
- Commercially-available predatory insects
- Feed on pests, pollen and nectar; attracted to HIPVs
- Need to consider dispersal during periods of low pest availability





Green
Lacewing



Convergent
Ladybug



Minute
Pirate Bug



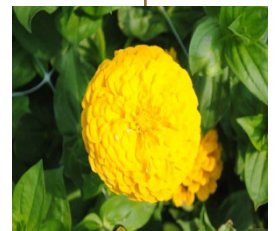
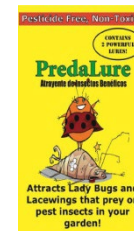
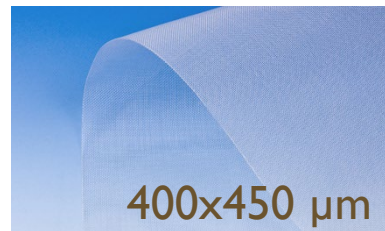
Spined
Soldier Bug



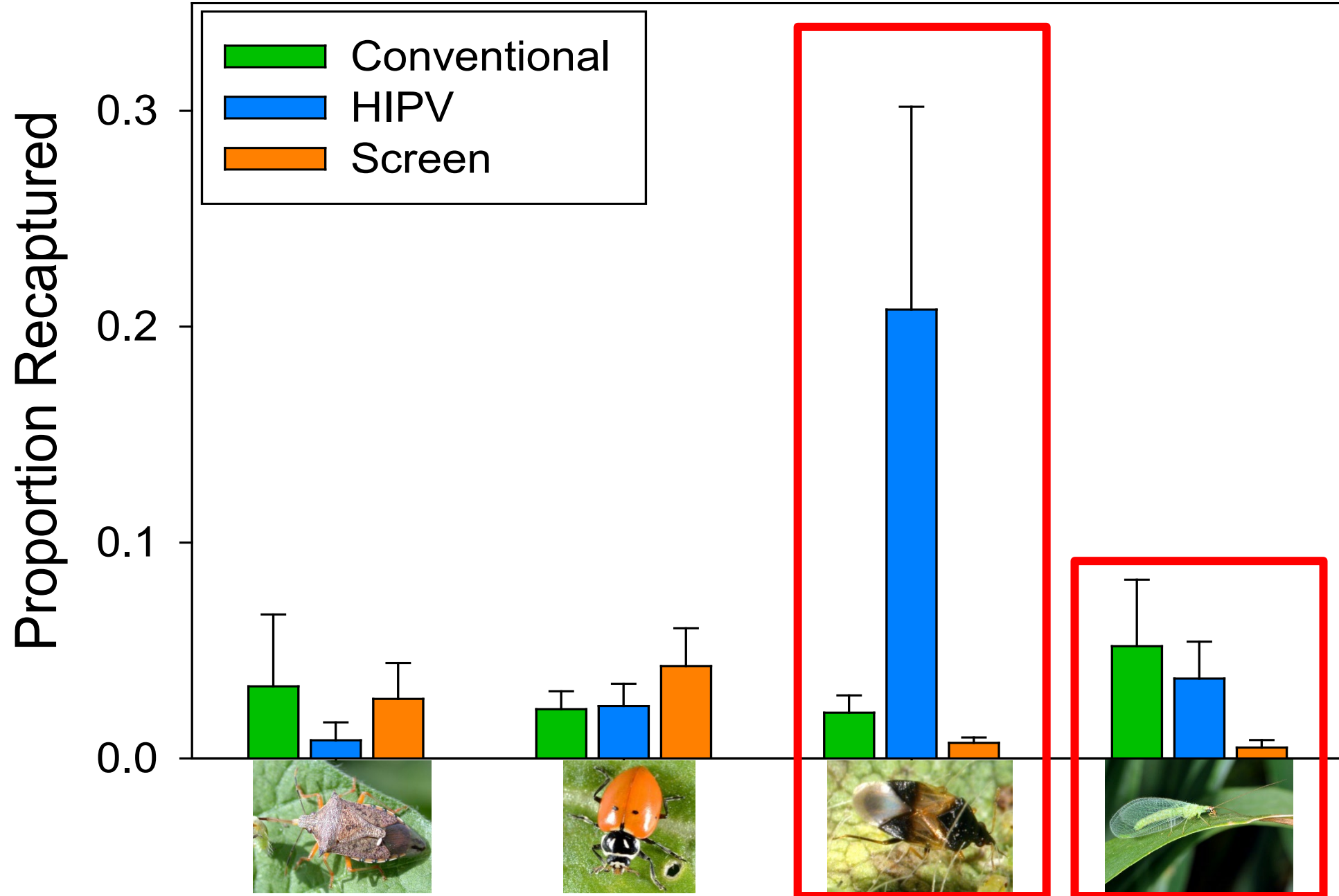
Conventional

Screened

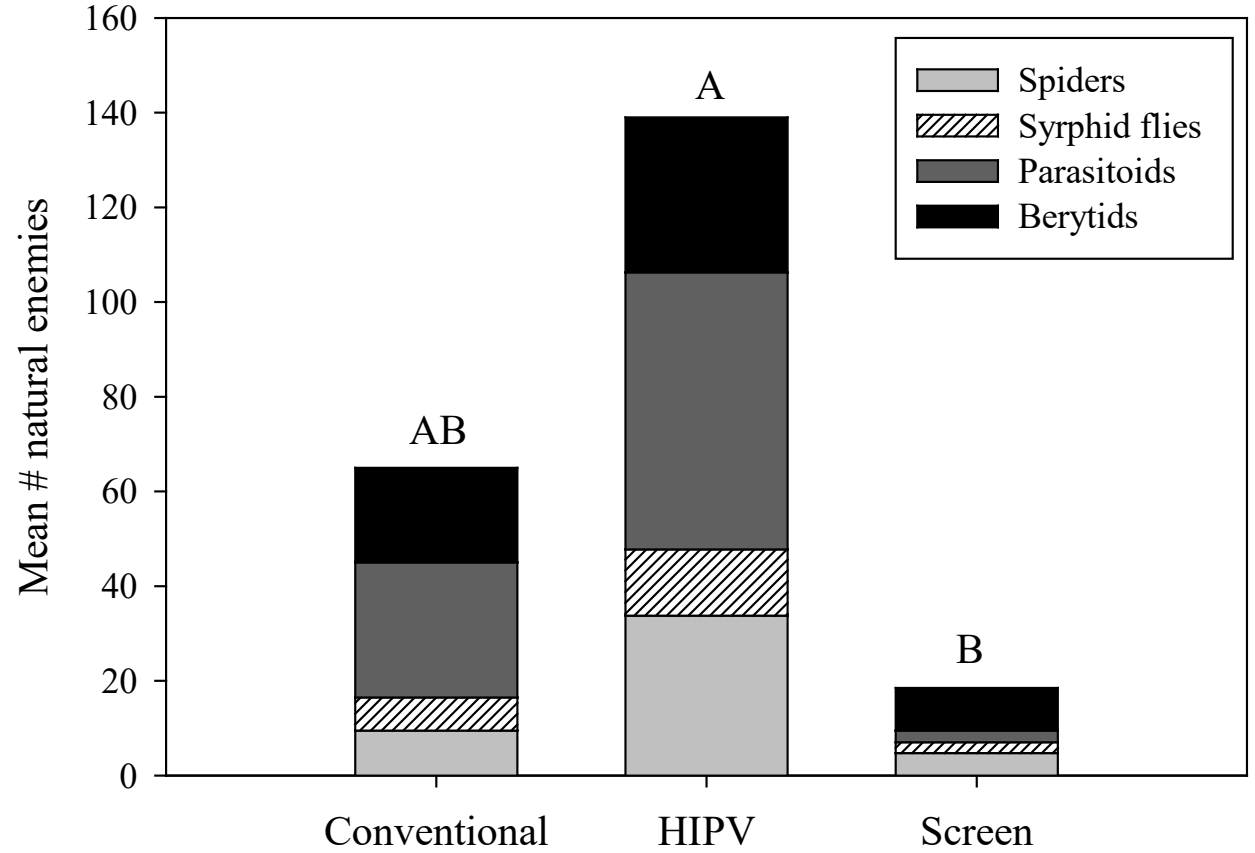
Volatile + Flowers



6 Days Post Release

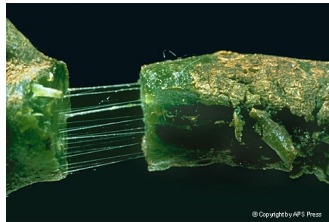


BEYOND ORIUS, FLOWERS WERE GOOD!

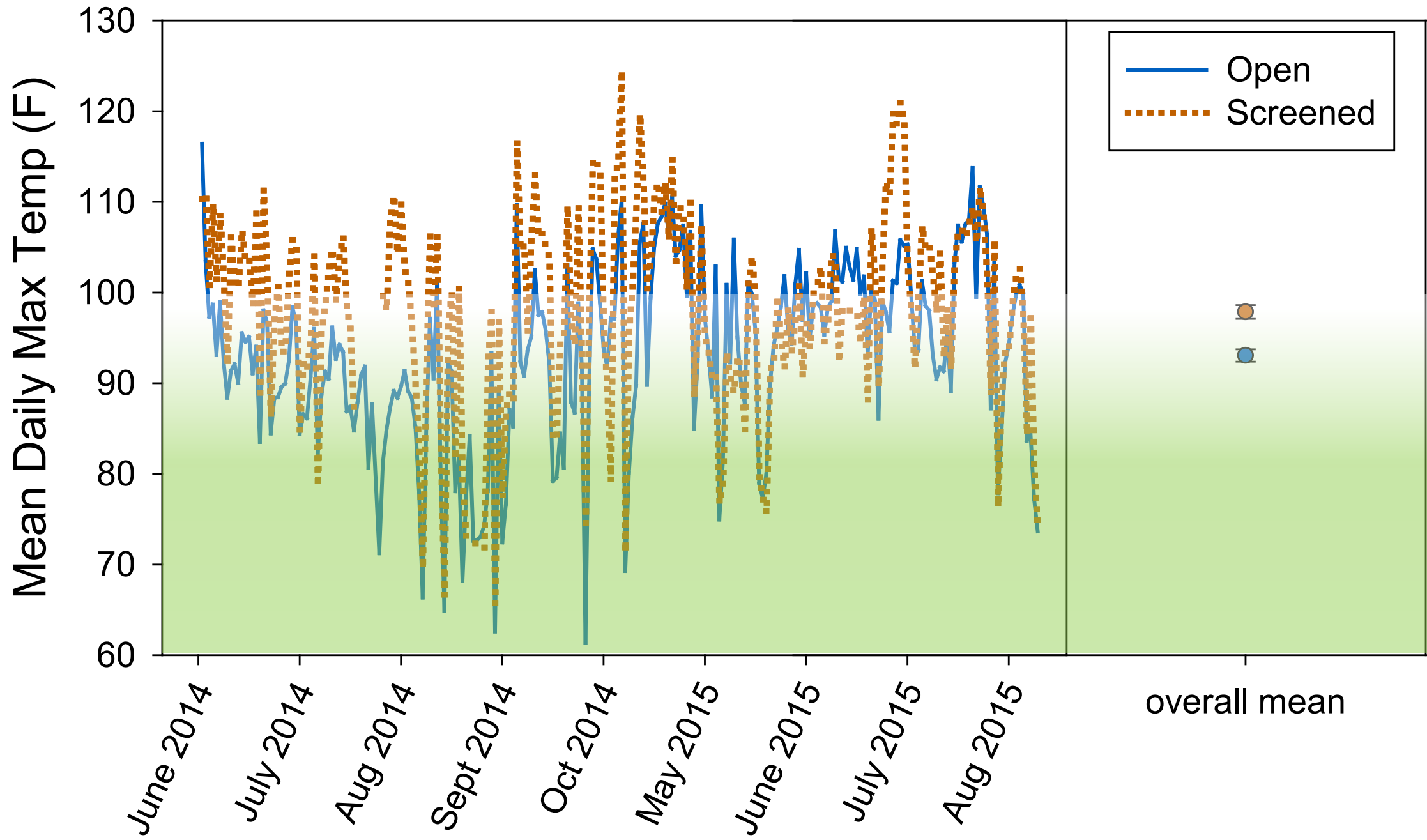


Lessons Learned

- Screening protects against cucumber beetles and bacterial wilt



- Screening can increase aphid outbreaks

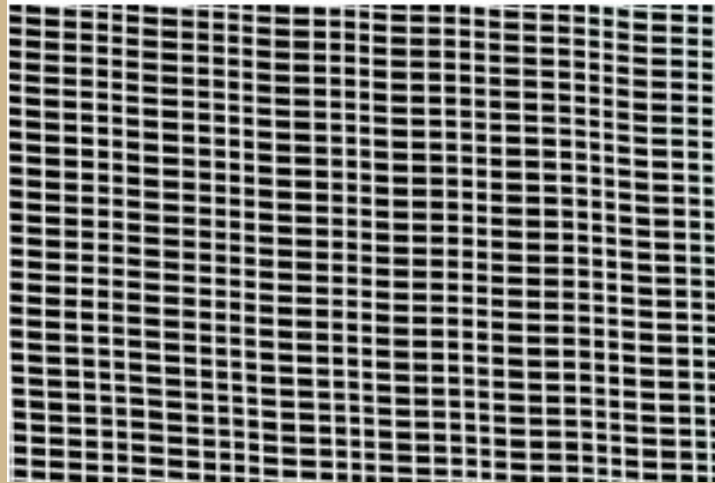


Insect Exclusion Screens



LS Econet 100400

- Hole 1.00 x 4.00 mm
- 90% PAR transmission
- 5% ventilation reduction



Anti-Insect Netting, 25 Mesh

- Hole 0.72 x 0.97 mm
- 78-82% PAR transmission
- 40% ventilation reduction

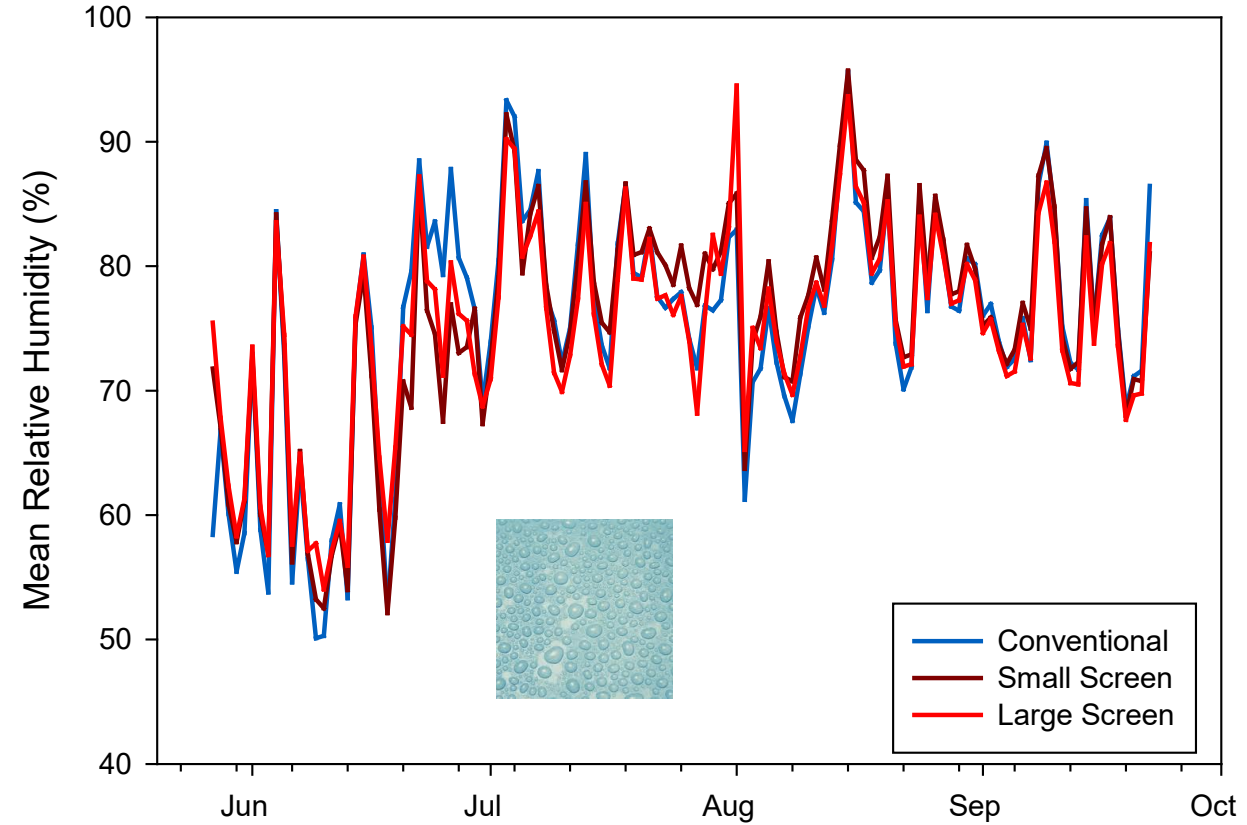
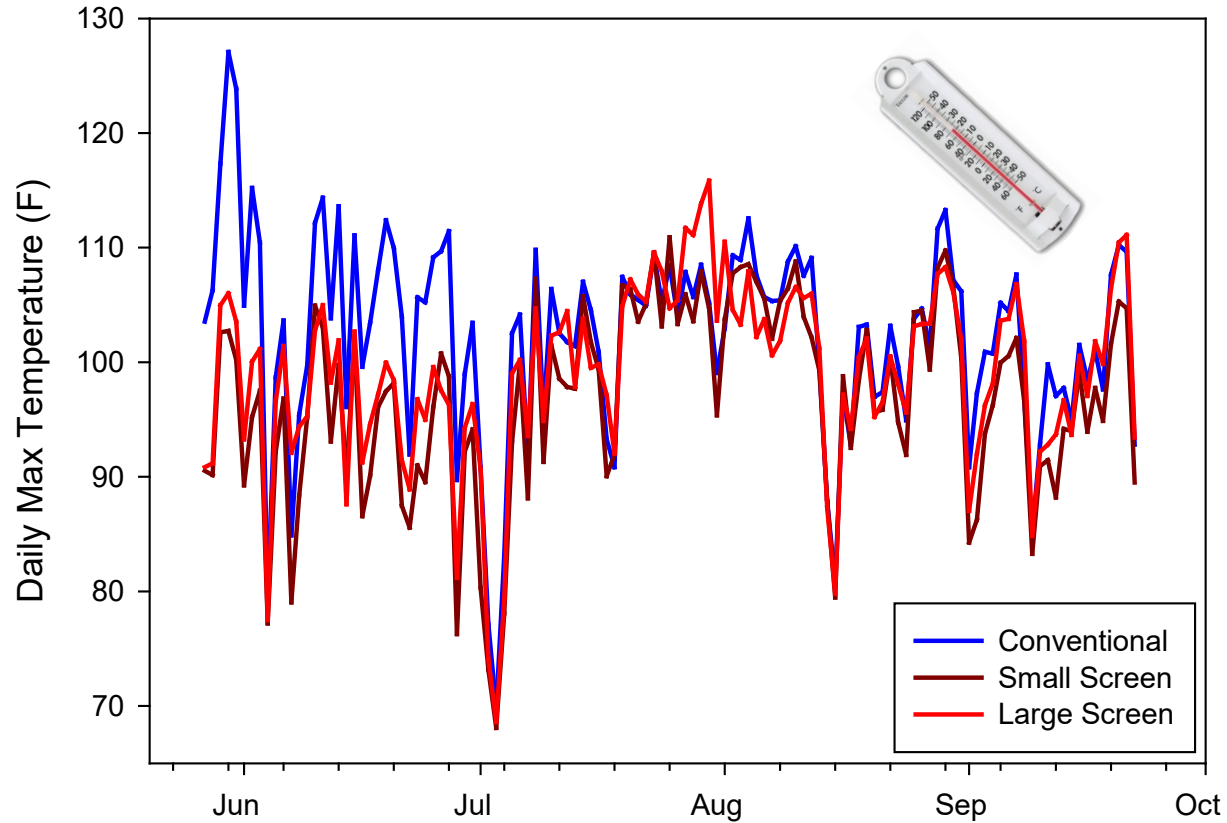
Eunis



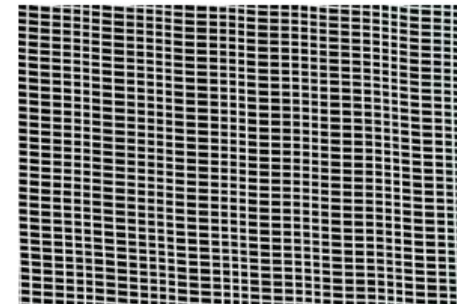
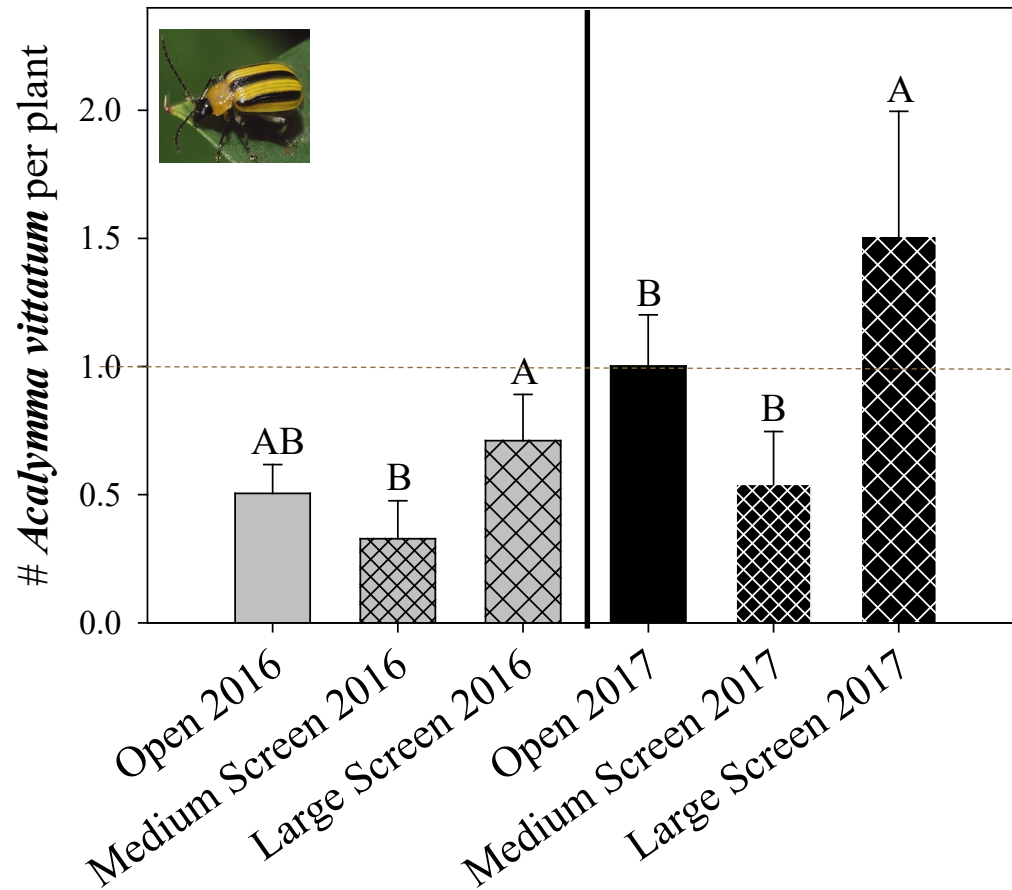
Corinto



No difference in temperature or %RH



Utility of Screening



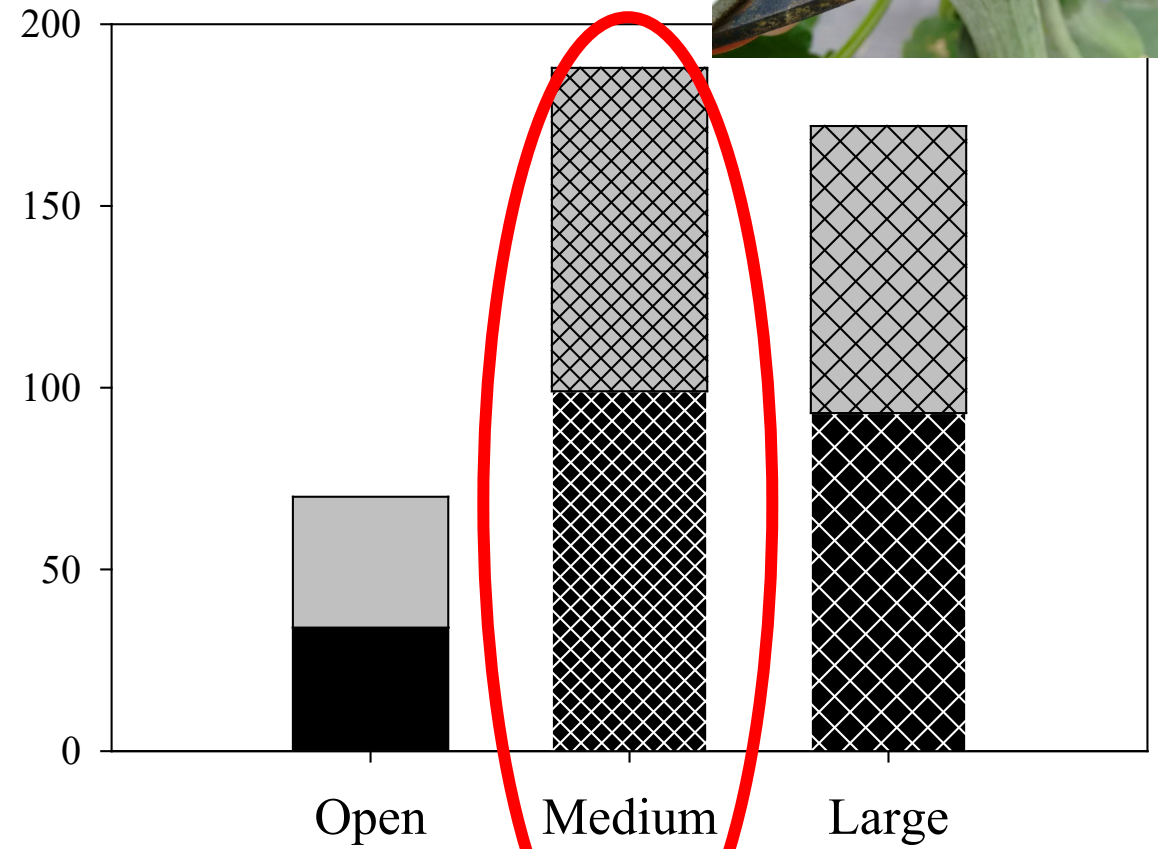
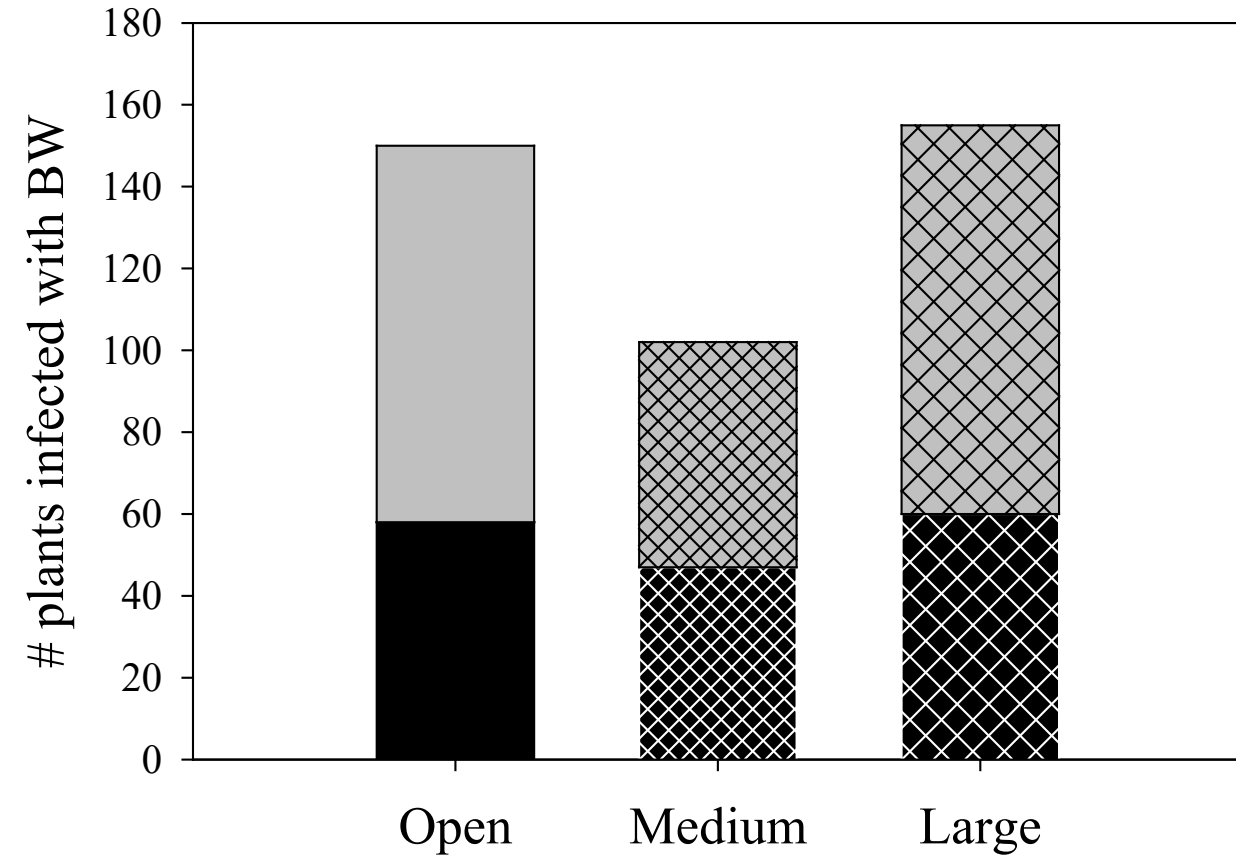
Anti-Insect Netting, 25 Mesh

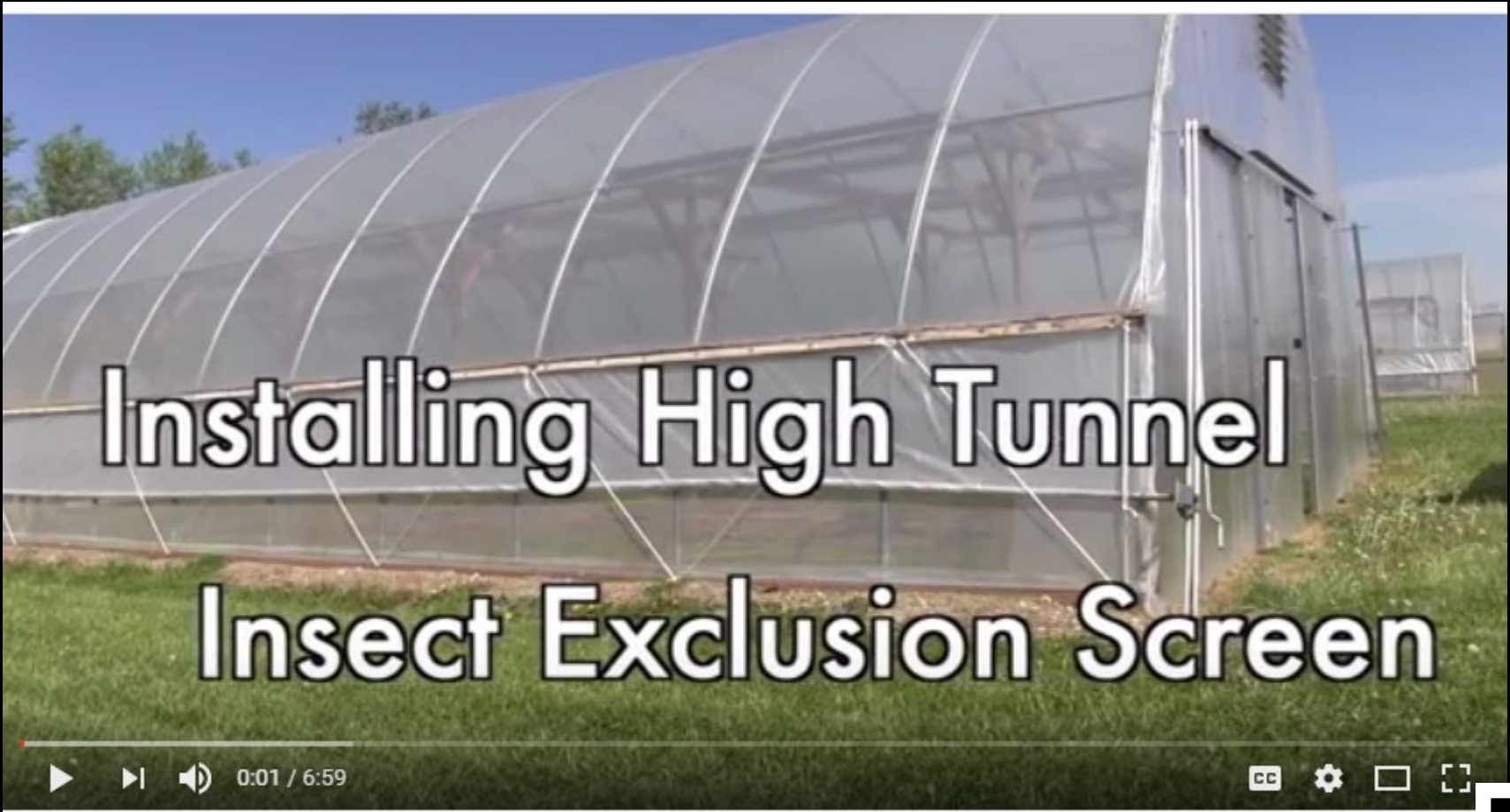
- Hole 0.72 x 0.97 mm
- 78-82% PAR transmission
- 40% ventilation reduction

1.00 x 4.00 mm
too big!

0.40 x 0.45 mm
too small!

Best management practices are key!





Installing High Tunnel Insect Exclusion Screen



PurdueExtensionEntm

 **Subscribe** 497



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 Purdue Fruit & Veg IPM

- General Production Considerations
- Cultivar Selection
- Pruning and Trellising Systems
- Insect and Mite Management
- Disease Management
- Physiological Disorders
- Grafting



High Tunnel Cucumber Production Guide



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