

Reflective Mulch for Vegetables

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Tomatoes

- Valuable crop
 - Ranked 9th most important in 2007
 - Local and fresh preference
 - Increased revenue and acreage
- Pests and pathogens



Tomato Yellow Leaf Curl Virus (TYLCV)

- Detected in 2009
- Symptoms
 - Stunted plant growth
 - Chlorotic leaves
 - Reduced yield
- Transmission
 - Insect vectored
 - Whitefly *Bemisia tabaci* Biotype B



Reflective Plastic Mulch

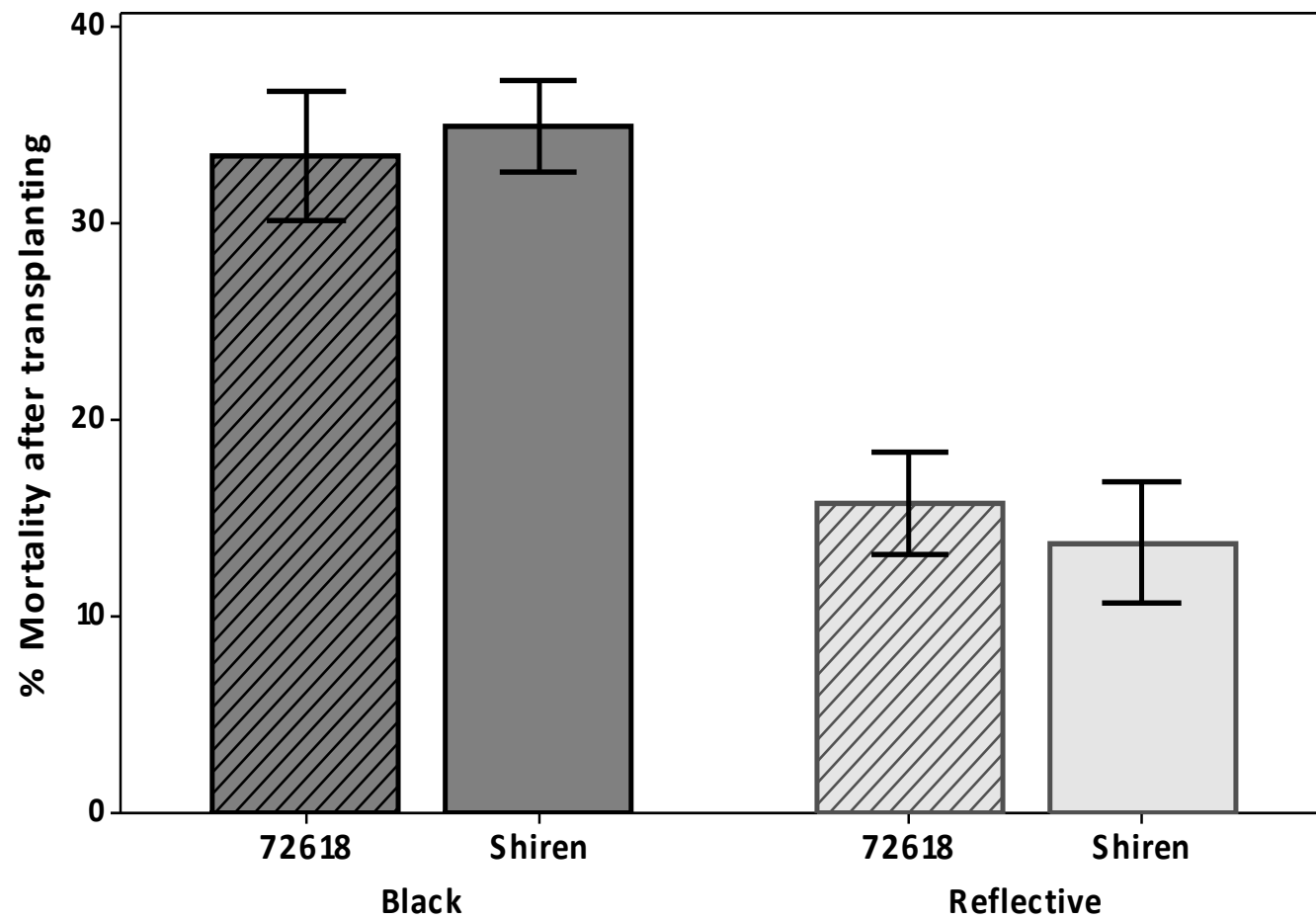
- Changes microclimate around the plant
- Increased growth and yield
- Reduces pest densities
- Used in mainland



Plastic Mulch

- Black Plastic Mulch
 - Affordable control method
 - Weed control
 - Soil water retention
 - Increase soil temperature



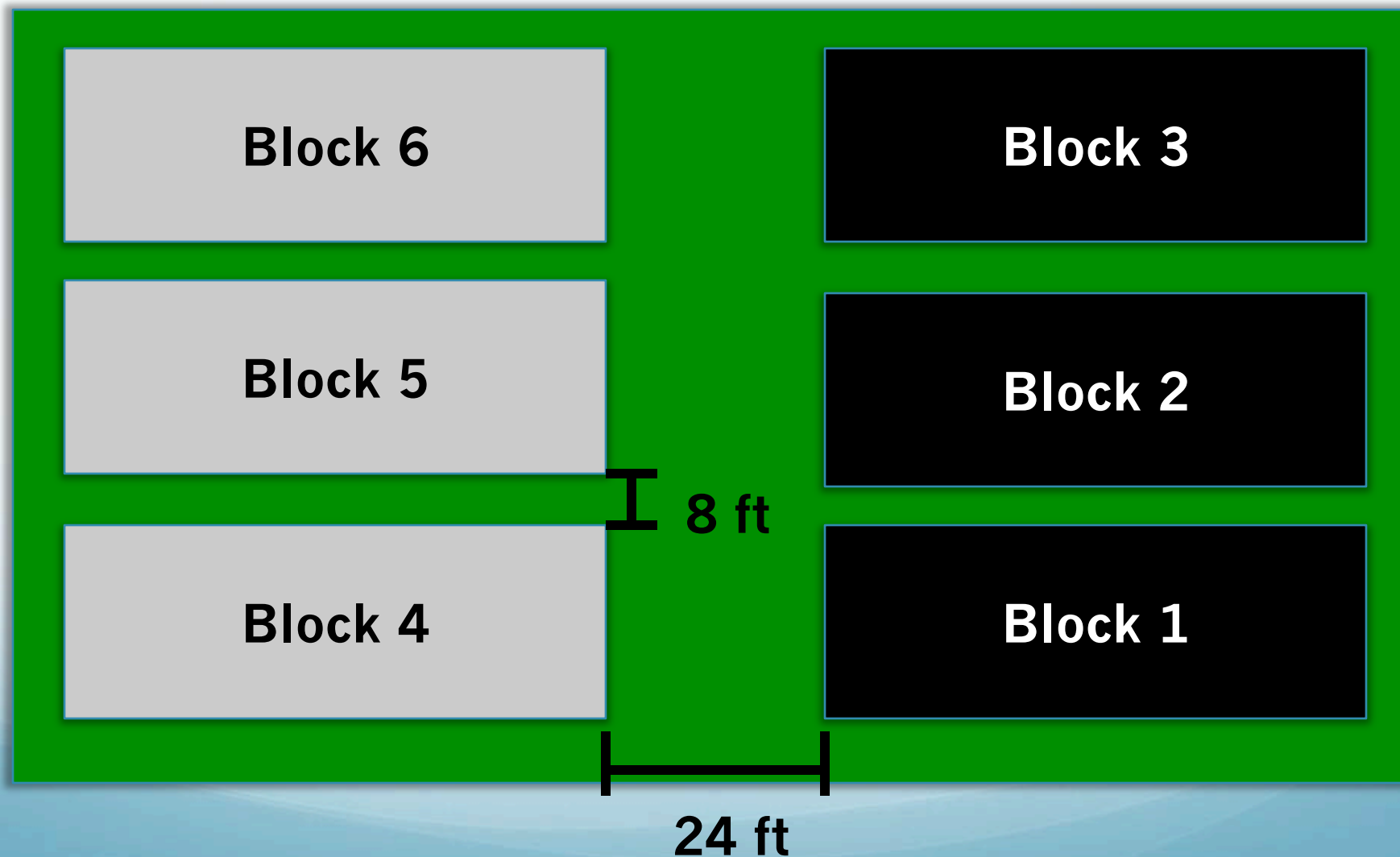


Comparisons

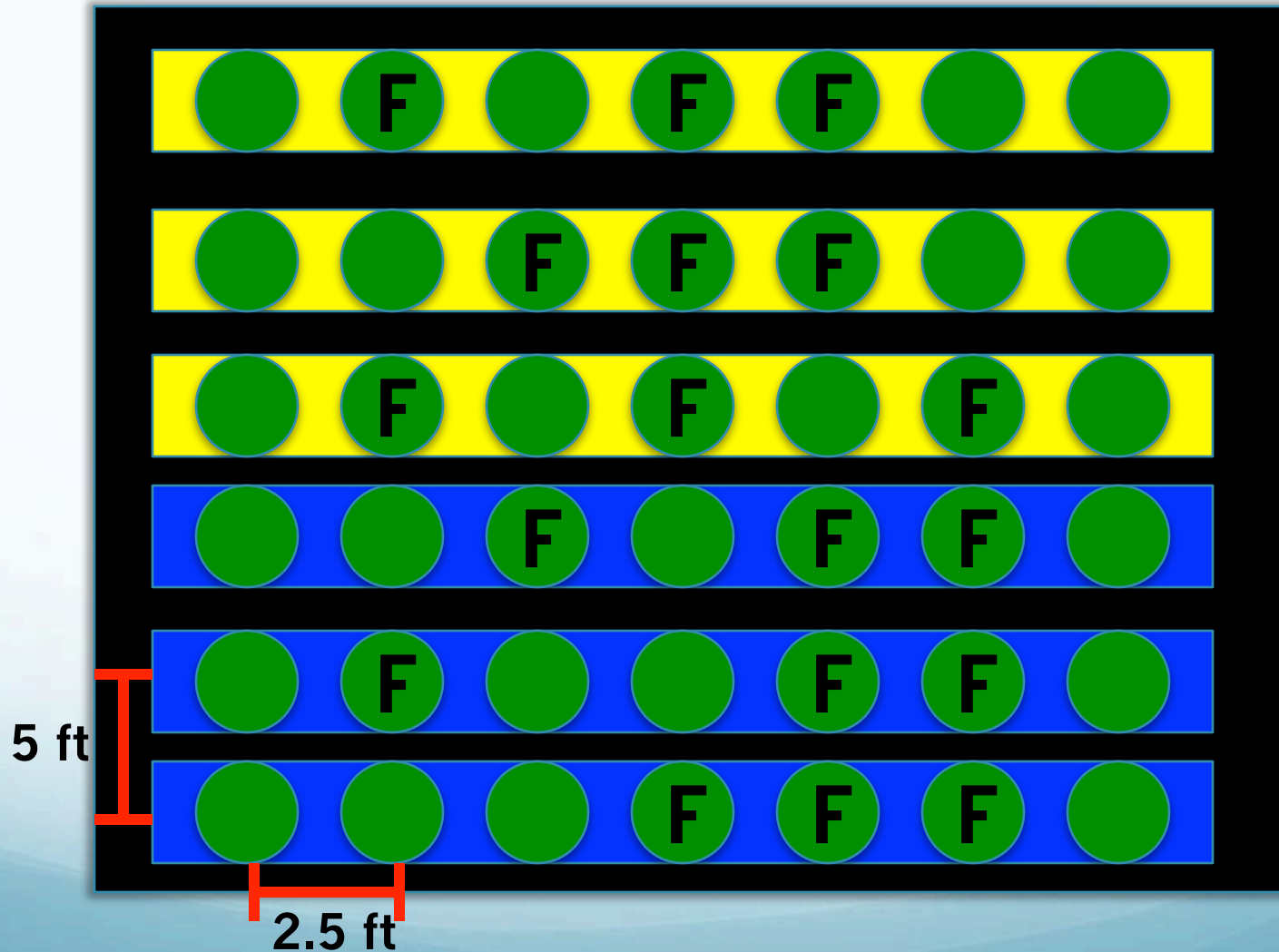
- Mulch: Black and Reflective
 - Growth and Yield
 - Pest Densities
 - Virus
- Varieties tested:
 - Shiren (Hazera Seeds): TYLCV Susceptible
 - 72618 (NiritSeeds): TYLCV Resistant



Field Set Up



Block Set Up



72618
Resistant

Shiren
Susceptible

Growth

- Stem Diameter
- Height
- Biomass
 - Fresh
 - Dry

Yield

- Fruit Bunches
- Fruit Yield
 - Sorted into categories
 - Count and weight



Pests

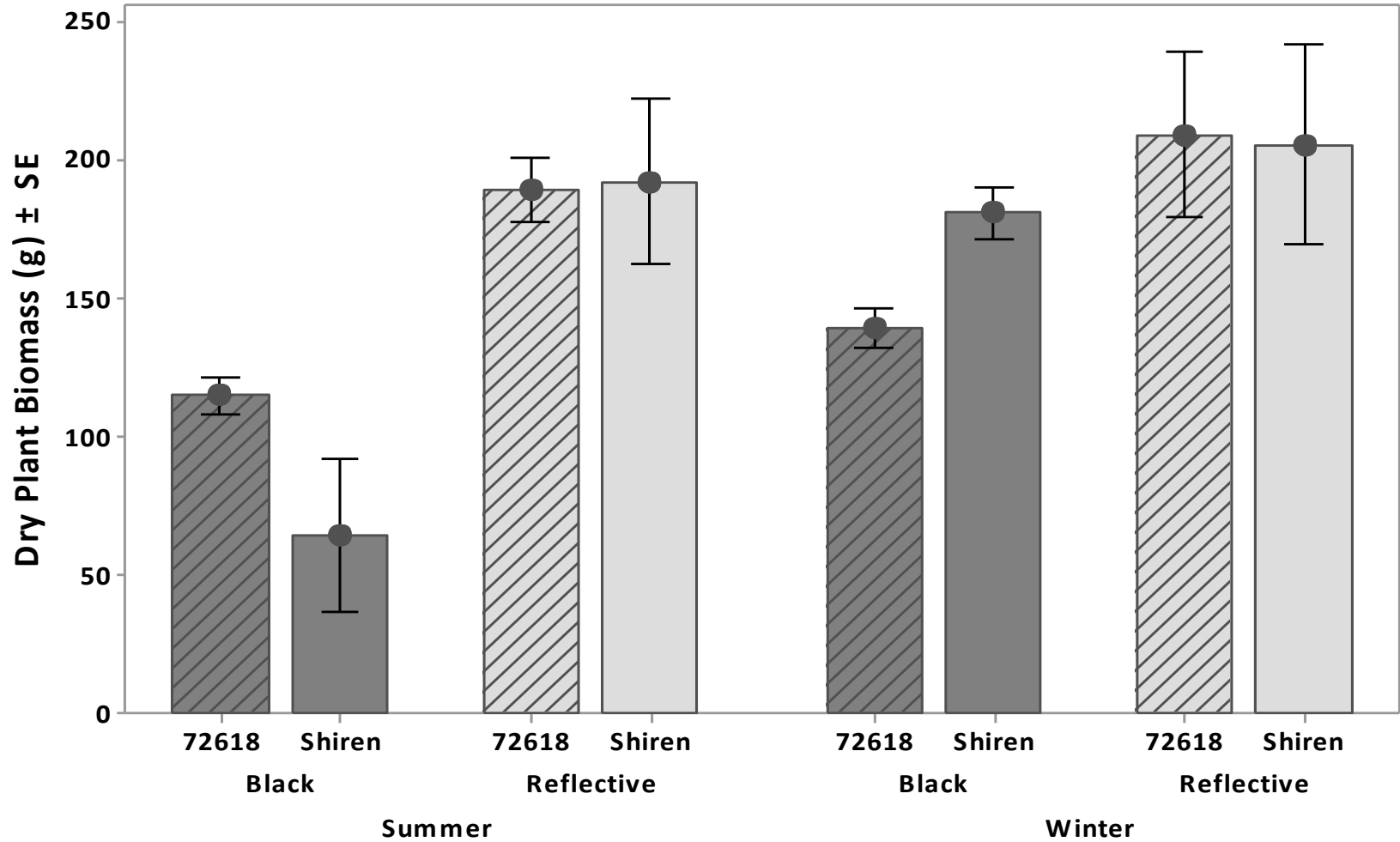
- In Field
 - Adult Whitefly (WF)
 - Terminal leaf of axillary shoot on bottom third
- Leaf Samples
 - WF egg and nymph
 - Terminal leaf on 7th axillary shoot from apical meristem

Virus

- Disease severity index from 0-4
- PCR- ongoing



Dry Biomass





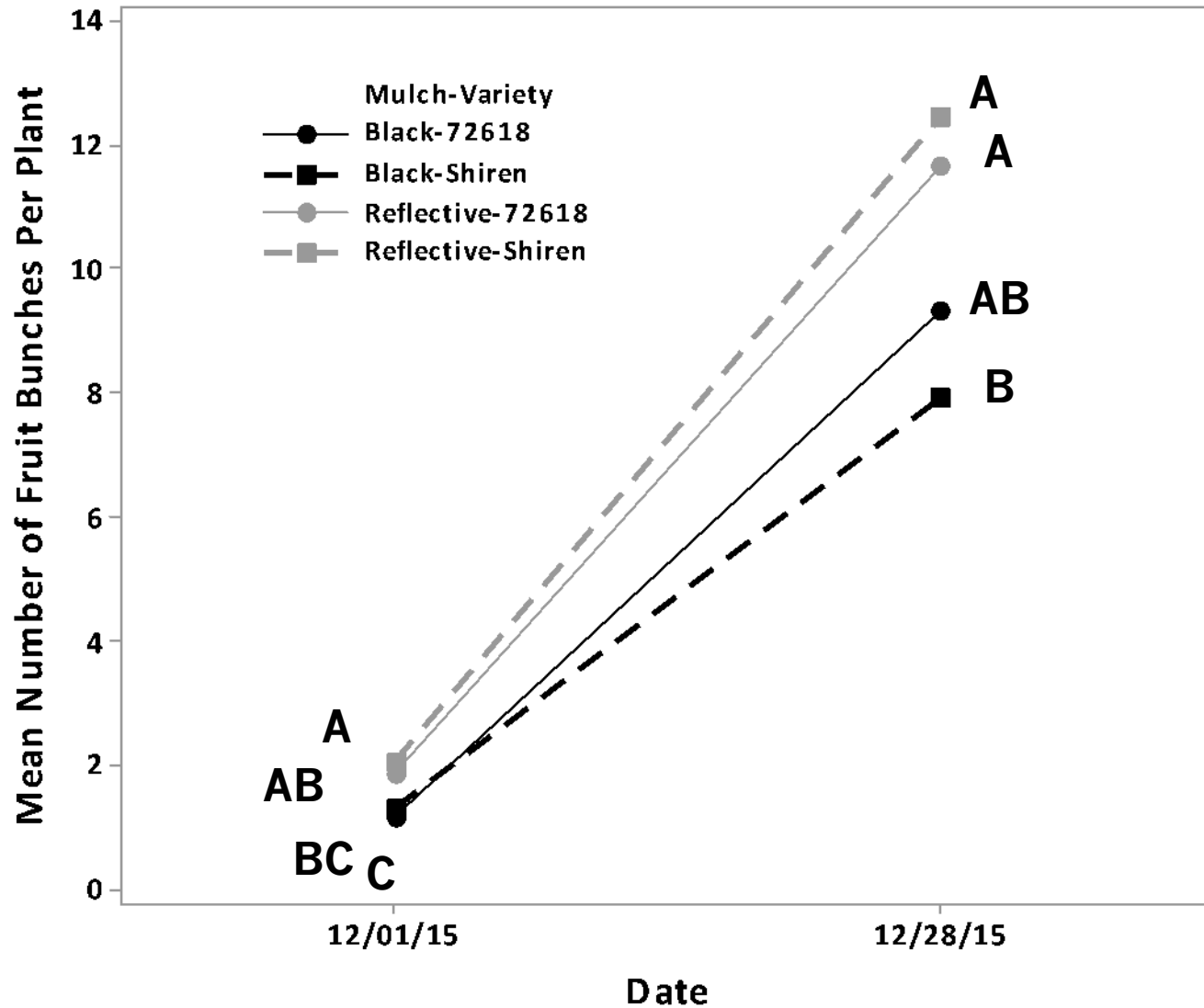
Reflective mulch



Black mulch



Fruit Bunches Over Time



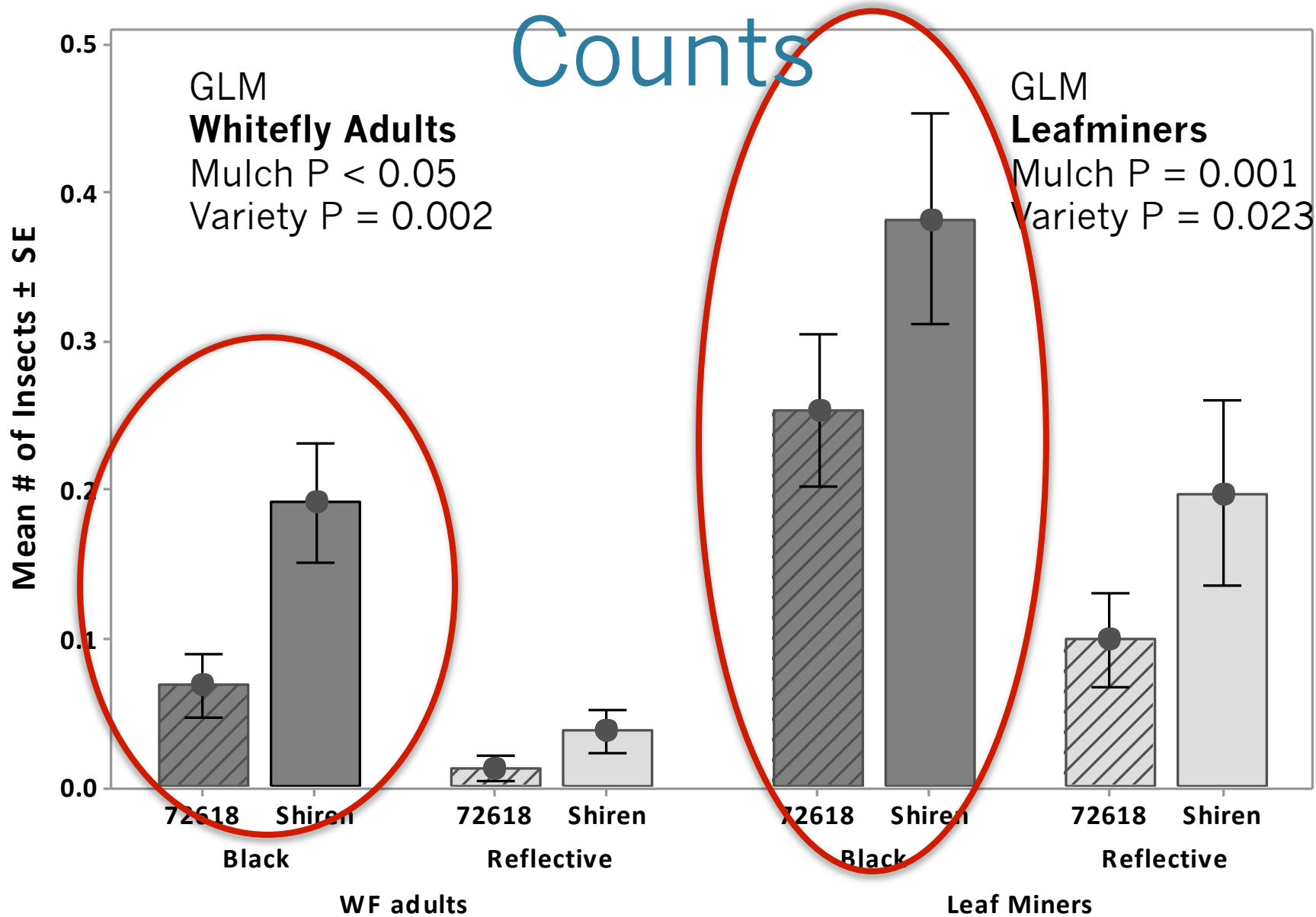


Black mulch

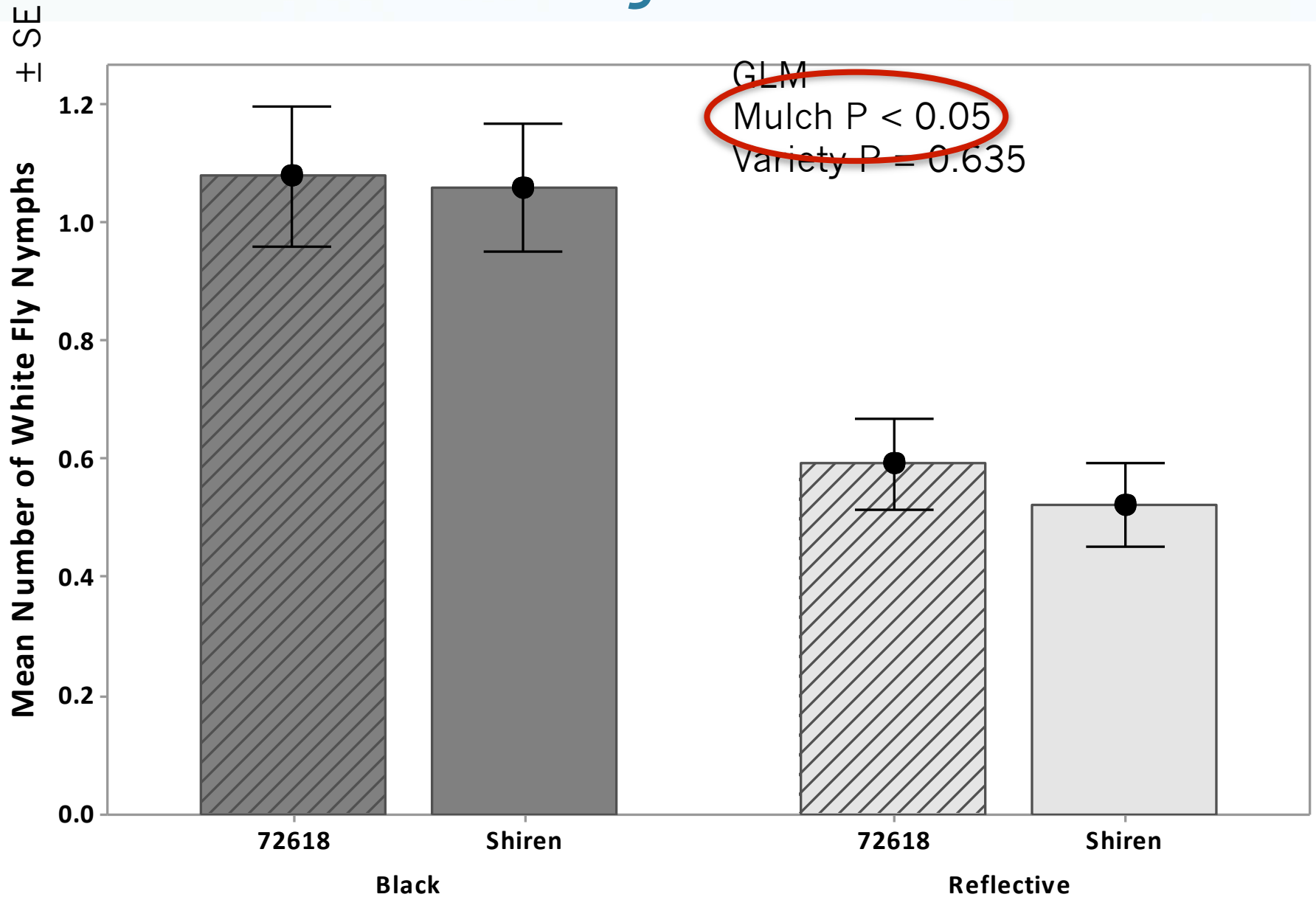


Reflective mulch

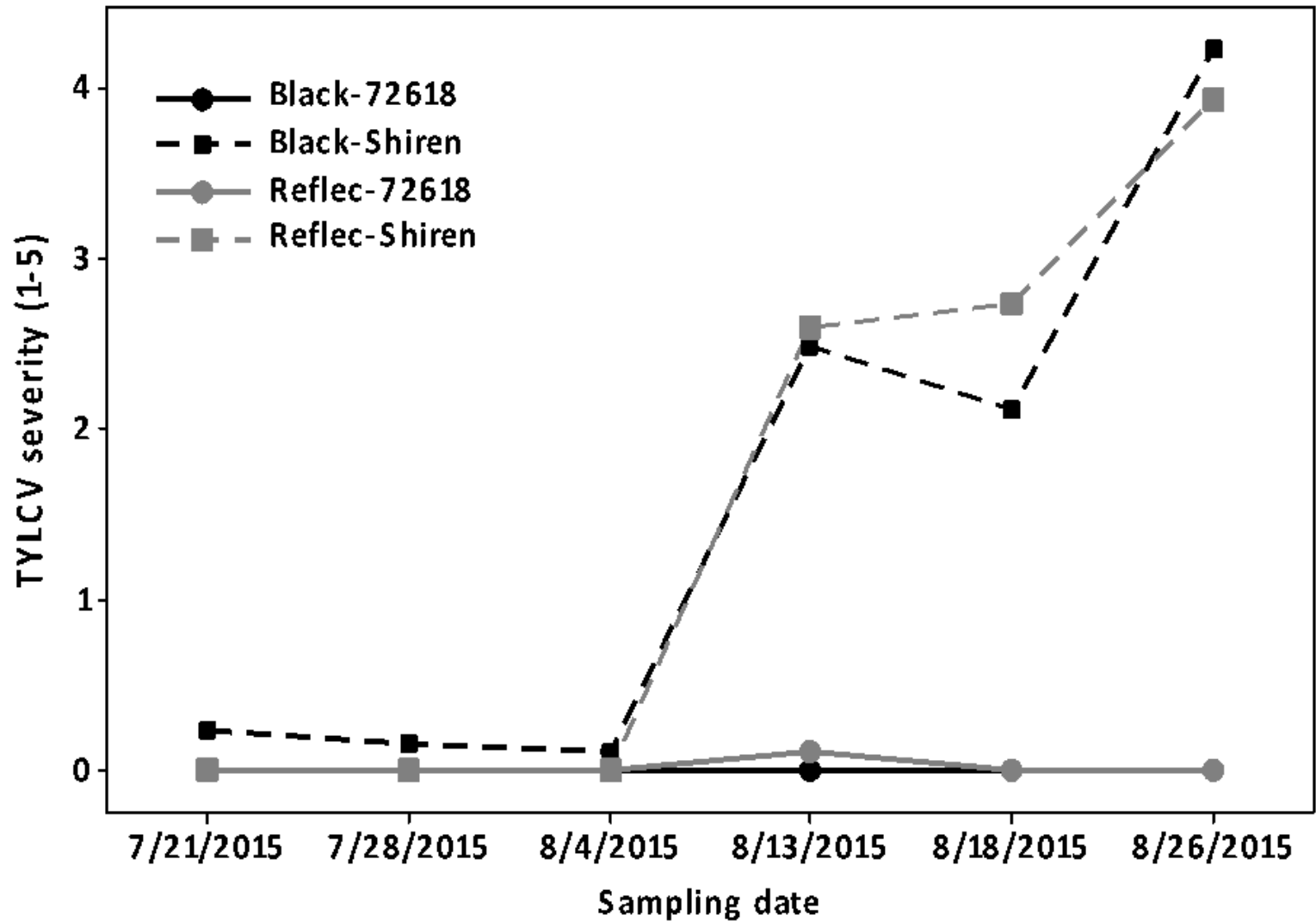
Whitefly and Leafminer Counts



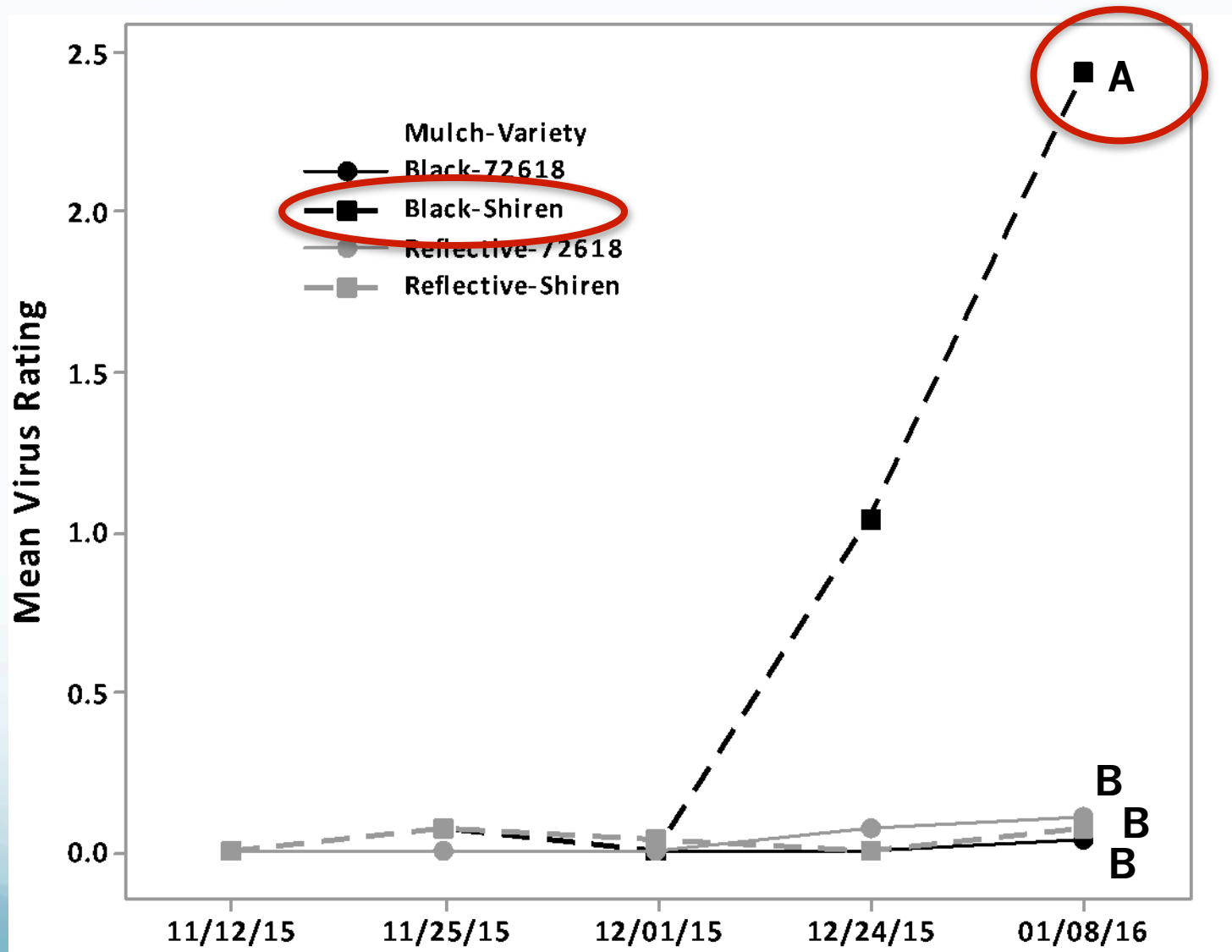
Whitefly Counts



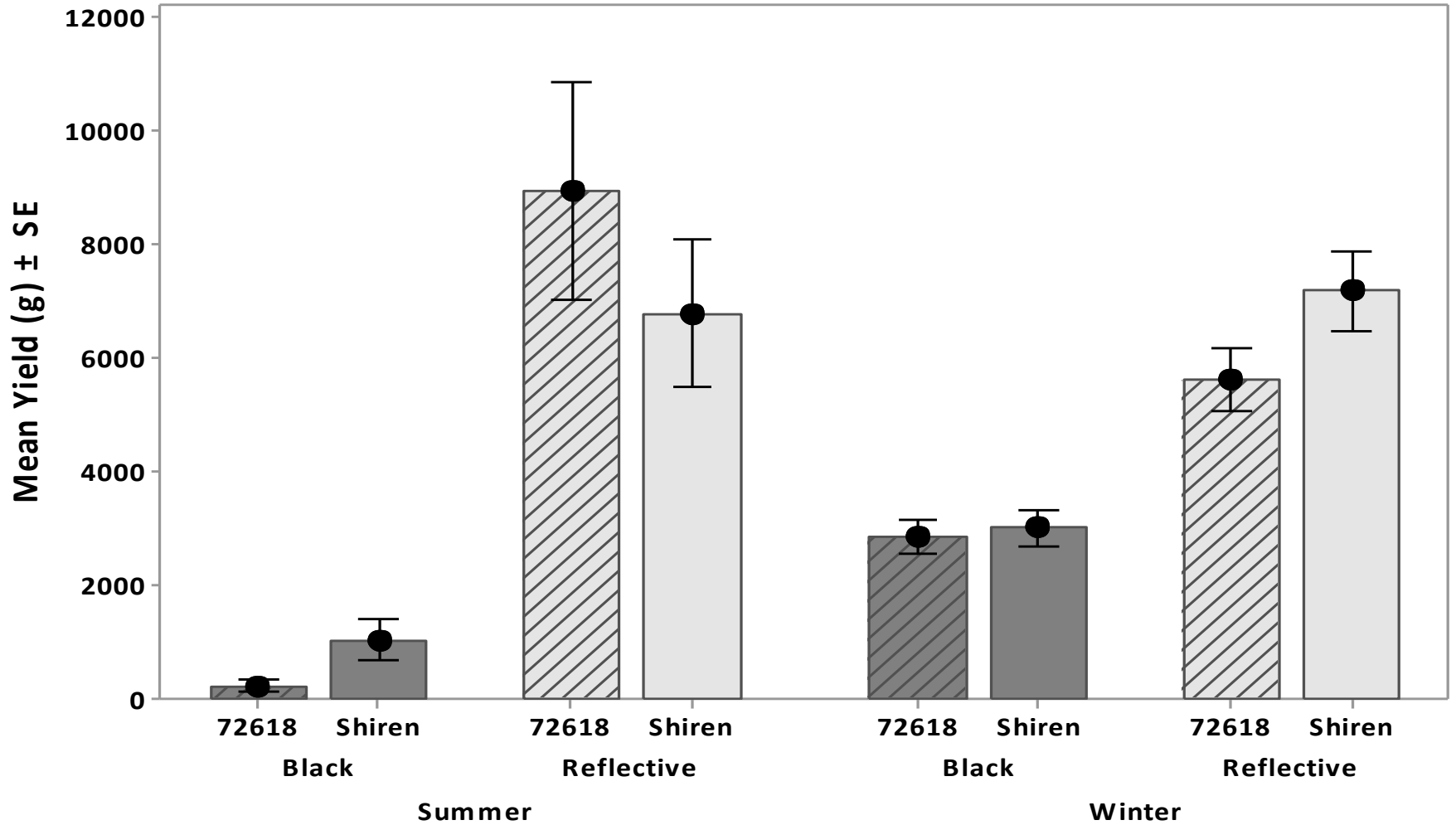
Virus Rating – Summer Trial



Virus Rating – Winter Trial



Marketable Yield

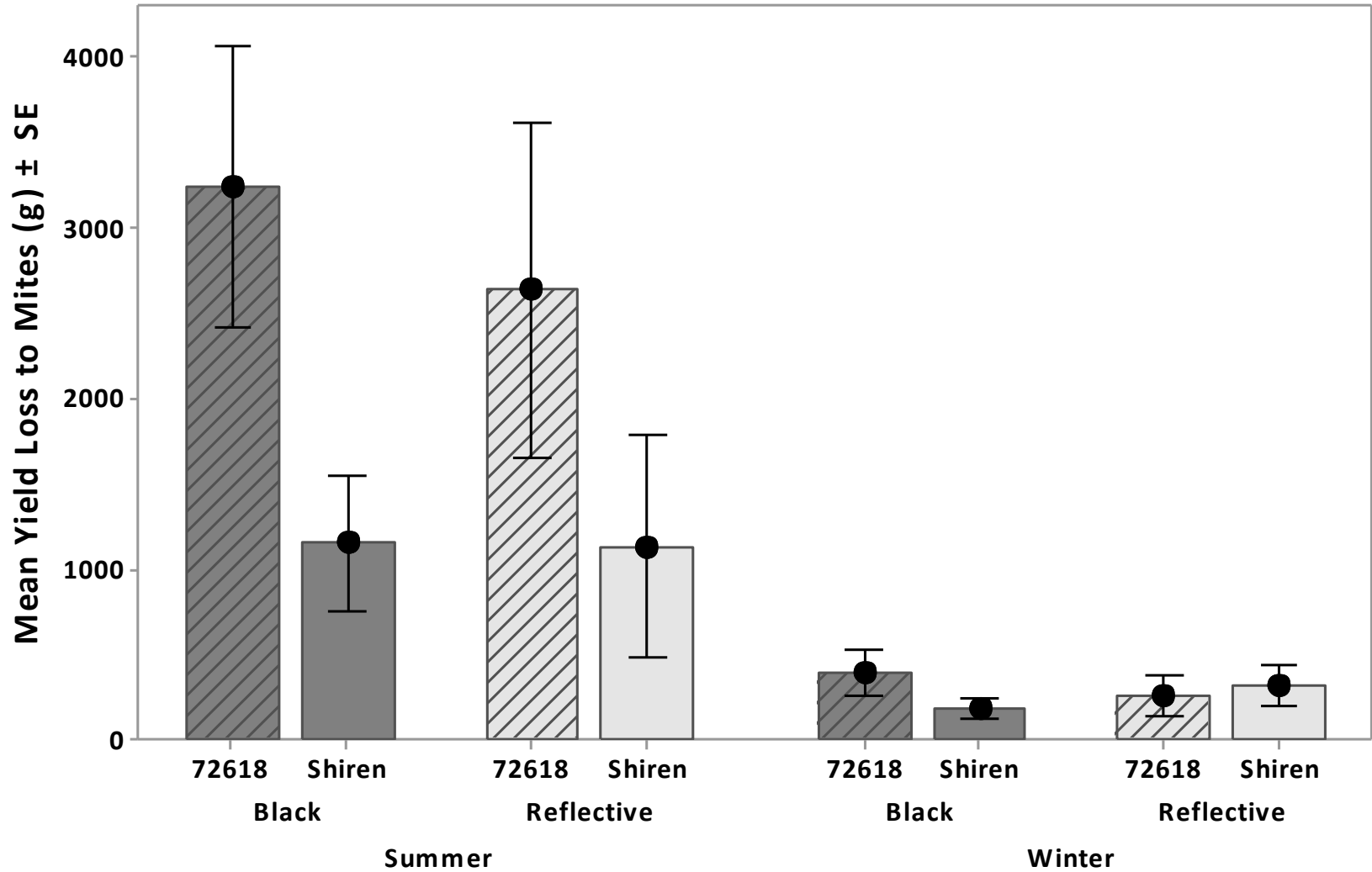




Reflective Shiren

Black Shiren

Yield Lost to Mites



Summary

- Plants growing in the reflective plastic mulch experienced significantly less mortality soon after transplanting compared to the black mulch. This can be important during the hot summer months.
- The reflective mulch significantly improved plant growth rate for both varieties. Plants in the reflective mulch grew faster and more vigorously compared to plants in the black mulch.
- Plants in the reflective mulch started flowering and fruiting sooner, and had greater yield than plants growing in the black mulch.

Summary

- Pest density was significantly lower in the reflective mulch compared to the black mulch
- The reflective plastic mulch **did not** prevent the transmission and spread of TYLCV in tomato plants in the susceptible variety (Shiren) in the summer trial but **it did** during the winter trial.
- Marketable yield was higher in the reflective mulch treatment compared to the black mulch treatment.

Next Step

- Combination with Pesticides
- Economic Analysis



Acknowledgements

- USDA Western SARE
- Poamoho personnel
- Christian Mathias
- Marisol Quintanilla
- Candide Krieger
- Mike Dennis
- Erik Matousek
- Hazera Seeds
- Nirit Seeds