

Performance and Potential Value of the New Bt Thrips and Plant Bug Trait



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Gowda et al. 2016

Background

Thrips are bad



Plant bugs are worse



SOMETHING NEW TO HELP CONTROL THEM COULD BE NICE



No Trait + Cruiser Avicta



Lygus Trait + Cruiser Avicta

Jackson, TN (2014)

Bt = Cry51Aa2

Materials and Methods



Experiment Locations (2016 and 2017)

- Jackson, TN – West Tennessee Research and Education Center
- Milan, TN – Milan Research and Education Center

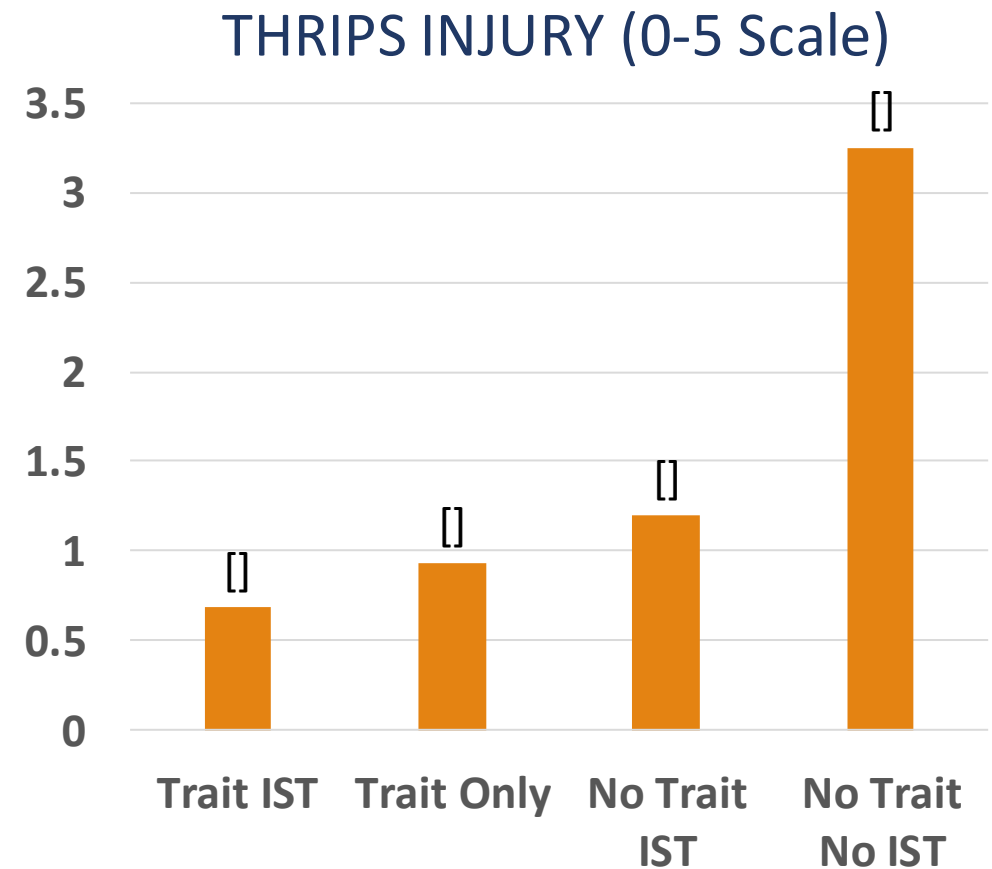
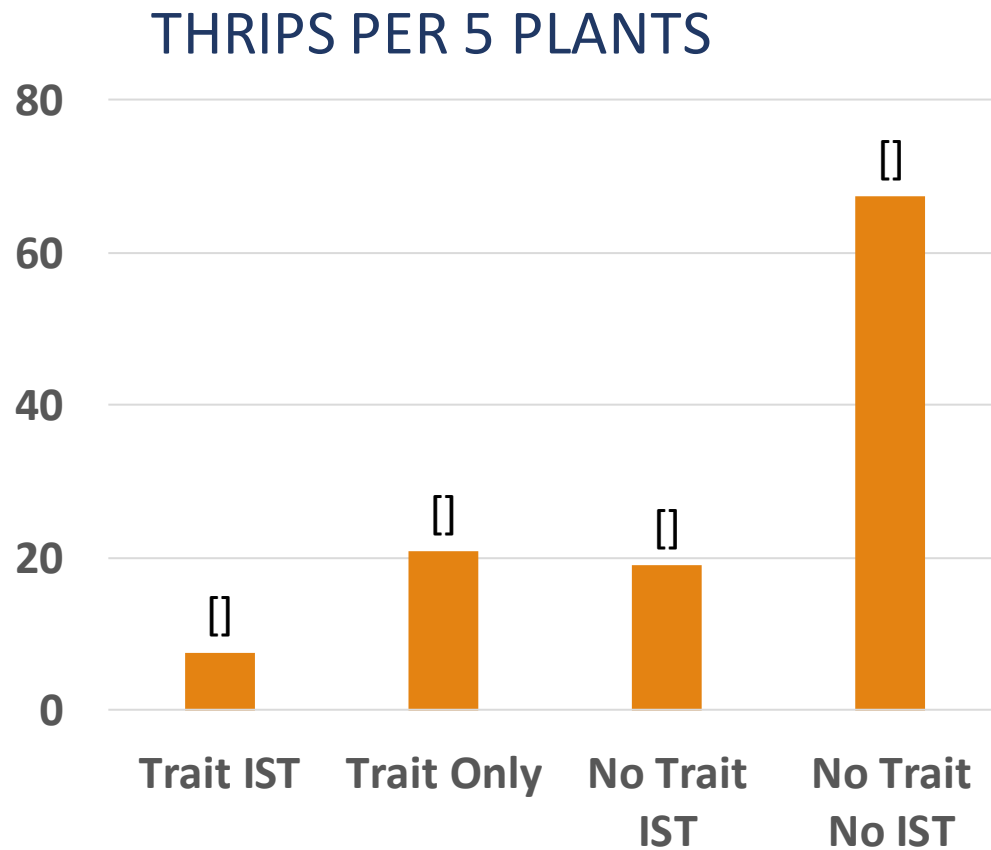


Split-Plot Design with Three Main Effects

- Factor A – 3 Foliar Spray Regimes for TPB
- Factor B – Bt Trait vs. No trait
- Factor C – IST + Foliar Thrips Spray vs. Not Treated

Thrips Ratings

3.5 Leaf Stage



Averaged over 2 years in 2 locations

Thrips Injury in 2-Leaf Cotton

2016, Jackson



Jackson, 2016

Not Treated

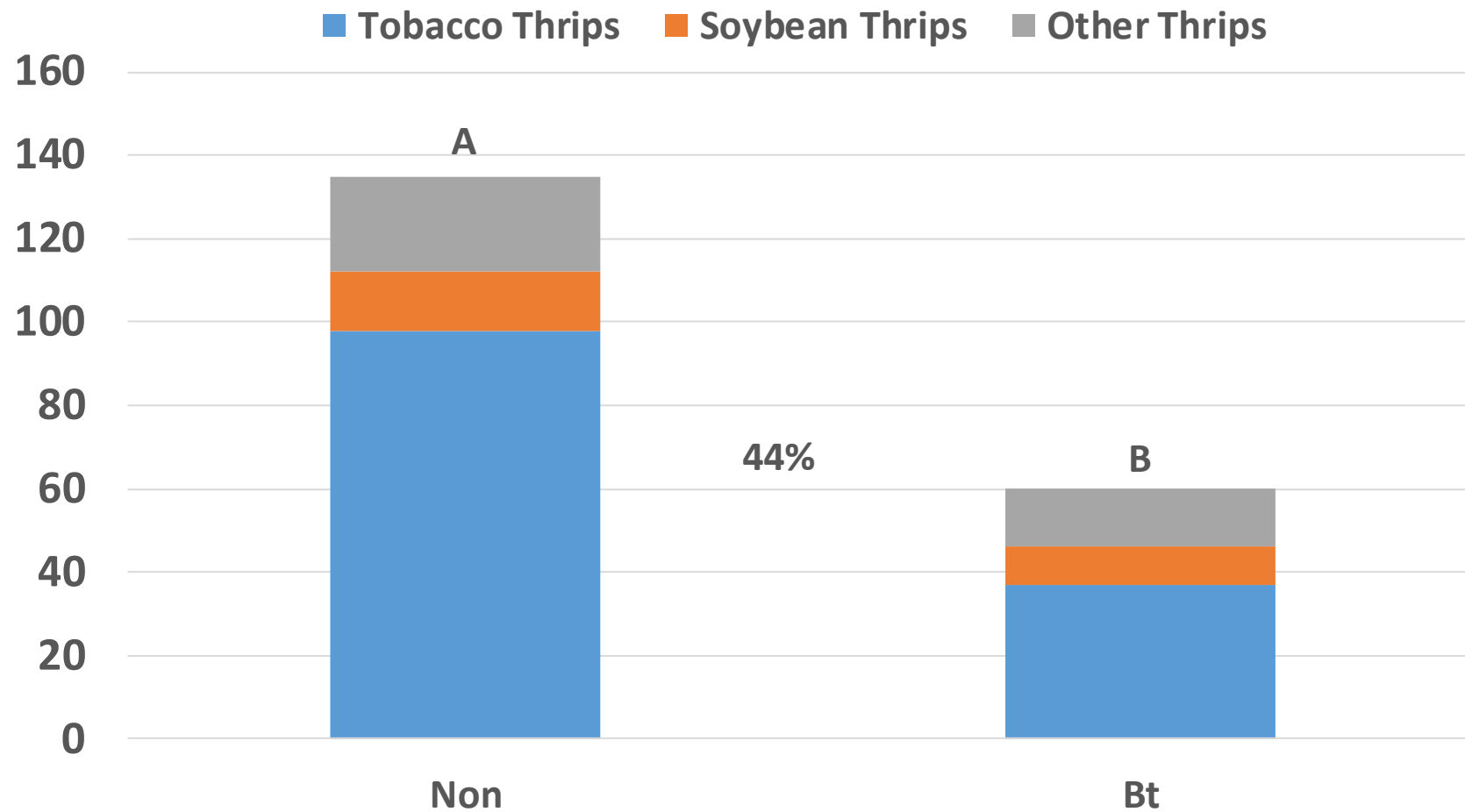


Thrips Preference



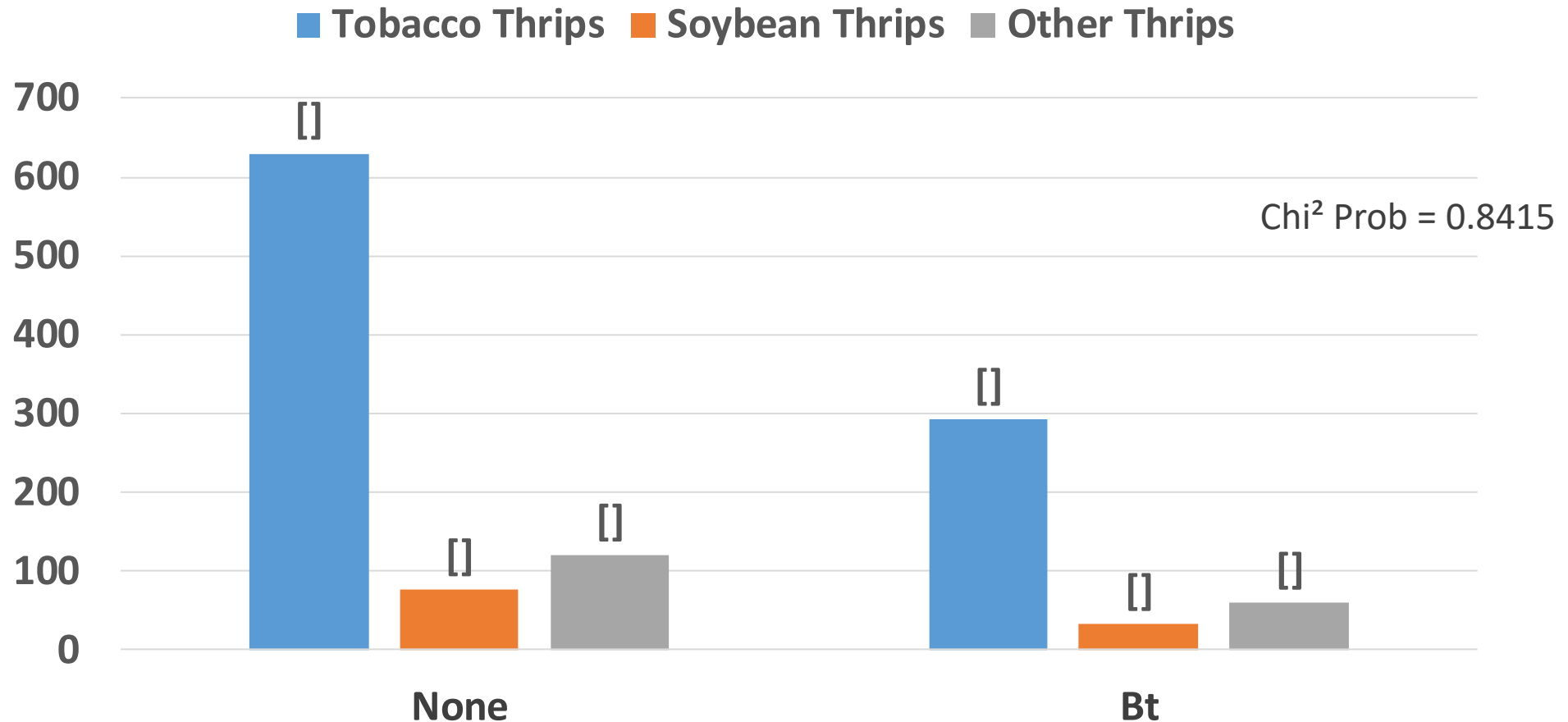
Thrips (Preference Study)

Total Adult Thrips



Distribution of Adult Thrips

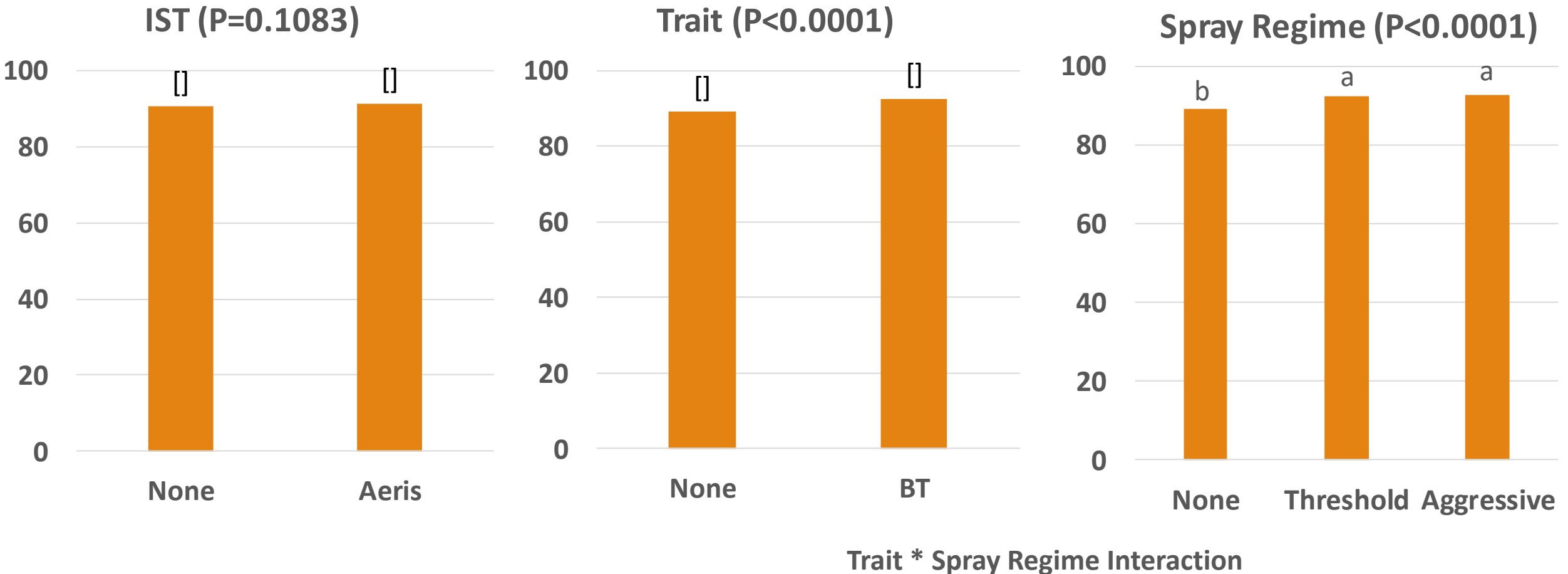
N = 1208 Thrips (Field Study)



Total adult thrips over 4 tests in 2 locations in untreated plots

Average Early Season Square Retention

Percent Retention

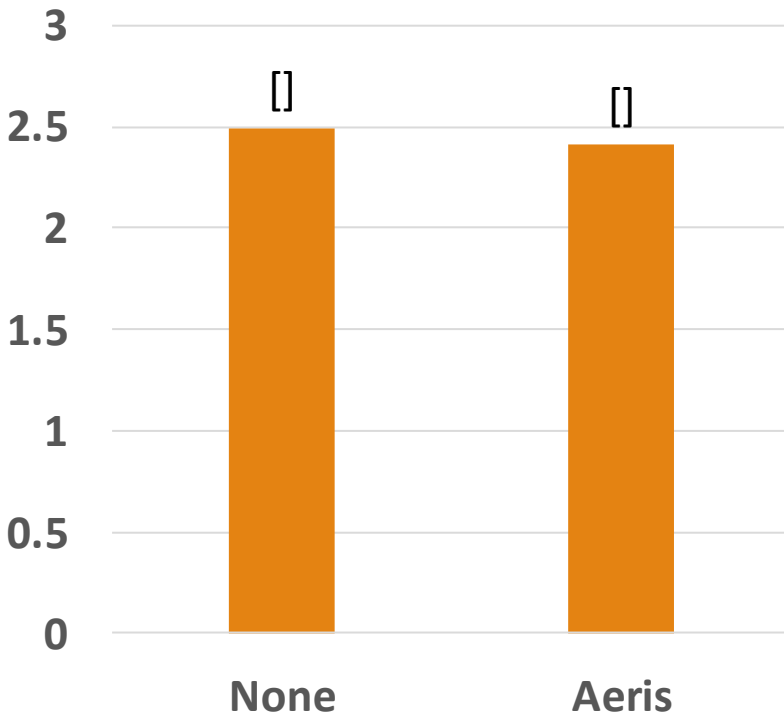


Averaged over 2 years in 2 locations

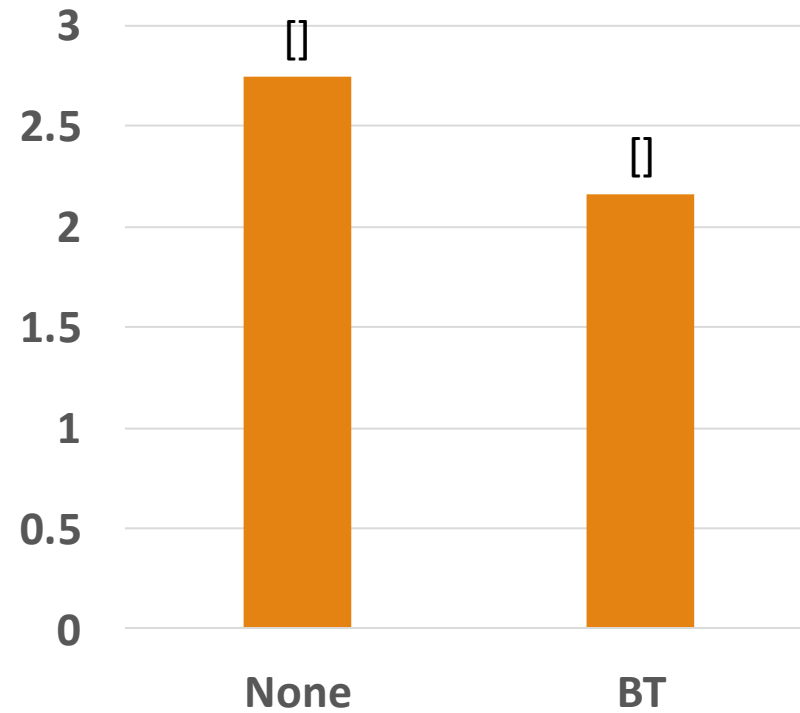
TPB Adults – Prior to Bloom

Sweep Net – Average per 25 Sweeps

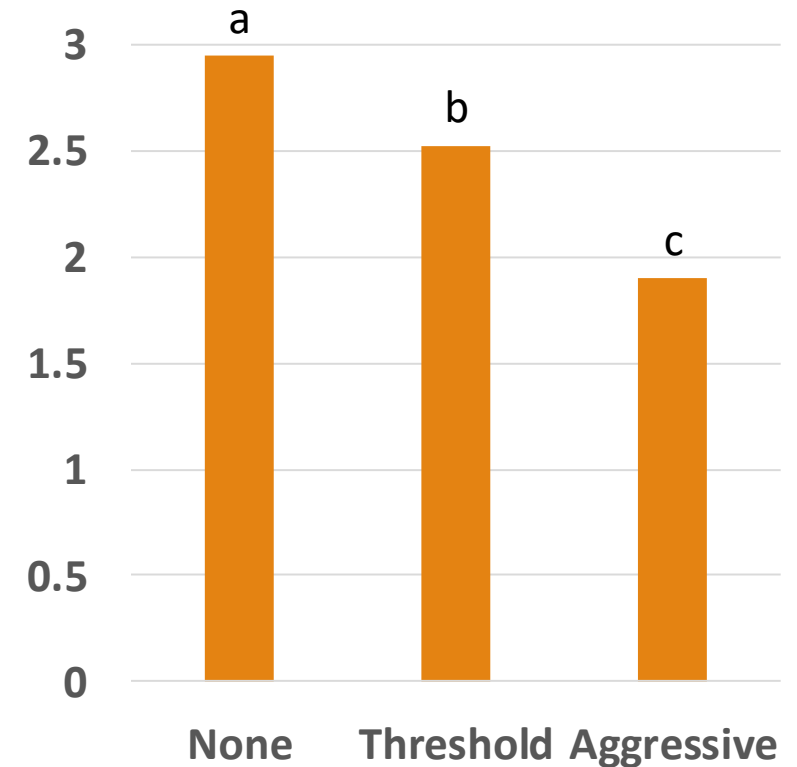
IST (P=0.6622)



Trait (P=0.0017)



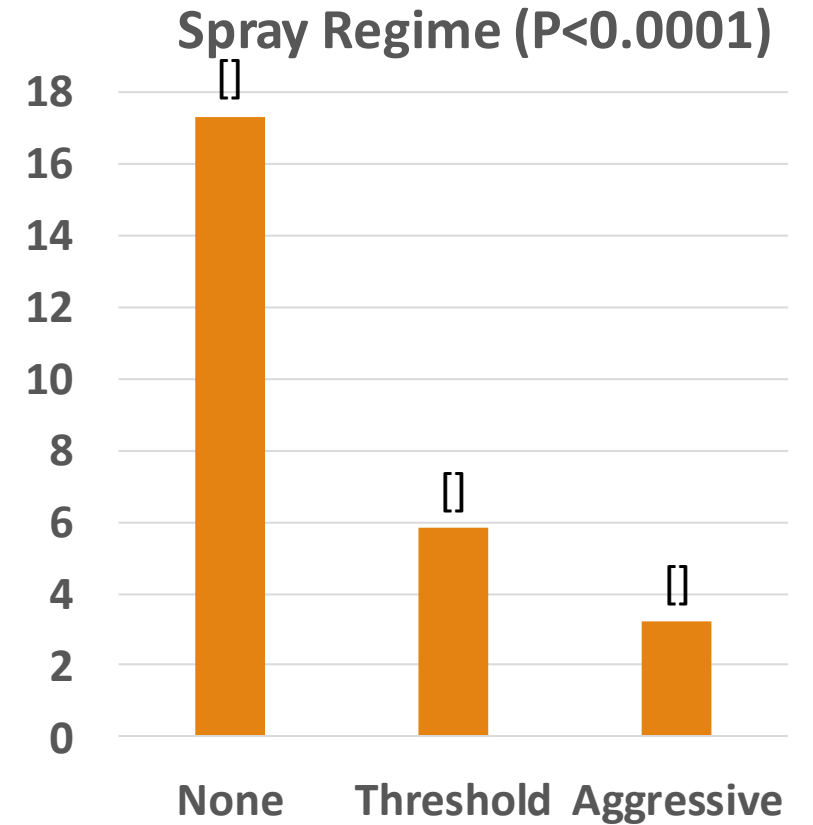
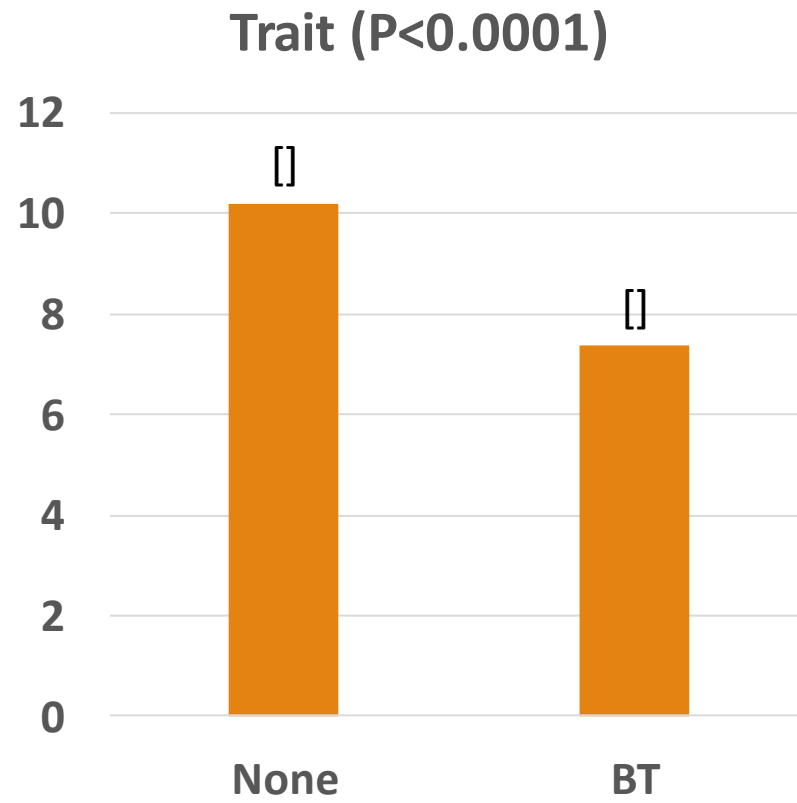
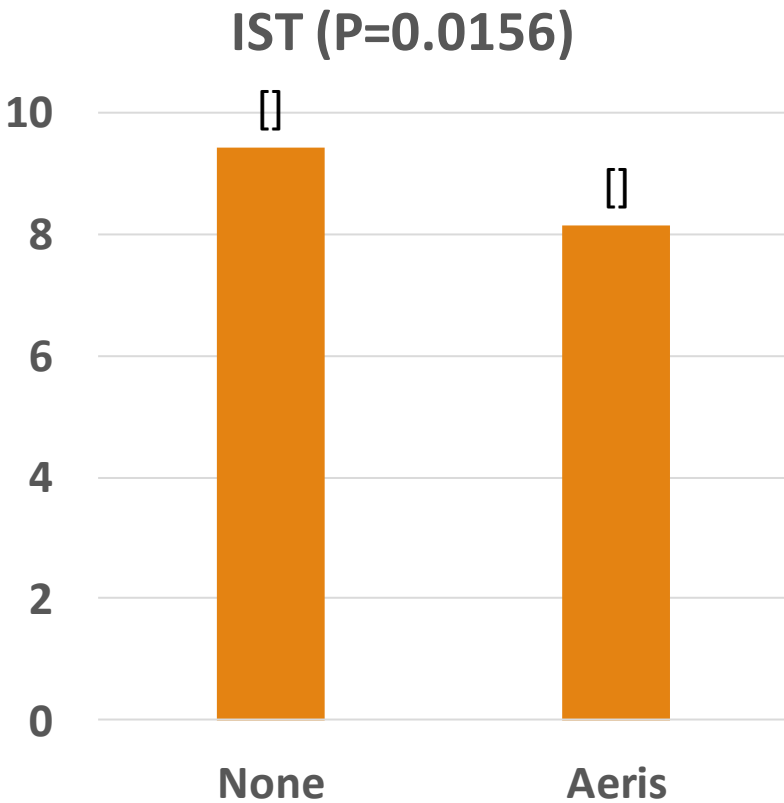
Spray Regime (P<0.0001)



Averaged over 2 years in 2 locations

Season Average Nymphs

Drop Cloth – Numbers per 10 Row Ft



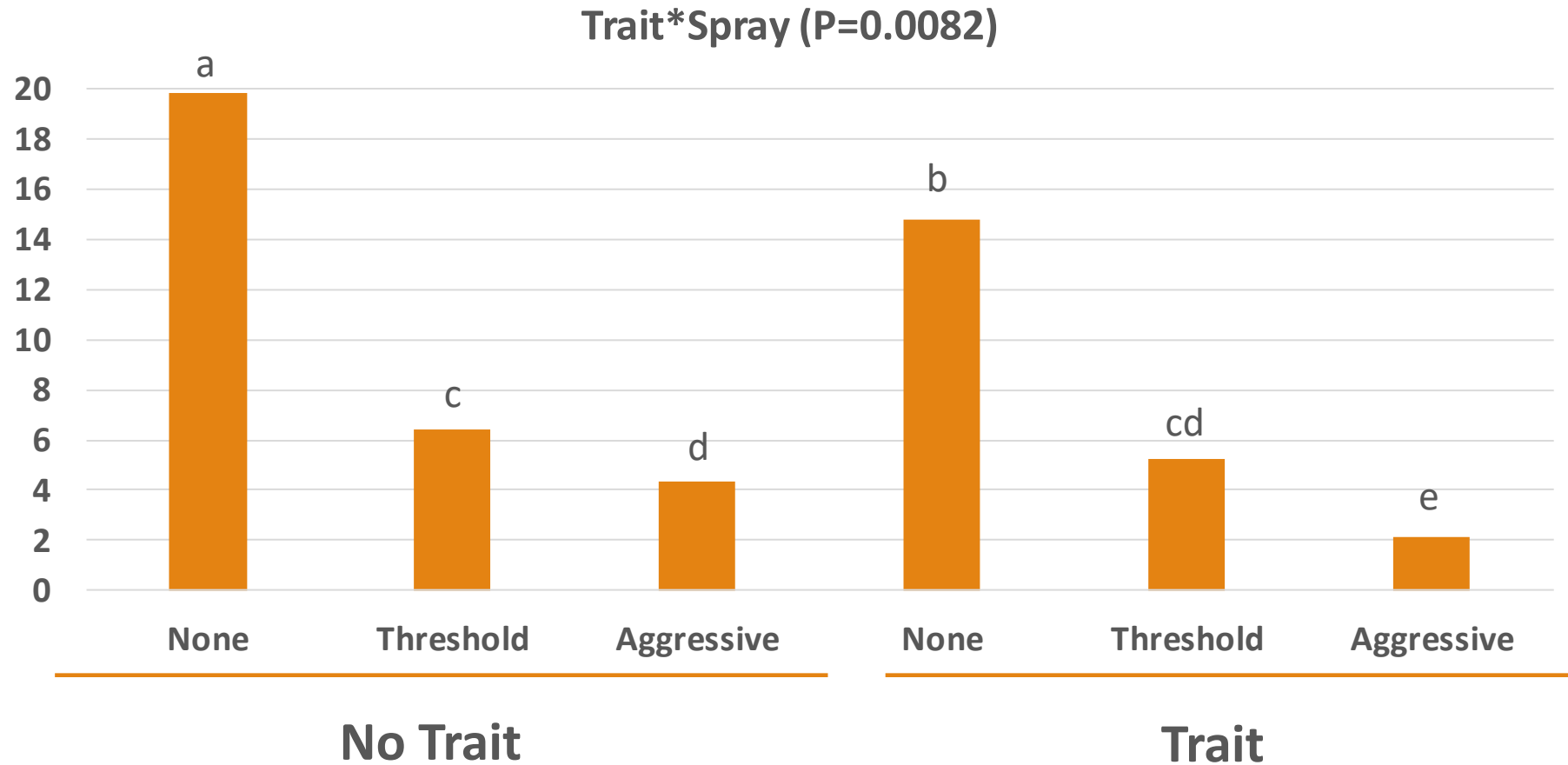
IST*Spray Regime Interaction

Trait*Spray Regime Interaction

Averaged over 2 years in 2 locations

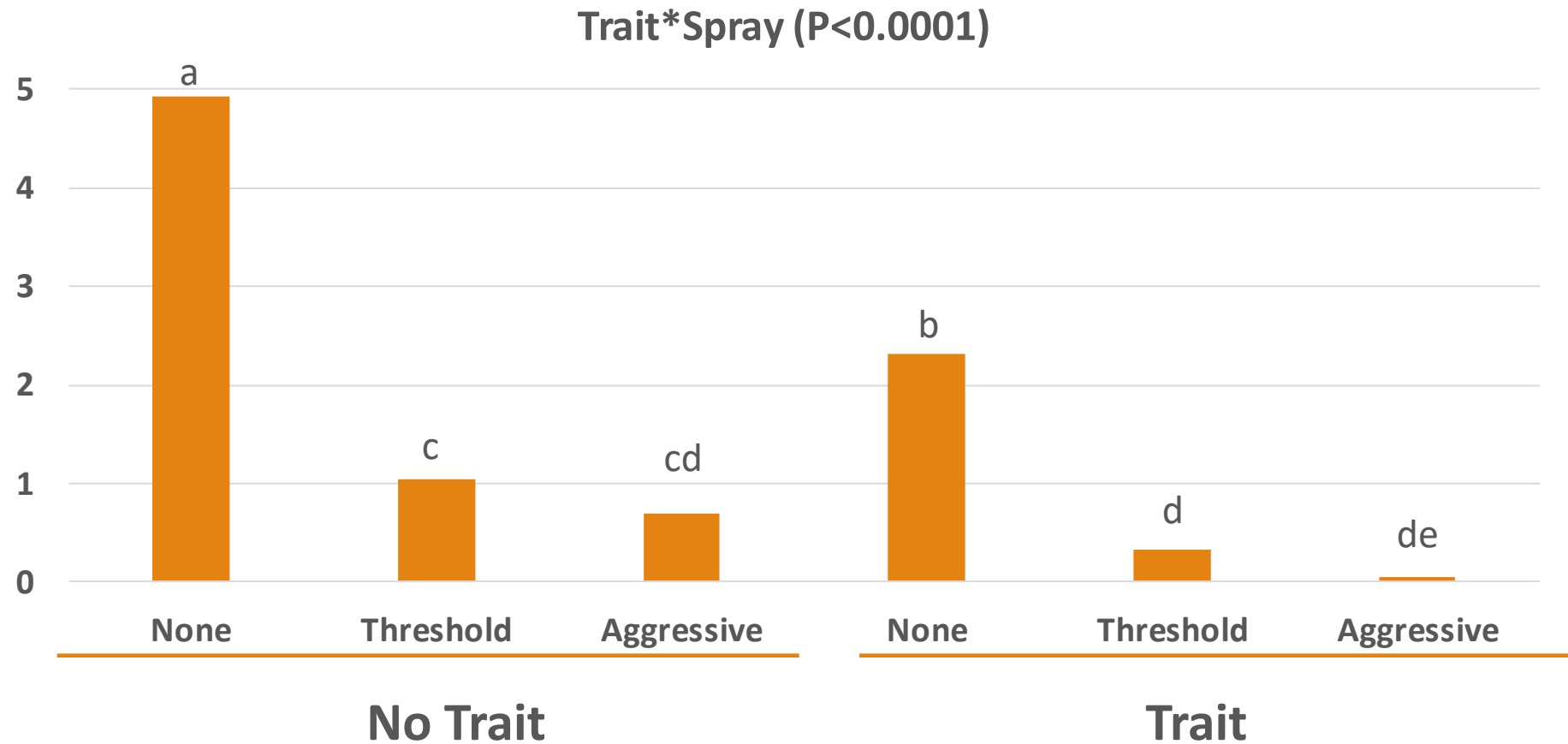
Season Average Nymphs

Drop Cloth – Numbers per 10 Row Ft



Averaged over 2 years in 2 locations

Season Average Large Nymphs *Drop Cloth – Numbers per 10 Row Ft*



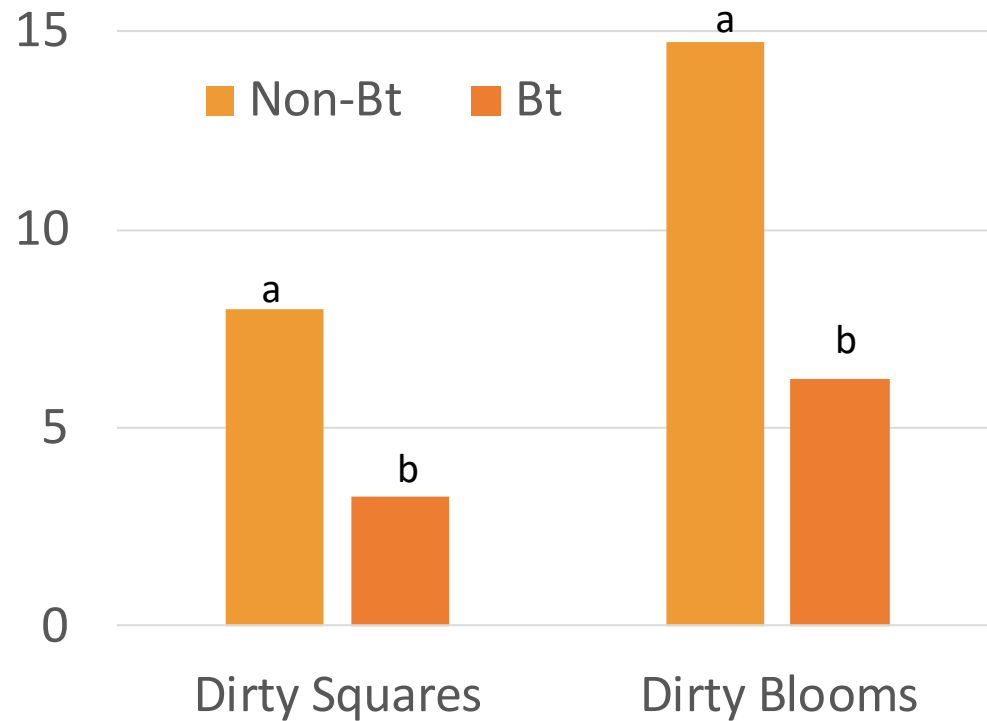
Averaged over 2 years in 2 locations

Lygus Trait

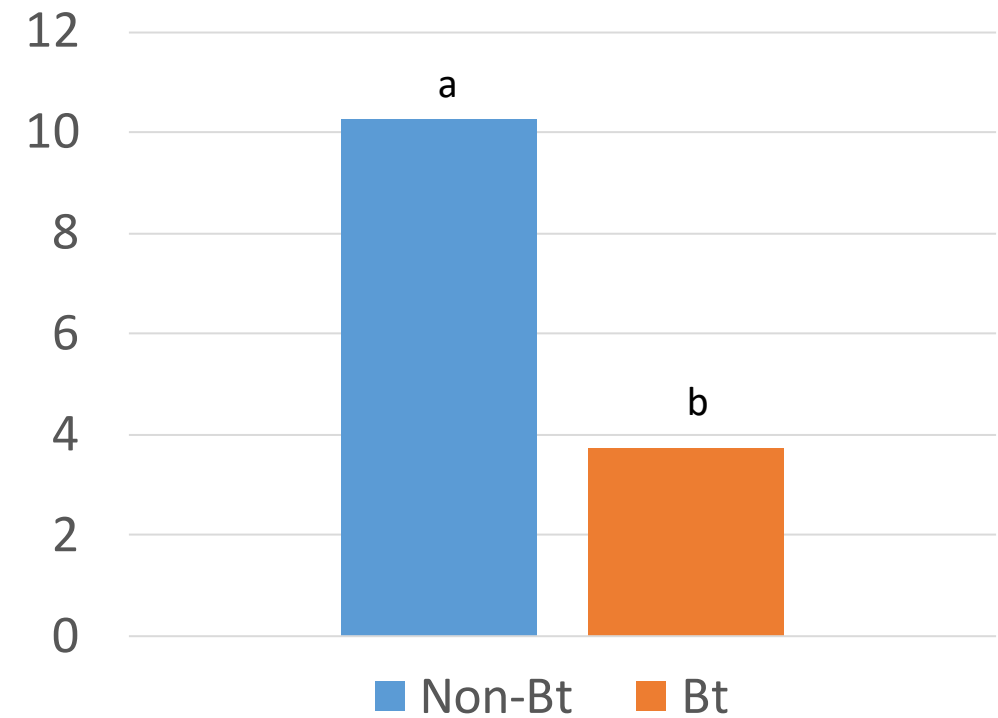
2017, Plots not treated after 1st bloom



PLANT BUG INJURED (#/25)



TOTAL PLANT BUGS



Non-BT



BT



1/6 SUPERTUFF
MFG. CO.
Florence, KY 41042
Made in USA

Non-BT

More external marks
More internal warts
More lint staining

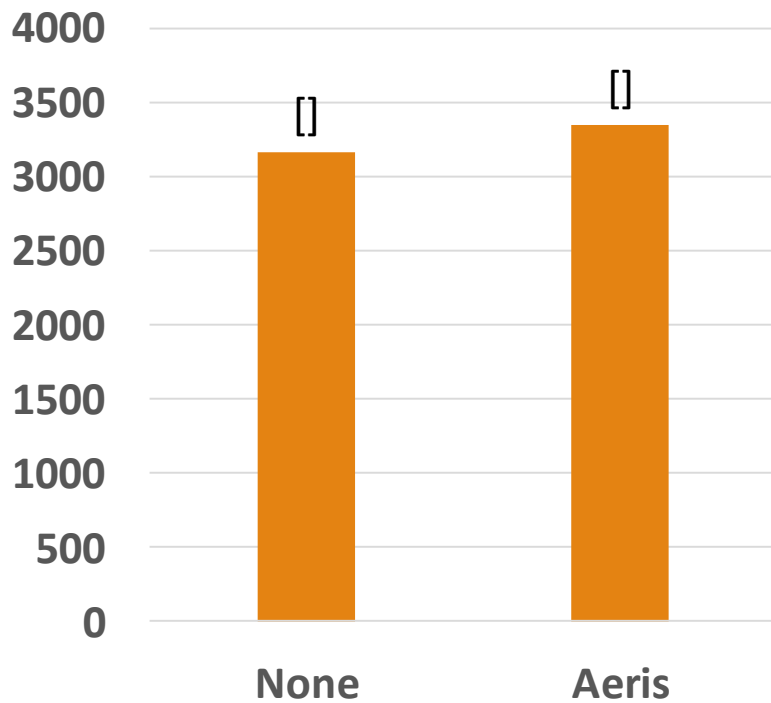


SUPERTUFF
DURRO
BAG MFG. CO.
Florence, KY 41042
Made in USA

Yield

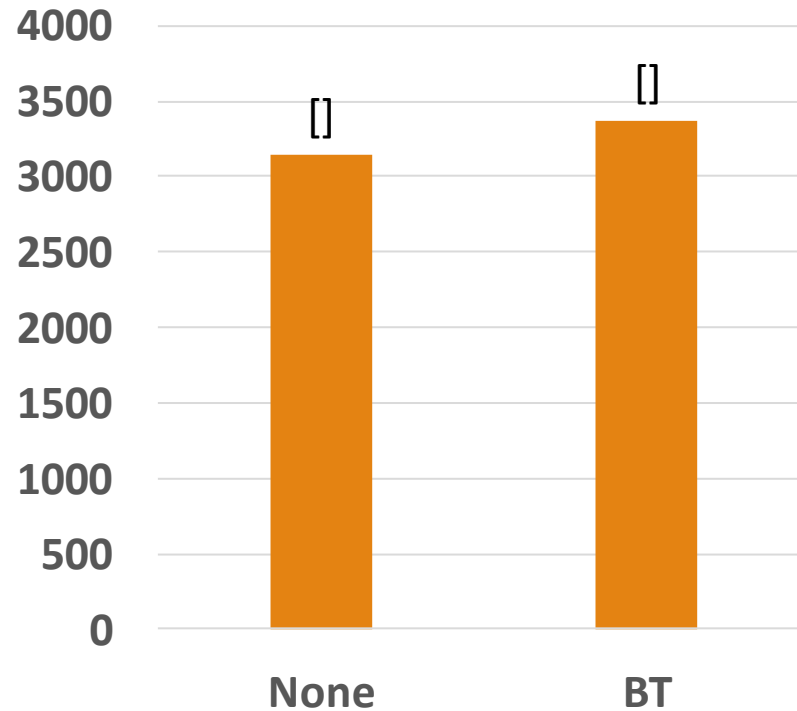
Pounds of Seed Cotton per Acre

IST (P=0.0008)



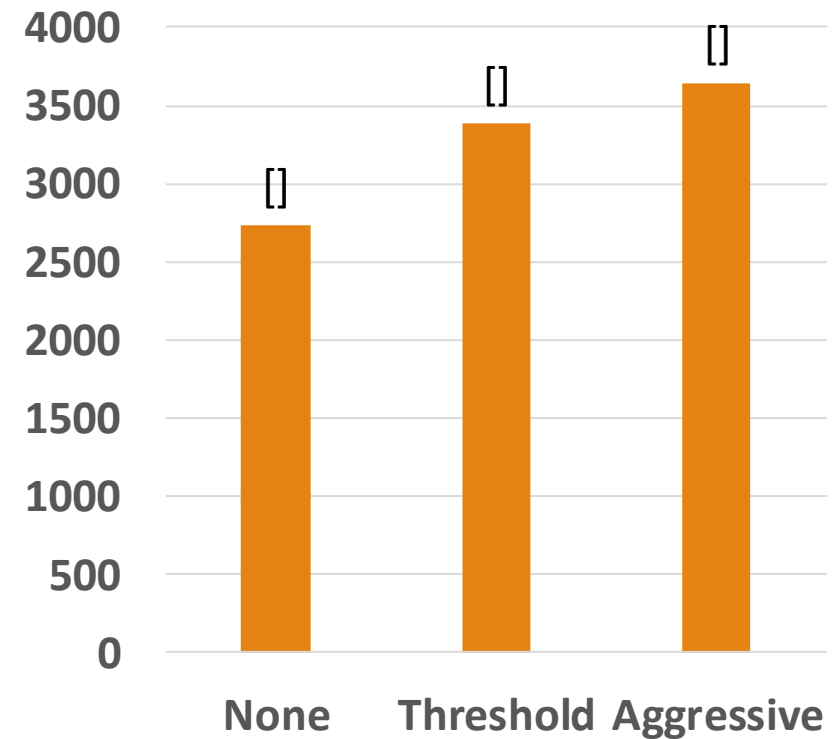
IST * Trait Interaction

Trait (P<0.0001)



Trait * Spray Regime Interaction

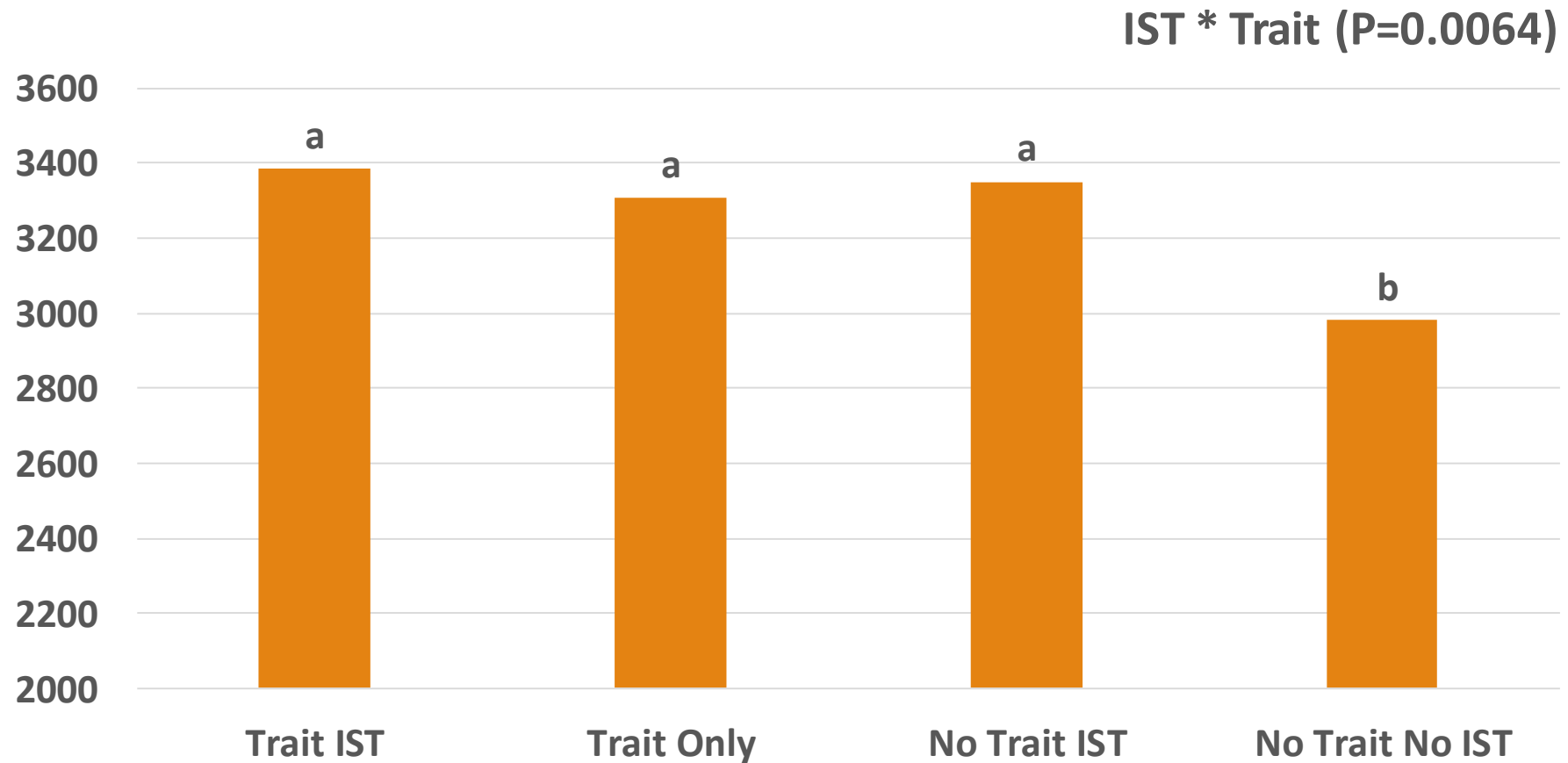
Spray Regime (P<0.0001)



Averaged over 2 years in 2 locations

Yield

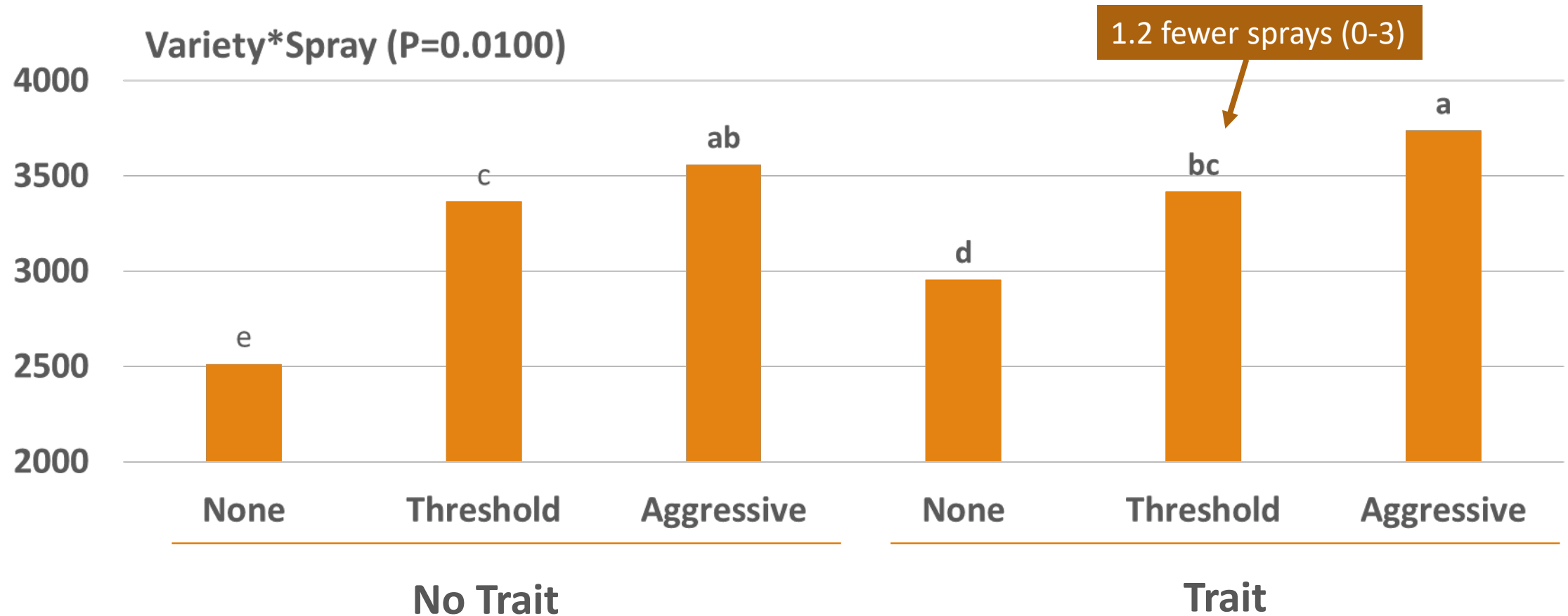
Pounds of Seed Cotton per Acre



Averaged over 2 years in 2 locations

Yield

Pounds of Seed Cotton per Acre



Averaged over 2 years in 2 locations

Summary

The Bt trait gave as good or better control than the best, alternative thrips control strategy

The Bt trait also:

- Reduced the numbers of plant bugs
- Decreased plant bug injury
- Decreased insecticide applications
- Increased yield ... if no insecticides were applied
- Similar observations in Mississippi



Some other things to consider

Need to treat the Bt trait with insecticides for plant bugs

- But appears to a standalone treatment for thrips control
- Greatest value appears to be a reduction in the need for insecticide applications (thrips and plant bug)
- Current plant bug thresholds appear to work pretty well but we need to follow them strictly to maximize the benefit of the technology

This is still 4+ years in the future, so let's not get ahead of ourselves

- We need more experience, particularly in larger plots
- What about cotton fleahoppers, western plant bug, clouded plant bug, stink bugs
- How much will it cost?

Acknowledgements

Thanks to

- Monsanto
- Cotton Incorporated
- Dr. Scott Stewart, Sandy Steckel, Matthew Williams, Randi Dunagan, Clay Perkins, and our Summer Crew

