

Managing sorghum-sugarcane aphid in forage sorghum

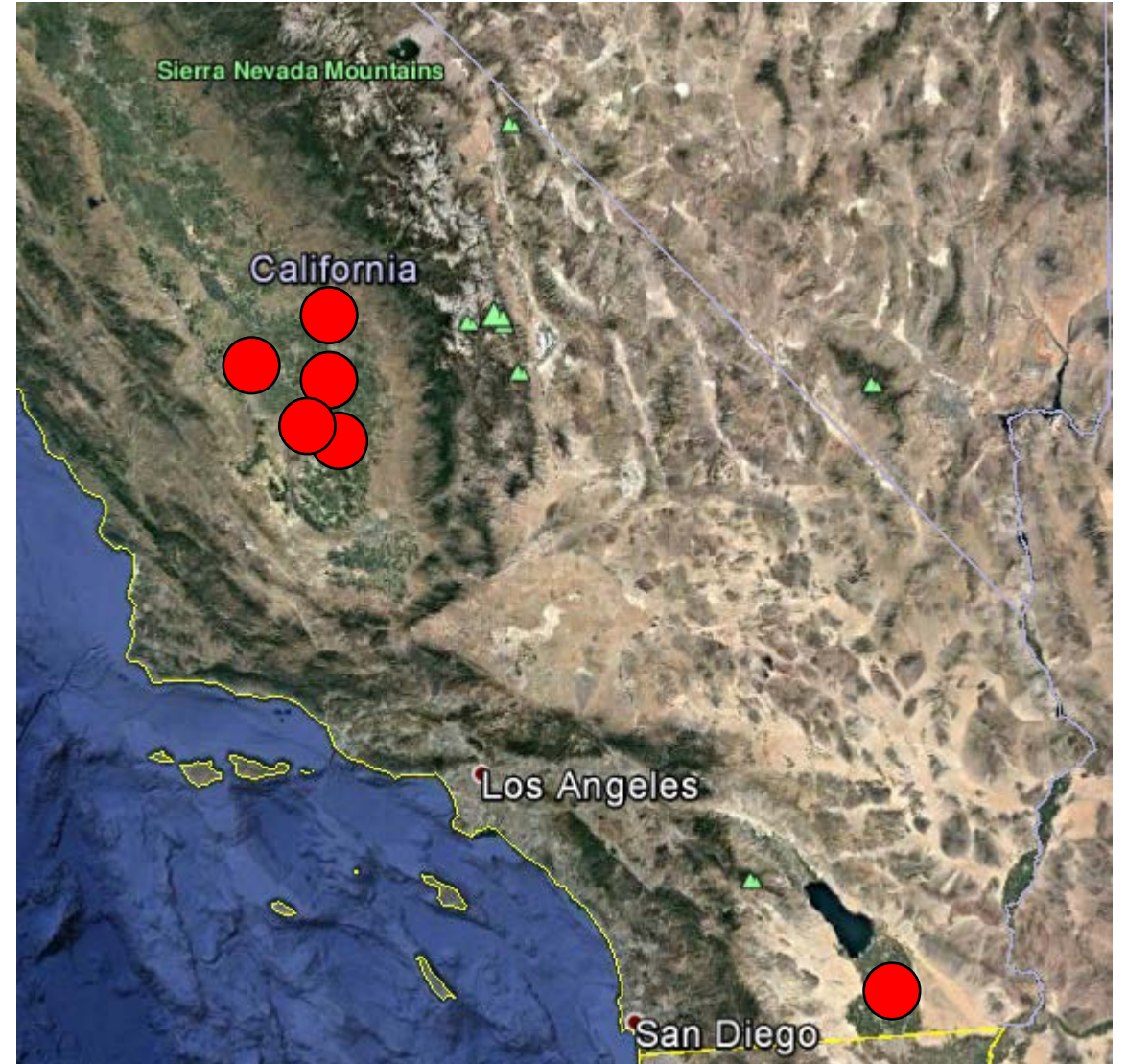
Alfalfa & Forage Field Day

Kearney Agricultural Research & Extension Center 9/20/17

Nick Clark, Agronomy Advisor in Kings, Tulare, & Fresno Counties

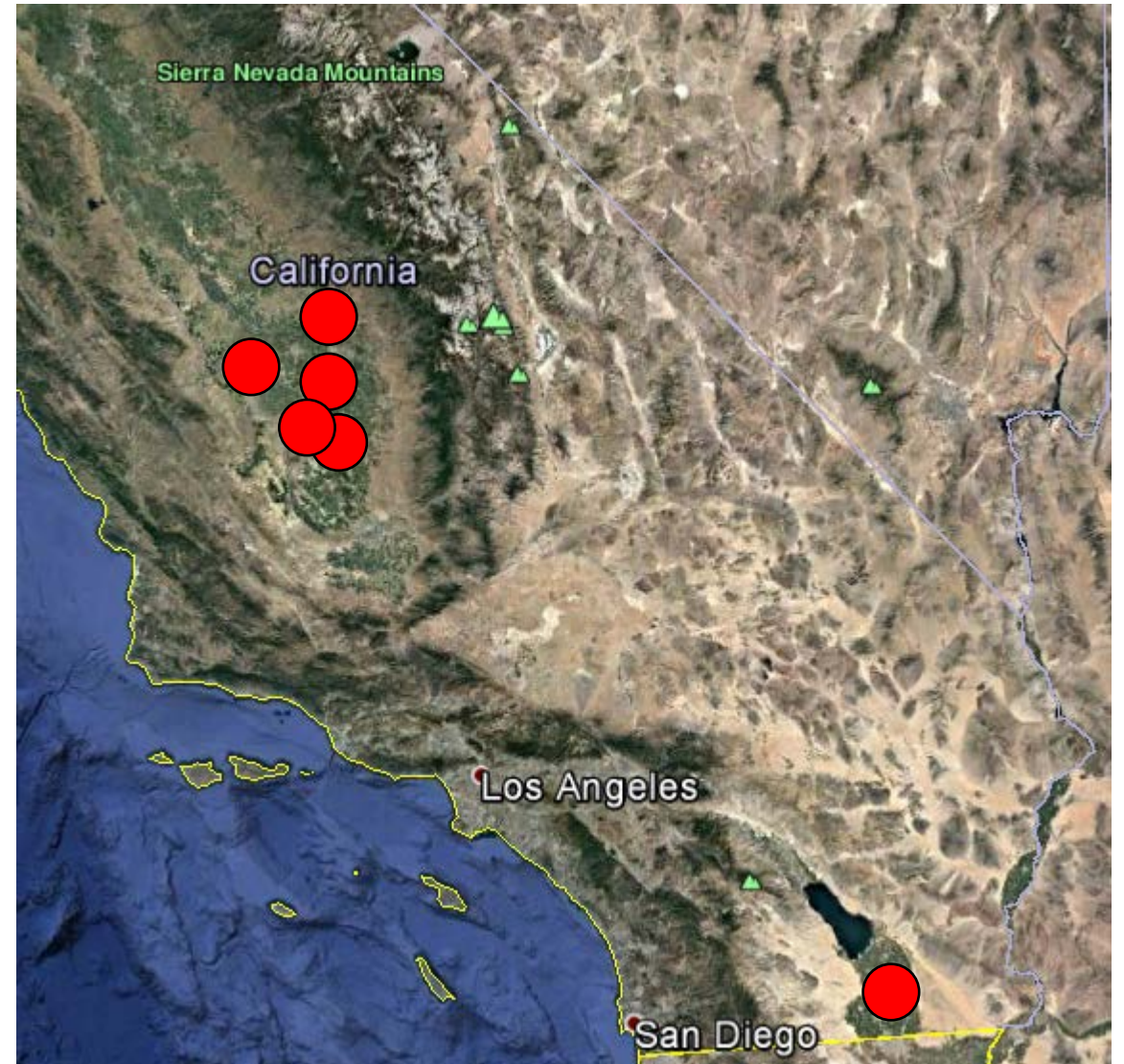
2016 CA Reports of Sugarcane Aphid

- KAREC, WSREC, and DREC ***
 - Tulare County (Tipton/Pixley area)
 - Kings County (Hanford area)
-
- July-August, reports of aphid not controlled by malathion, dimethoate, or chlorpyrifos.



2017 CA Reports of Sugarcane Aphid

- KAREC, WSREC – required treatment
- Tulare County (Tulare, Tipton/Pixley area)
- Kings County (Hanford, Corcoran area)
- Early July reports of aphid continued to present.
- Many acres planted with treated seed
- Many eyes and feet in the field, few (if any) uncontrolled SCA populations.



IDENTIFICATION



Corn leaf aphid



Yellow sugarcane aphid



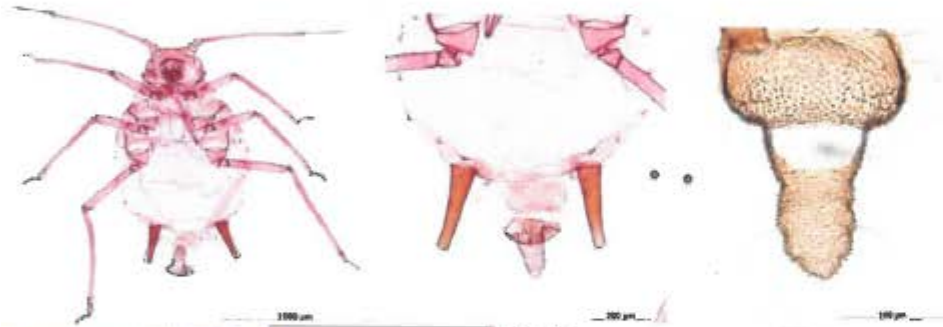
Sugarcane aphid



Greenbug aphid

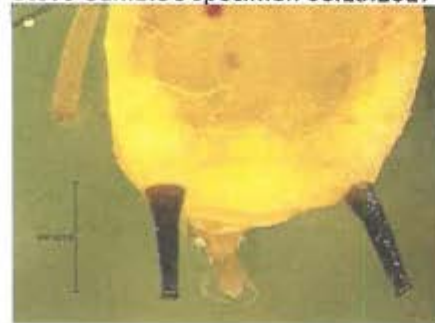


Wingless females of *Aphis gossypii* vary in size and colour depending on conditions. In cool favourable conditions they are medium-sized and blackish green or green mottled with dark green. In hot conditions or when crowded they are smaller and are a very pale whitish yellow. Most commonly they are light green mottled with darker green. The **dorsum** has no dark **sclerotized** markings. The **siphunculi** are dark. The **cauda** is usually paler than the siphunculi and bears 4-8 hairs. The body length of **apterae** ranges from 0.9-1.8 mm. *Aphis gossypii* **alates** have 6-12 **secondary rhinaria** distributed on the third antennal segment and usually none on the fourth.



Cotton Aphid

Steve Gamble's specimen 06.15.2017

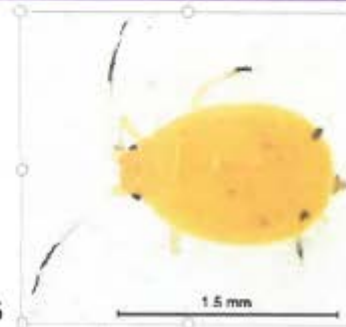
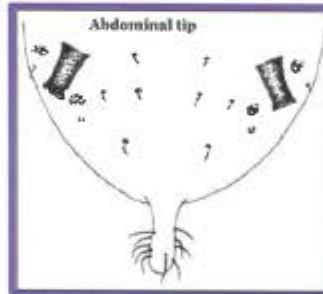


Genus *Melanaphis*

Melanaphis Aphids

Small to medium-sized to elongate oval or pear-shaped **aphids** closely related to *Rhopalosiphum* aphids. The **siphunculi are shorter than the cauda**. The abdomen has dark dorsal markings. The winged forms have dark forewing veins with the media vein twice-branched.

Sugarcane Aphid



Pete's aphid 08.25.2016

Eugene Hannon,
County of Fresno Ag
Commissioner
Entomologist

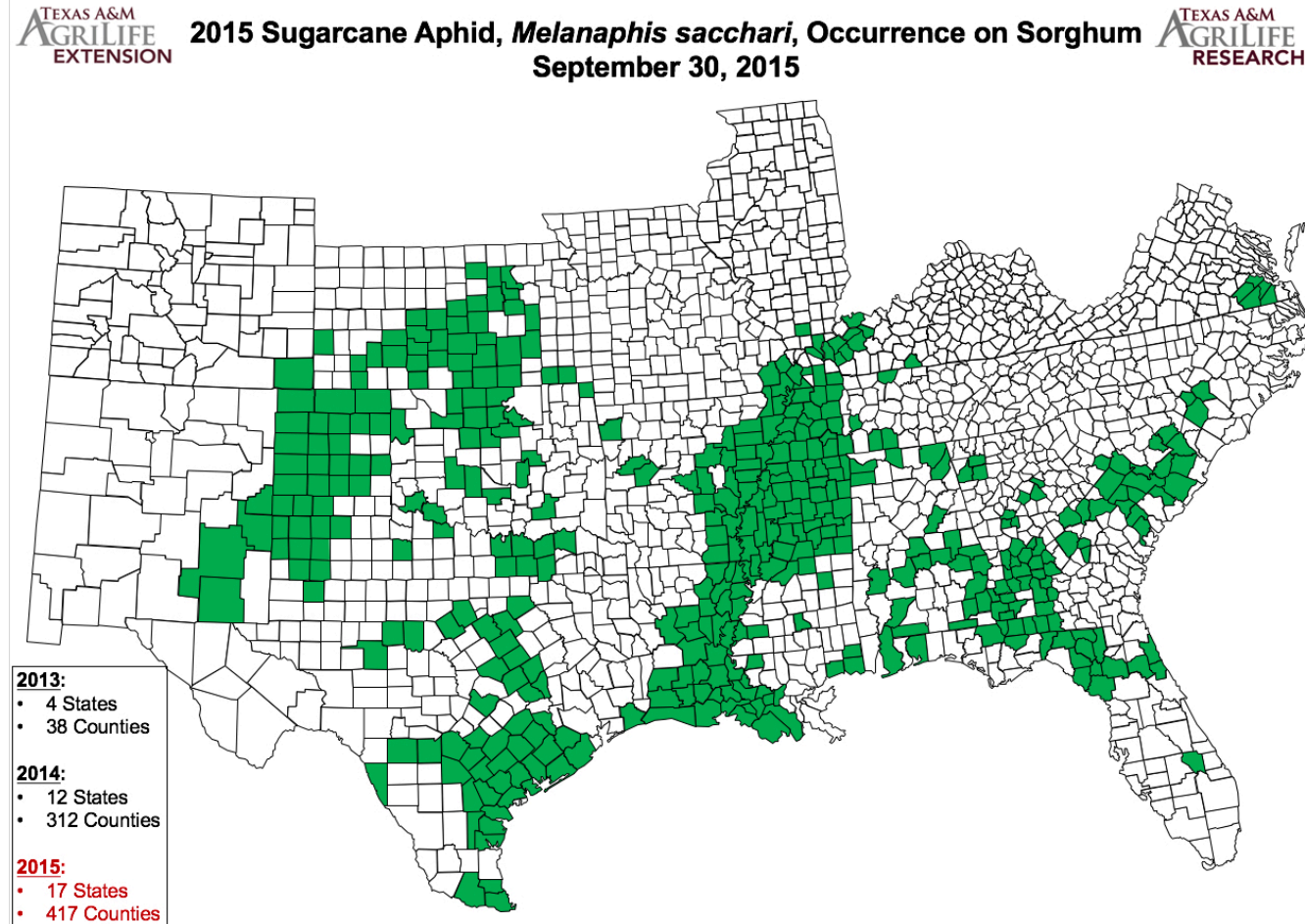


Dennis Haines, County
of Tulare Ag
Commissioner
Entomologist

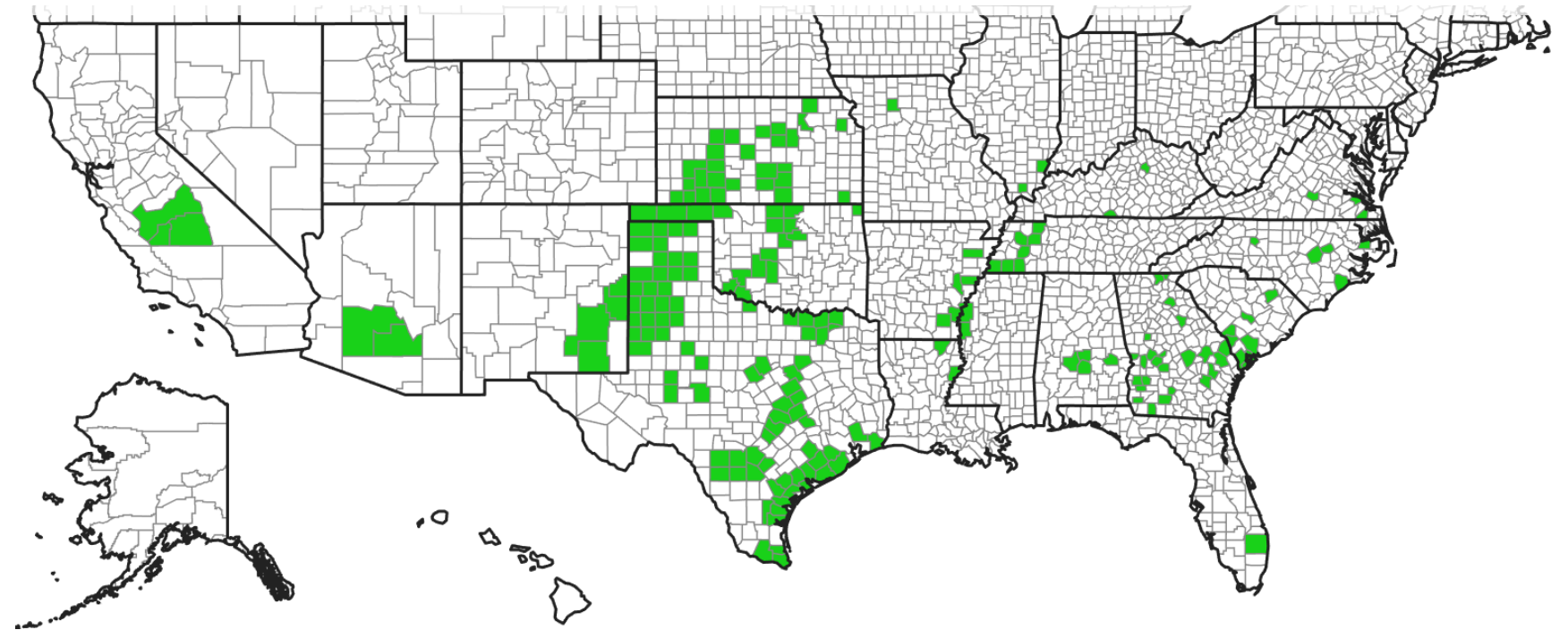


US Distribution of SCA

Ryan Gilreath, (LSU)



2017 US Distribution of SCA



Sugarcane Aphid Hosts

- Reproduces on sorghum, Sudan, sorghum-Sudan, & Johnson grass
- Feeds, but won't reproduce on corn
- Will not feed on small grains
- Probably will not survive on cotton. David Kerns (LSU & TA&M) host studies showed no SCA affinity to dicots. No reports in TX of SCA damage to cotton. Question remains about SCA affinity for Pima. Continue to monitor and report SCA outbreak in cotton immediately if you suspect a growing population.

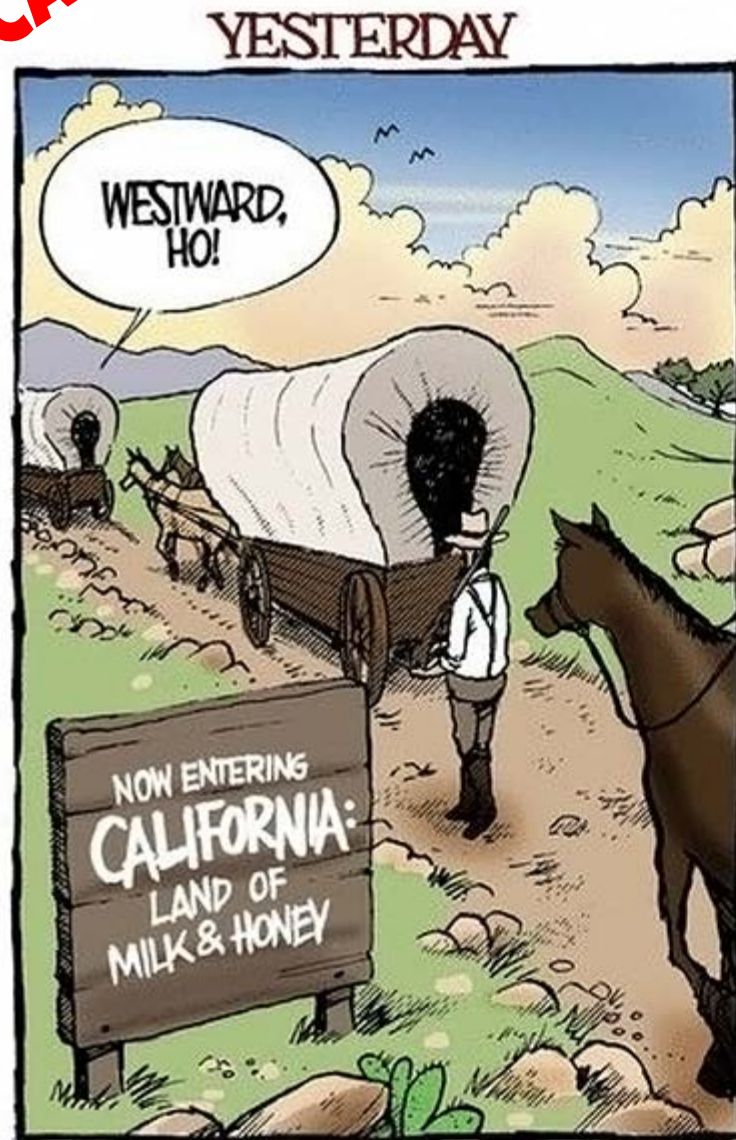
Damage

- Types of damage
 - Honeydew production/sooty mold growth
 - Reduced p-synth and difficulty harvesting
 - Sap flow reduction
 - Reduced sugars to new leaves and grains, stunting/grain production failure
 - Early senescence
 - Dryer leaves, plant death
- Grain yield is depressed more with early crop stage, untreated infestations
- Effect on quality...some research on hay (Robert Bowling et al., Texas A&M), inconclusive about quality



DISCLAIMER: NOW LEAVING CALIFORNIA

In all sincerity, very many thanks are owed to the Sorghum Checkoff Program and all of the researchers cited in this presentation for their quick, frontline work to provide the information we have to date.



Yield Loss

Jeff Gore, Miss. SU

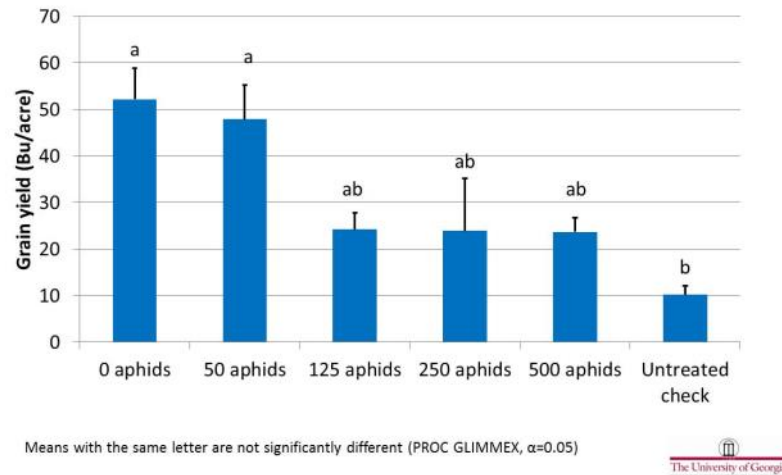


Crop Stage at 20% Infestation	Percent Yield Loss with no Treatment
Pre-boot	81-100%
Boot	52-69%
Panicle Emergence	67%
Soft Dough	21%

Why Yield Loss and Other Considerations

Why the Yield Loss Response

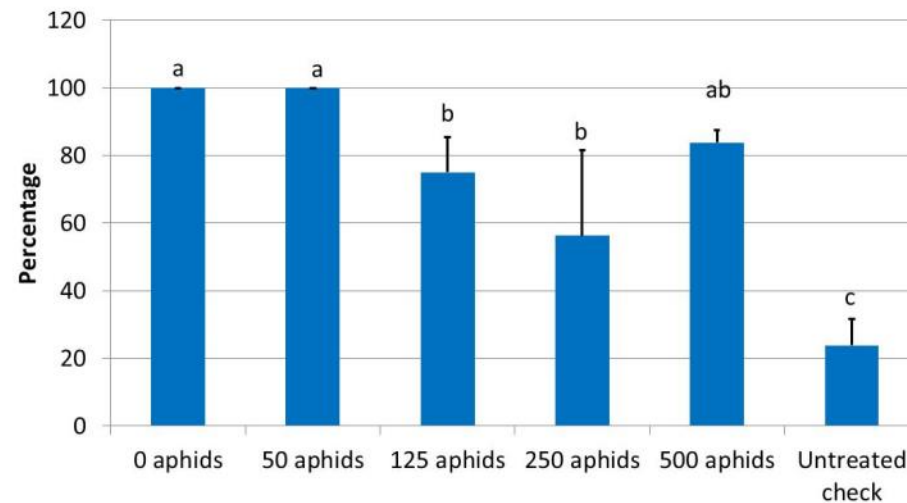
USB Sugarcane Aphid Threshold Study, Sorghum Grain yield (\pm SE), Georgia 2015



AMS Approved

Fewer Heads and Less Grain on the Remaining

USB Sugarcane Aphid Threshold Study, Percentage (\pm SE) of plants with grain heads, Georgia 2015

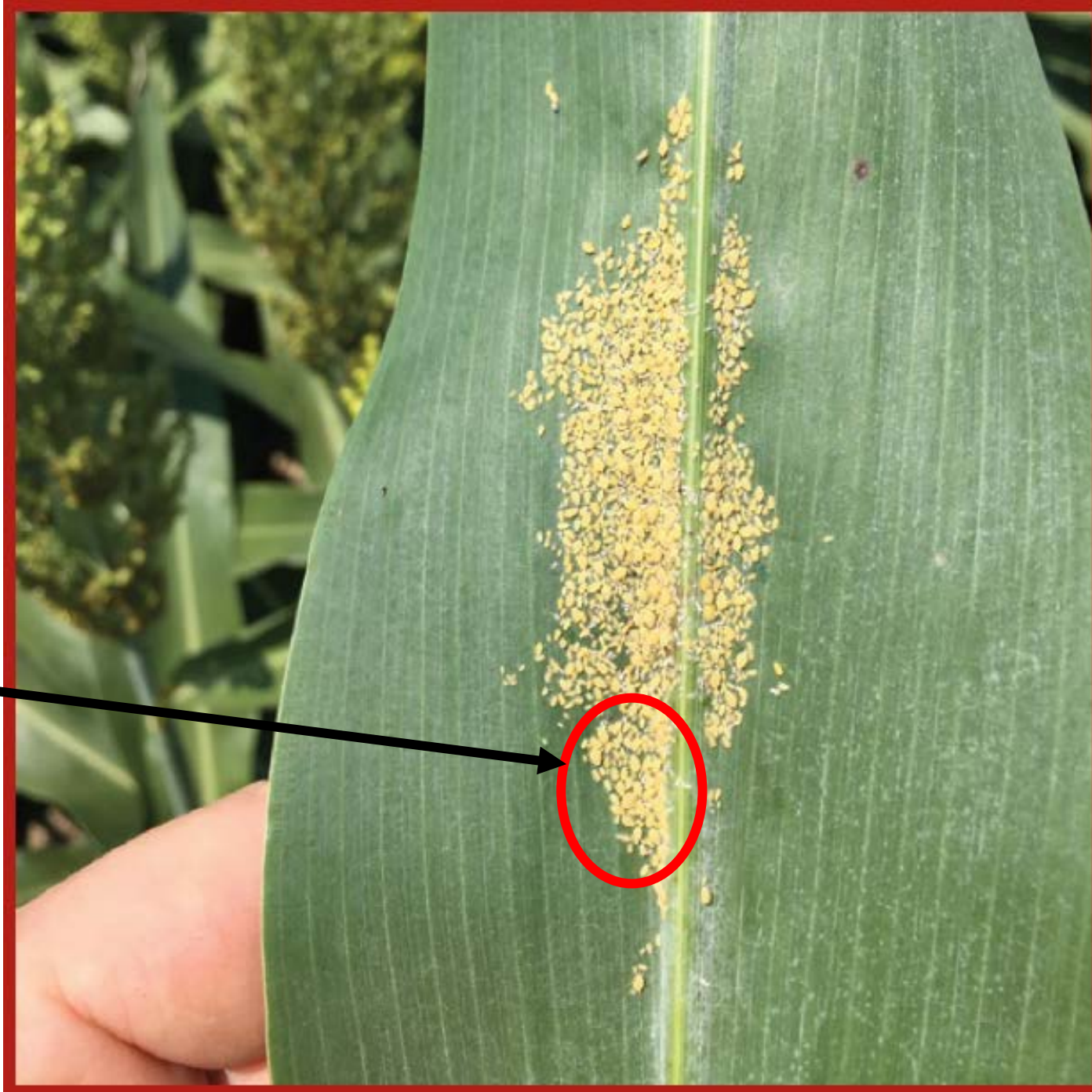


Source: David Buntin, U of Georgia

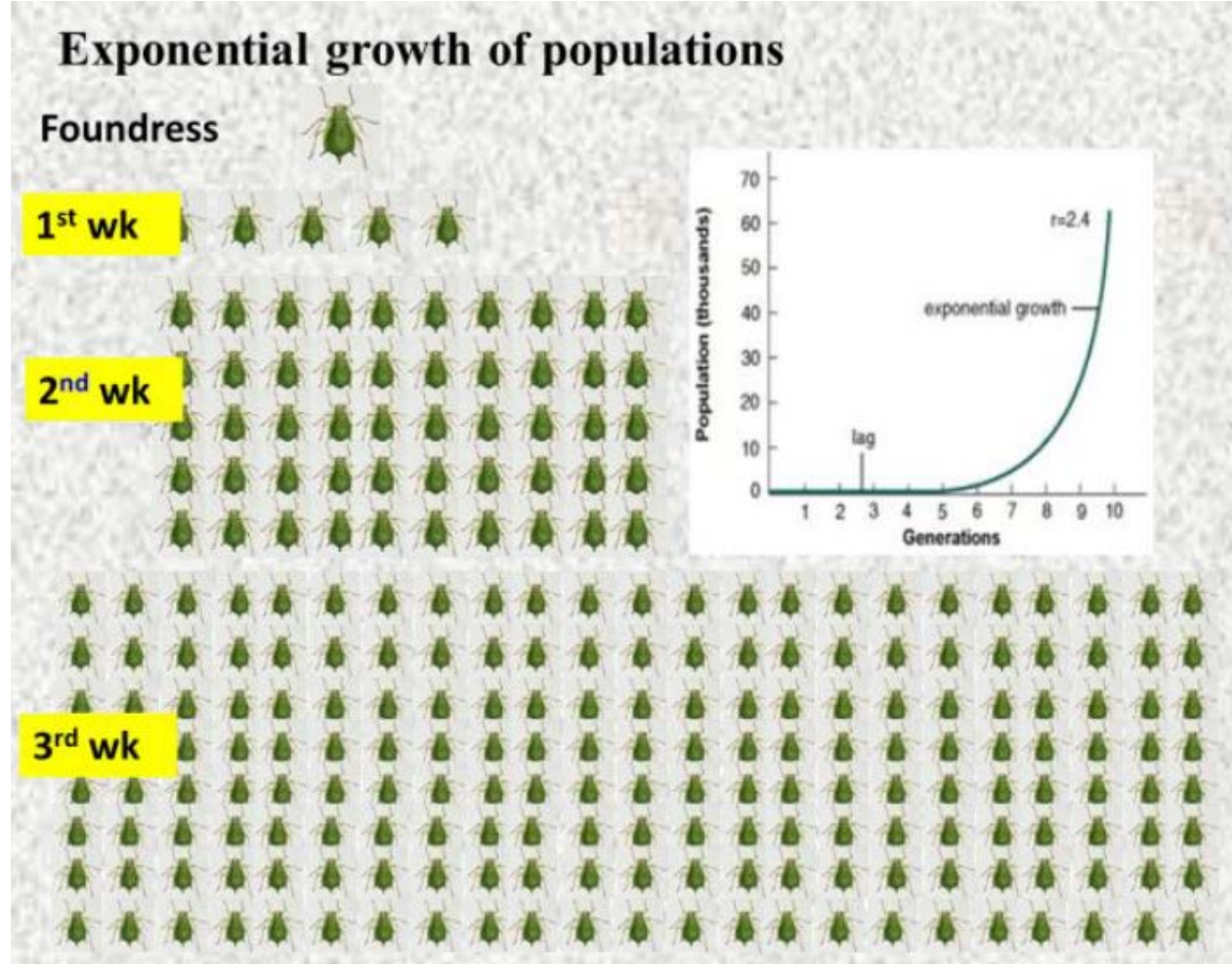
Scouting & Thresholds for Grain Sorghum

- Scouting methods
 - Early July or early vegetative
 - Throughout field (edge effect is location dependent – Tom Royer, OSU)
 - Lower leaves, then moves upward to peduncle or head stalk
 - Weekly until found
 - Twice weekly until treatment threshold (50 aphids/leaf on 25% of plants)
- Numbers to treat?
 - SCA population can double in 2-9 days, largely temperature dependent
 - 50 aphid/leaf if > 1 month to harvest
 - Consider 150 aphid/leaf if < 1 month to harvest

~ 50 aphids



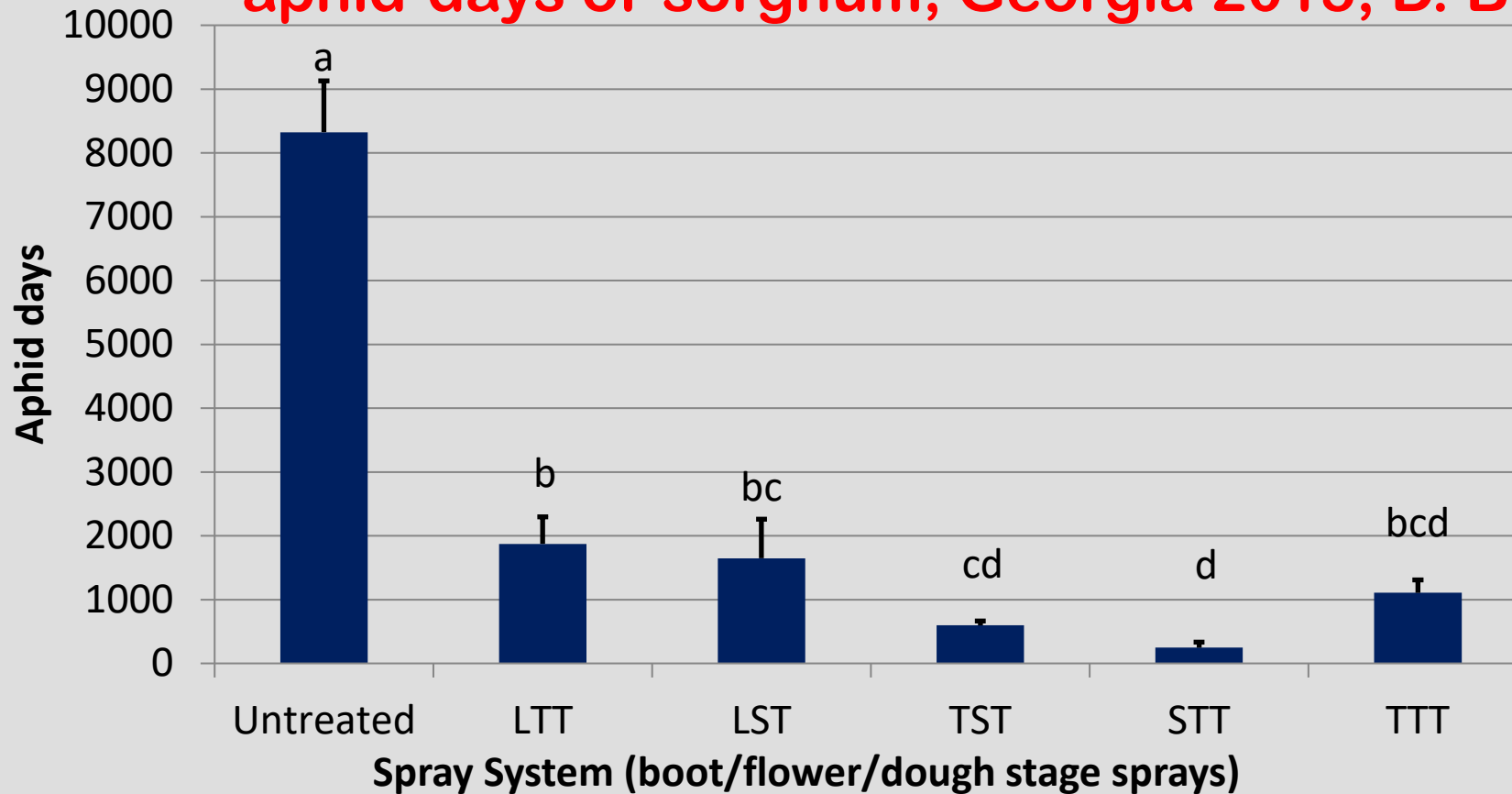
Can go from 50 to 500 Aphids per Leaf in Two Weeks



Control Methods

- Insecticide
 - Neonicotinoid seed treatment (important for early protection in late planting, best in combination with foliar application of insecticide) – appears to give ~ 24-40 days protection
 - Sivanto Prime (7-14 fl. oz./acre, 20 GPA ground, 10 GPA air – Rick Kochenower, Sorghum Partners)
- Cultural
 - Planting date (plant early if possible)
 - Site avoidance (rotate fields for sorghum planting)
 - Weed management (control Johnson grass, weeds in general for stand establishment and plant vigor)
- Cultivar resistance
 - Resistant cultivars consistently protect yield, especially in combination with early insecticide treatment

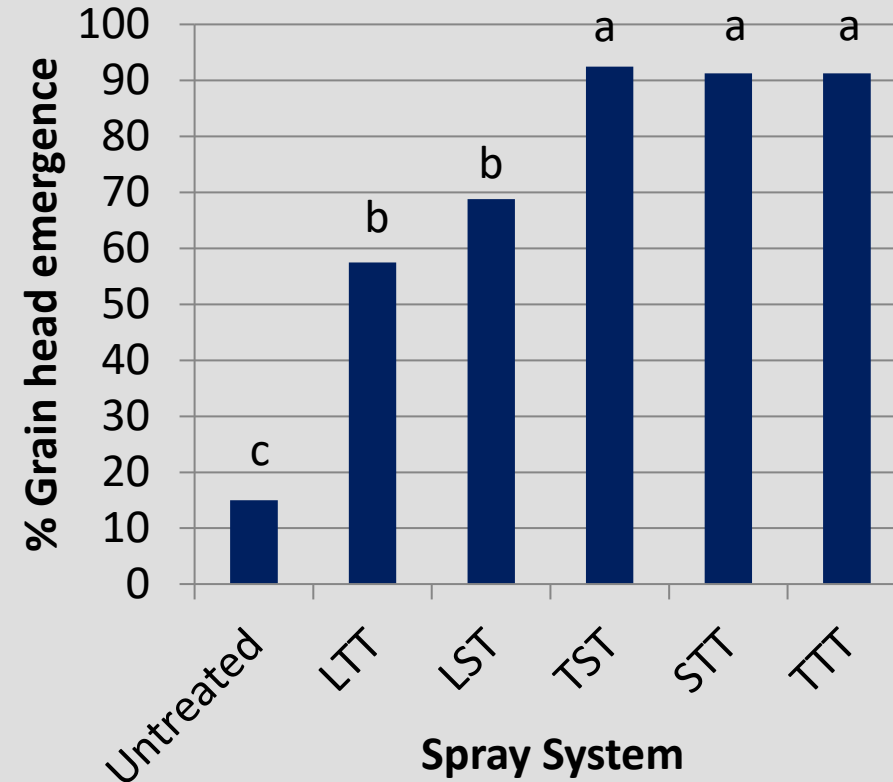
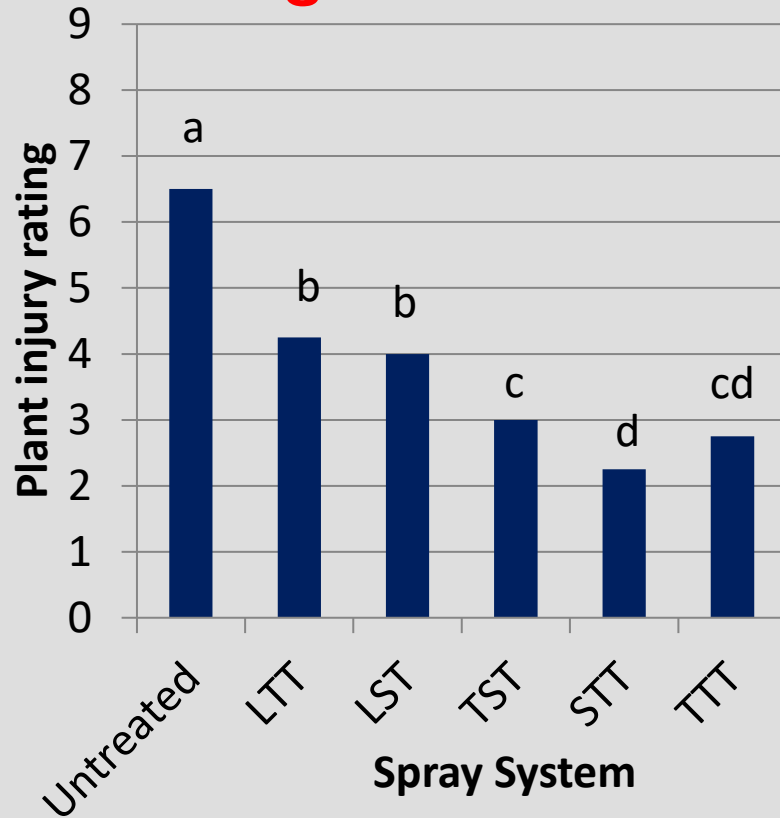
Effect of Sugarcane aphid spray system on aphid-days of sorghum, Georgia 2015, D. Buntin



Means with same letter not significantly different (LSD ($\alpha = 0.05$) of LSmeans)

Unt = Untreated, L = Lorsban @ 2pt, T = Transform @ 1 oz, S = Sivanto @ 4 fl. oz.

Effect of SCA spray systems on Sorghum plant injury and grain head emergence, Georgia 2015, D. Buntin



Unt = Untreated, L = Lorsban @ 2pt, T = Transform @ 1 oz, S = Sivanto @ 4 fl. oz.

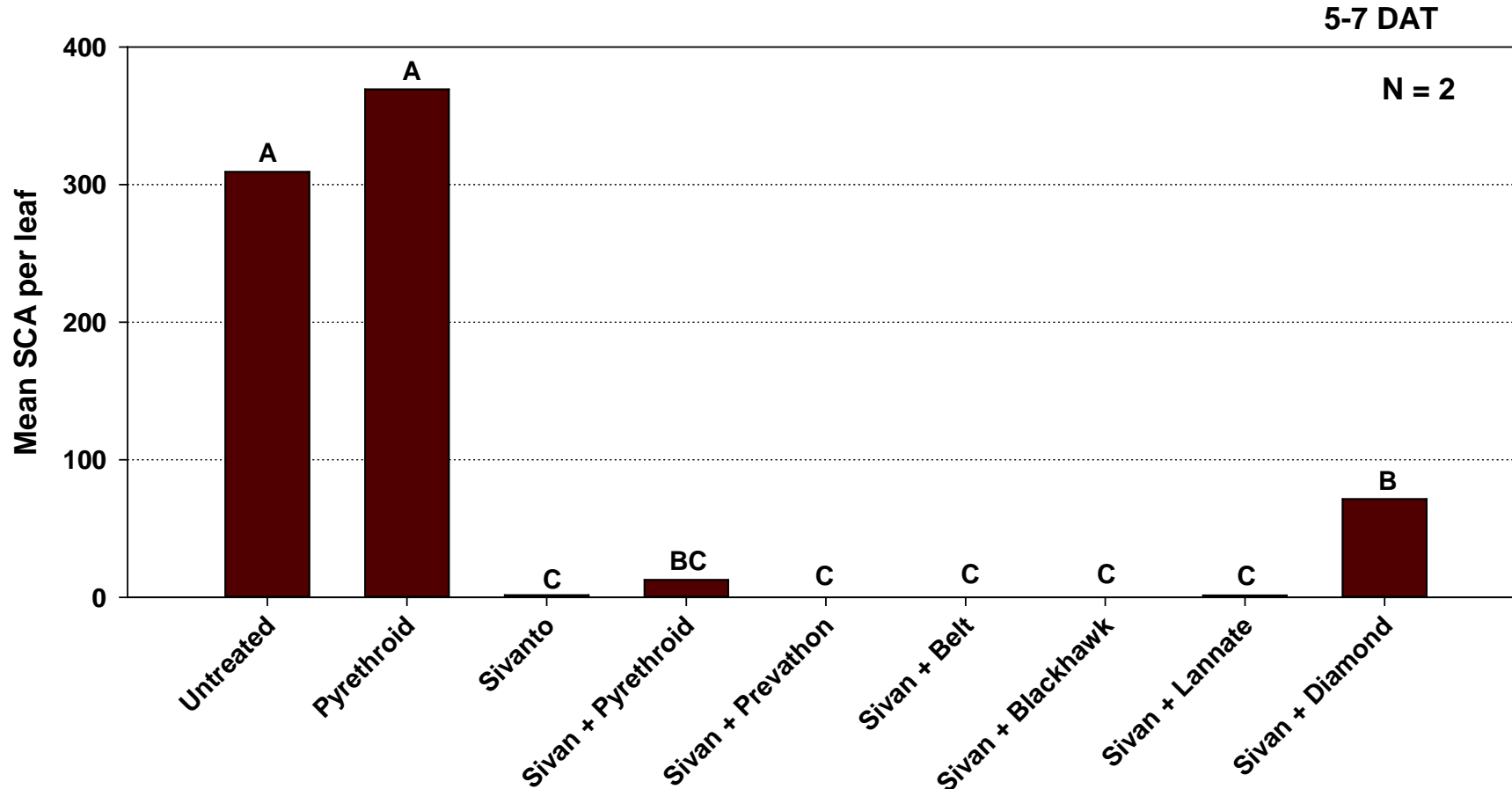
Means with same letter not significantly different (LSD ($\alpha = 0.05$) of LSmeans)

SCA

Sivanto Prime (4oz./acre)



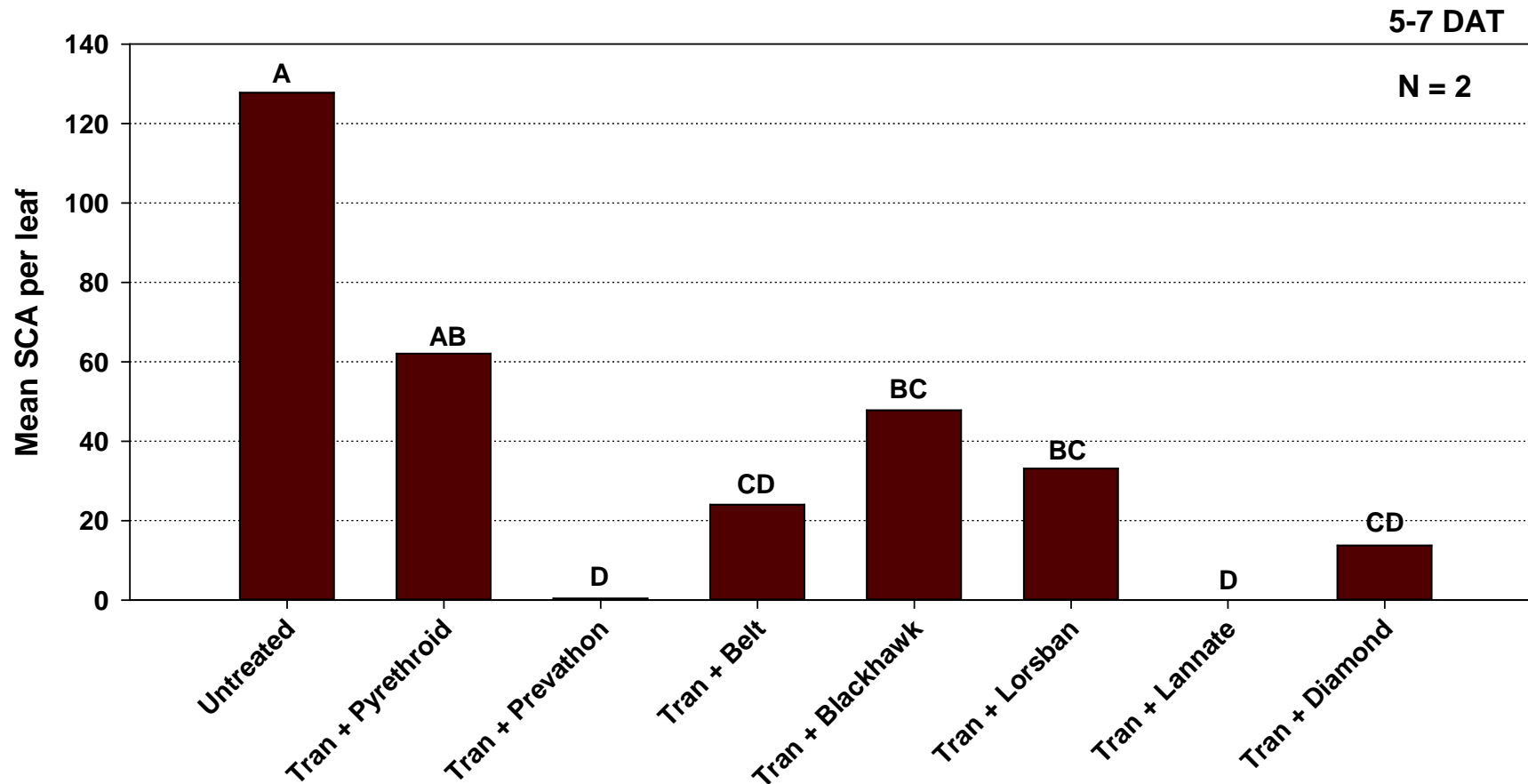
David Kerns &
Gus Lorenz



SCA Transform (1 oz./acre)



David Kerns &
Gus Lorenz



Parasitized Sugarcane Aphids on Sorghum at UC DREC



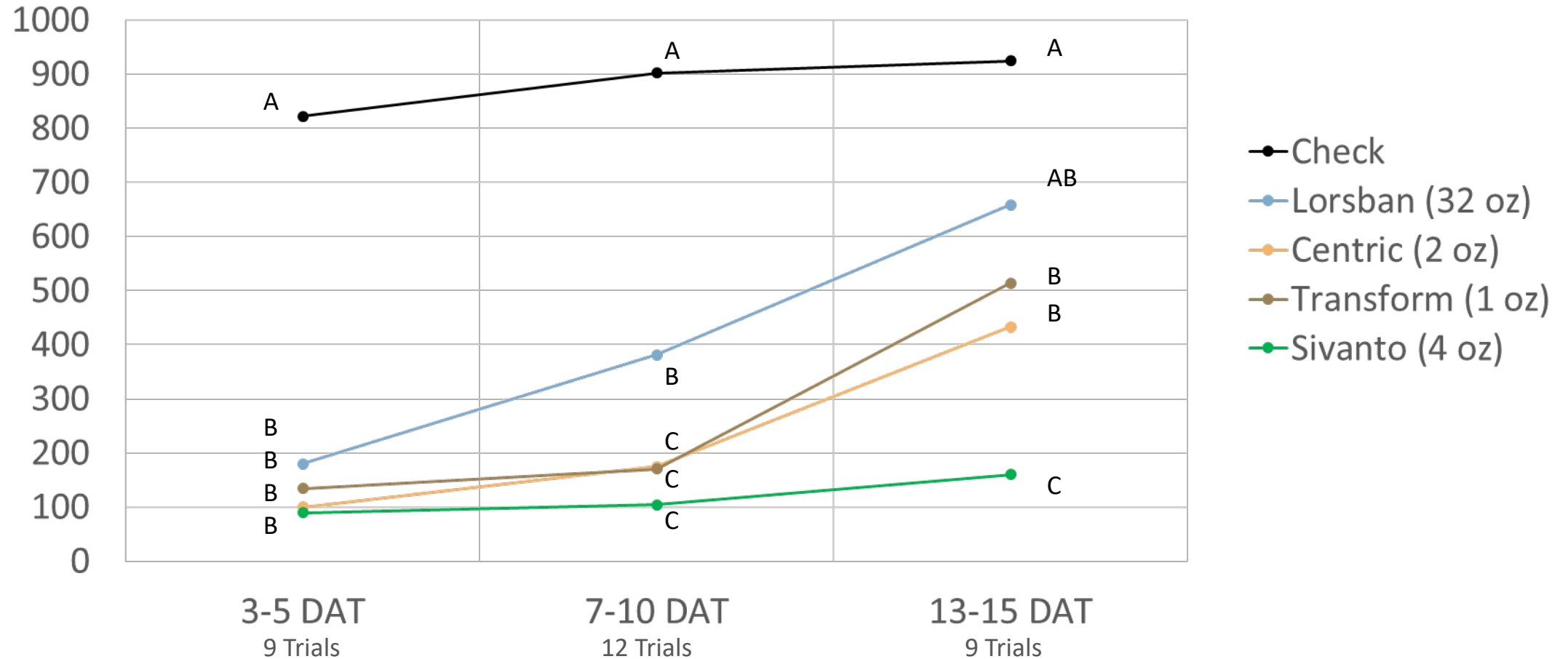
Eric Natwick, DREC



Aphid parasitoid

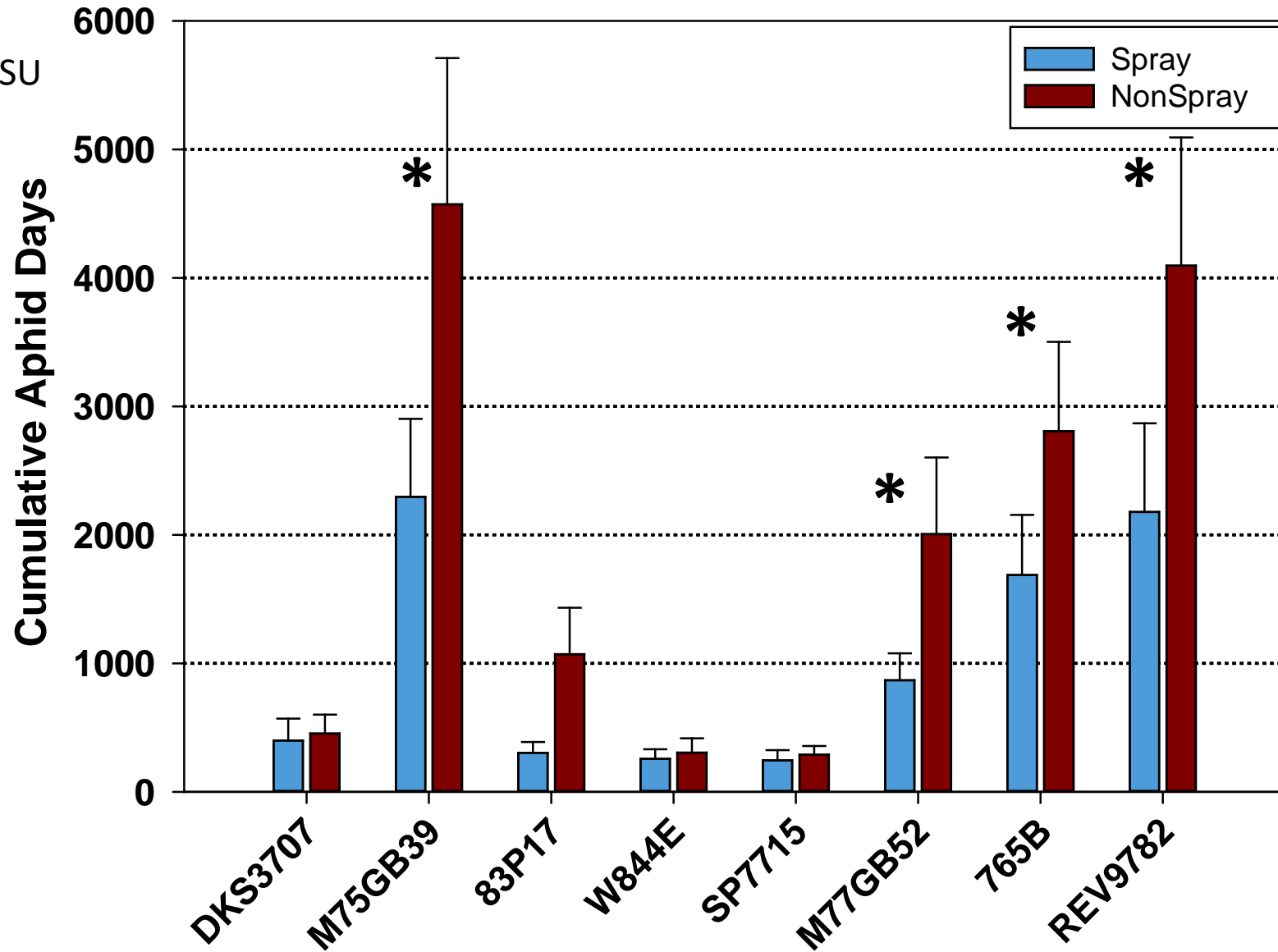
Average Number of SCA (middle + flag leaf)

Scott Stewart (U of Tenn)



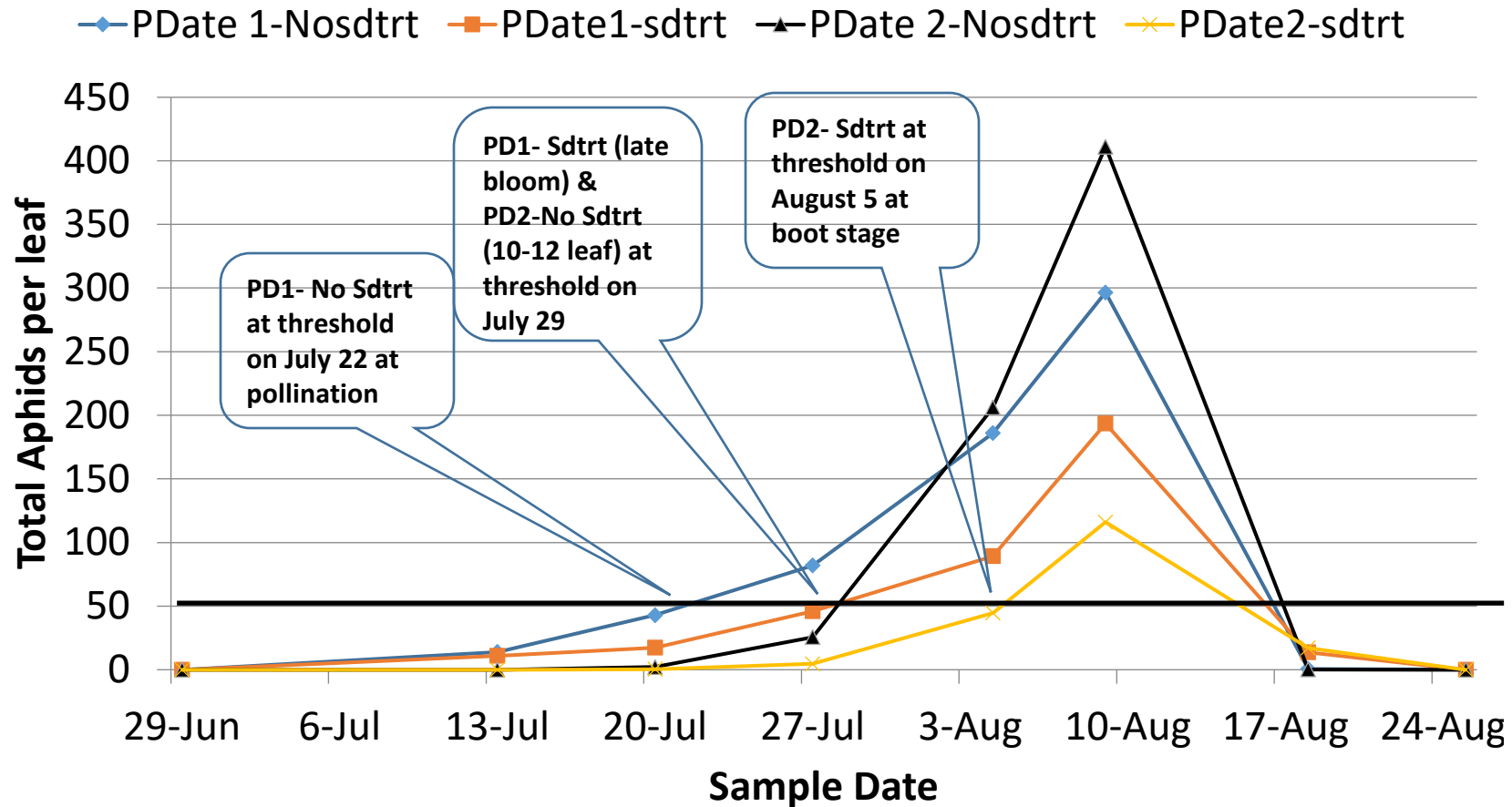
Cumulative Aphid Days Between Cvr.

John David Gonzales, LSU



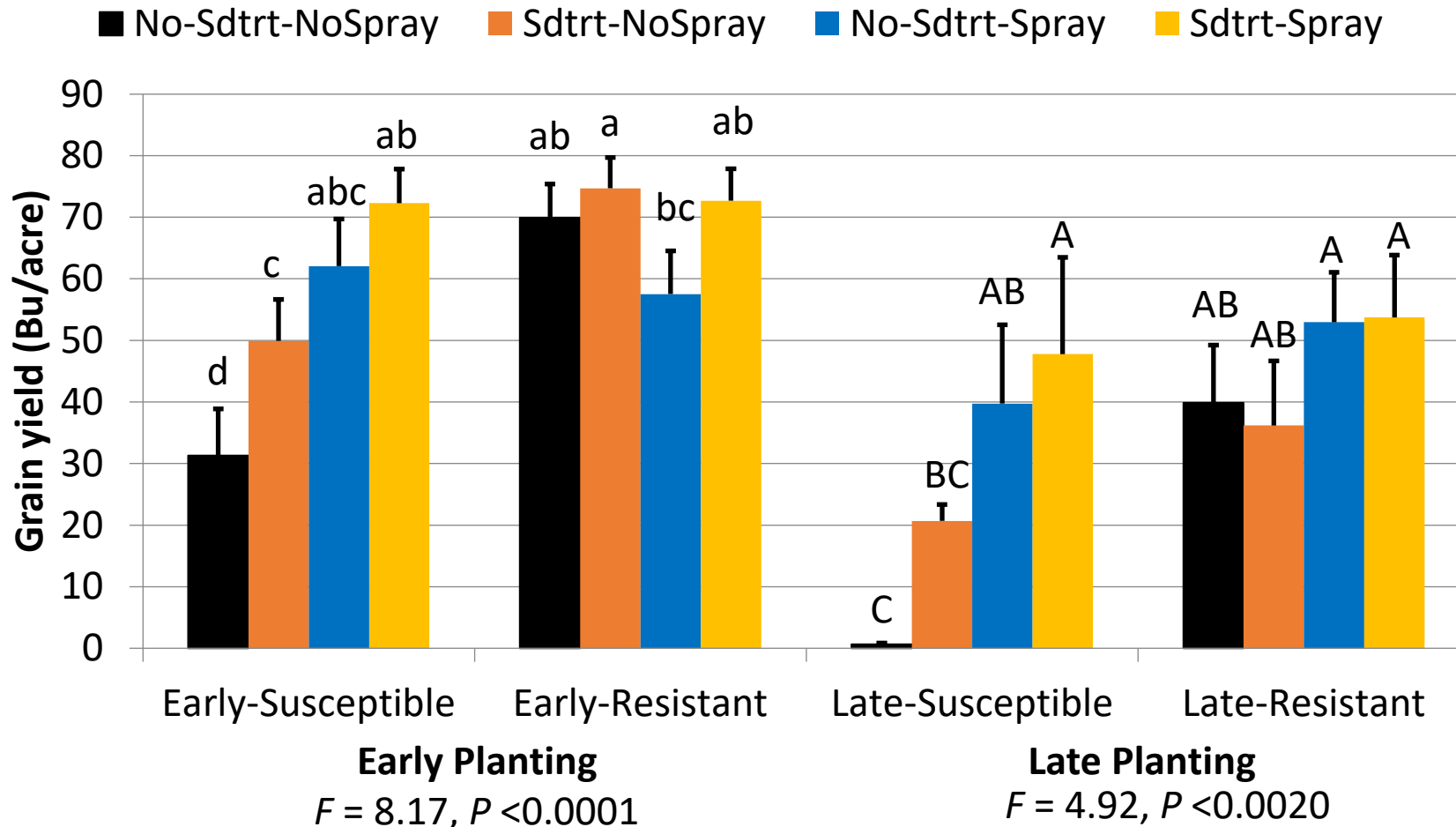
2016, Georgia, SCA on early and late planting of susceptible variety (DKS 3888) sorghum, no spray, with and without Poncho Insecticide Seed Treatment (Sdtrt)
 Seed treatment delayed Threshold by 1 week (TX, OK also)

G. David Buntin
 (U of Georgia)



2016, Georgia, Effect of planting time, variety resistance, seed treatment and foliar spray for control of SCA on sorghum grain yield

G. David Buntin
(U of Georgia)



Means within planting date followed by the same letter are not significantly different, LSD $\alpha=0.05$

SUMMARY:

BEST MANAGEMENT PRACTICES

- Plant as early as possible, keeping in mind 60F soil temp for good germination rate
- Control Johnsongrass as an alternative host, all weeds to protect stand establishment and promote early crop root vigor and exploration
- Use neonicotinoid treated seed, especially on later planted stands
- Scout early and often (from ~ late June, once weekly until found; twice weekly until 50 aphid/leaf)
- Spray at threshold with recommended rate and volume
- Avoid chlorpyrifos, dimethoate, and malathion when possible to protect natural enemies

TROUBLESHOOTING POOR CONTROL

- Treatment threshold exceeded
- Rain occurs soon after application
- Temperatures too cool for insect feeding activity – PROBABLY NOT RELEVANT TO SJV, CA
- Too low of insecticide rate
- Too low of spray volume for adequate coverage

WHAT WE EXPECT THIS YEAR

- Higher surface water allocations, less sorghum planting?
- Occurrence of SCA in sorghums and Johnson grass

WHAT WE STILL DO NOT KNOW

- Action thresholds for forage sorghum production
 - Crop stage * infestation timing damage potential for forage sorghum?
 - Consider economics of treatment v. early harvest
 - Yield/quality tradeoff in early harvest for pest avoidance?
- Efficacy of below CA label treatment rates (7-14 fl oz/ac) of Sivanto Prime?
- What effects do which beneficials have on SCA population?

Current SCA research in CA

2017 SCA Insecticide Trial Plot Layout			
Shafter Research Station			
Clark, Haviland, Marsh, & Dahlberg		Trial Details	
Collaborating with Bayer and Dow		Follwing:	Alfalfa
		Cultivar:	NK-300
Insecticide	Rate (fl. oz./acre)	Pre-irrigated:	6/19/17, 8 inches
1. UTC		Planted:	6/22/2017
2. Sivanto Prime	4	Herbicide:	Dual Magnum, AAtrex, and Roundup
3. Sivanto Prime	7	Irrigated:	~ 10 days, 24 inches to date
4. Transform WG	1.5	Cultivated:	7/6/2017
5. Malathion 57%	24	Fertilized:	7/14/2017
6. Dimethoate 4EC	16	SCA augmented:	8/10/2017
7. Lorsban Advanced	32	Treated:	8/31/2017

Questions?

