



THE UNIVERSITY OF ARIZONA

Cooperative Extension

Field Crops

Management of Forage Crop Pests

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TABLE 1 2017 alfalfa hay yield by county (in tons per acre)

	State, area, county	Yield (in tons/acre)
1	Arizona, Southern, Maricopa	9.15
2	Arizona, Northern, Mohave	8.7
3	Arizona, Southern, Pinal	8.45
4	Arizona, Southern, Lapaz	8.15
5	Arizona, Southern, Yuma	7.6
6	Washington, Southeast, Walla Walla	7.3
7	Arizona, Southern, Pima	7
8	New Mexico, Southwest, Sierra	6.95
9	New York, Southeast, Columbia	6.9
10	Arizona, Southern, Cochise	6.65
11	New Mexico, Southeast, Eddy	6.5
12	Washington, East Central, Grant	6.45
13	Washington, East Central, Adams	6.4
14	Illinois, Northwest, Putnam	6.35
15	Kansas, Southwest, Seward	6.2
16	Illinois, Southwest, St Clair	6.05
17	Colorado, Northeast, Morgan	6
18	Illinois, Southwest, Clinton	5.95
18	Kansas, Southwest, Grant	5.95
20	Colorado, East Central, Phillips	5.85
20	Illinois, Central, Mclean	5.85
22	New Mexico, Southeast, Chaves	5.8
23	Illinois, East Southeast, Cumberland	5.75
23	Illinois, Southwest, Randolph	5.75
25	Illinois, West Southwest, Bond	5.65
25	Kansas, Southwest, Gray	5.65
27	Idaho, Southwest, Owyhee	5.55
27	Nebraska, Southeast, Fillmore	5.55
27	Nebraska, Southwest, Hitchcock	5.55
30	Idaho, South Central, Cassia	5.5
30	New Mexico, Northeast, Torrance	5.5
30	Oregon, Southeast, Jefferson	5.5

2017 Alfalfa Hay Yield (tons/acre) by County



Alfalfa Winter Pest situation

- No established threshold
- No selective insecticides (until 2015)
- Lack of IPM program



Alfalfa Weevil



Begin activating and laying eggs at 42°F



4 instars



Spin web cocoon



Holometabolous metamorphosis



Adult

Damages of Alfalfa Weevil



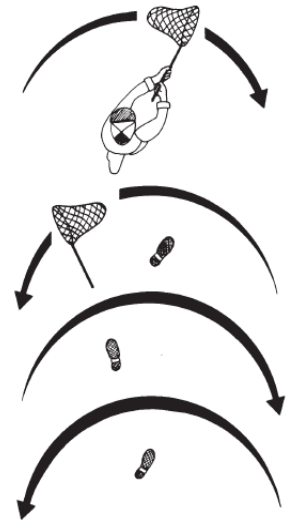
Adult damage to stem and leaflet



Management of Alfalfa Weevil

- **Monitoring**

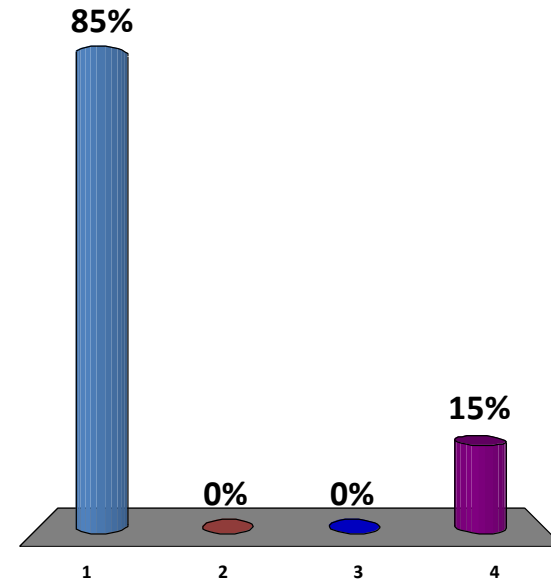
- Sampling should begin after temperatures have dropped below 42° F (usually January)
- Sweep net samples should be conducted in ≥ 4 areas in the field (5 sweeps / area)
- Control measure taken when an average of 15-20 larvae / sweep are found



UCIPM

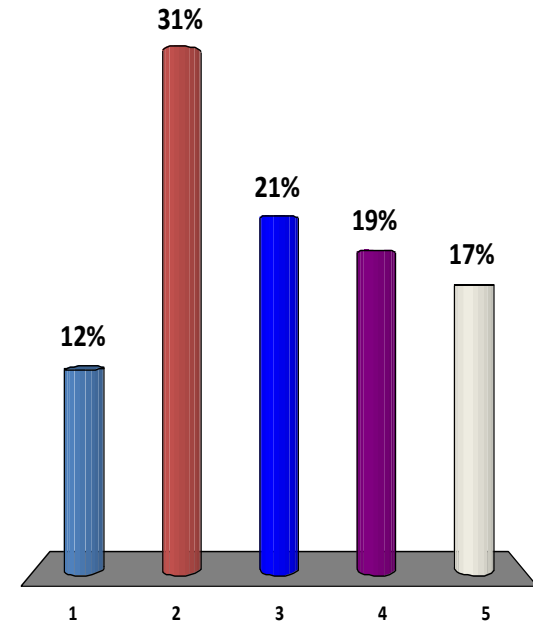
How did you decide when using insecticide treatment for alfalfa weevil

1. Follow threshold
2. Spray when spray for aphids
3. Spray preventively because they cause damage at the same time of year
4. Other



If using threshold when applying insecticide treatment for alfalfa weevil, what is this threshold

1. 15-20 larvae/sweep
2. 10-14 larvae/sweep
3. 9-5 larvae/sweep
4. Less than 5 larvae/sweep
5. Other



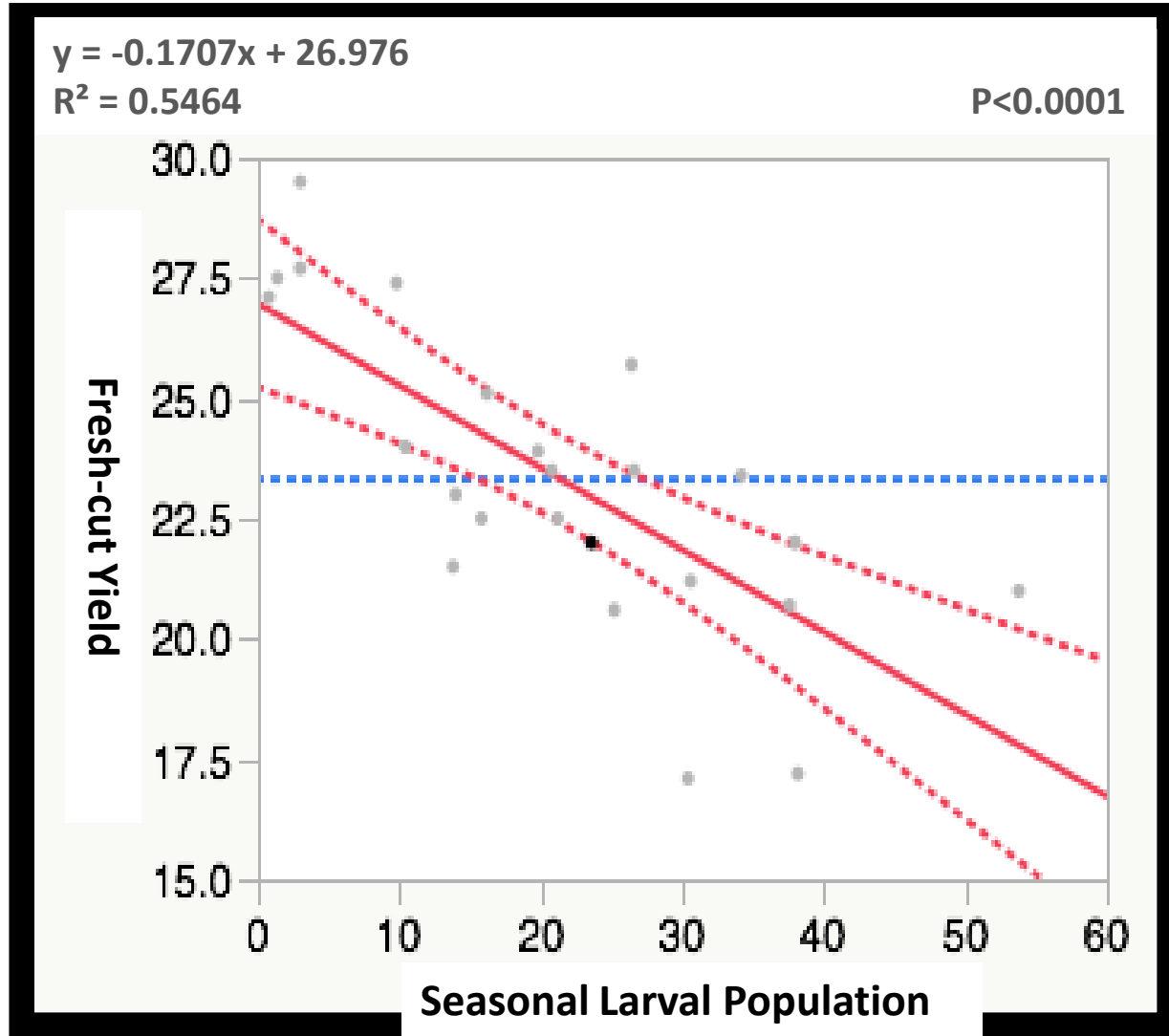
Alfalfa Weevil Threshold Study

- Multi year trials conducted at Maricopa Ag Center in Maricopa
- Trial conducted under randomized complete block design with four replications and alleys between treatments
- Weekly samples
- 5 sweeps/plot
- Yield and NQ at harvest



T5-1	T6-2	T2-3	T4-4
T2-1	T3-2	T6-3	T5-4
T1-1	T4-2	T5-3	T2-4
T3-1	T2-2	T4-3	T1-4
T6-1	T1-2	T3-3	T6-4
T4-1	T5-2	T1-3	T3-4

Relationship between Larval Population and Yield



“Large Larvae” vs “Small Larvae” & Other Insects in the sweep net



Action Threshold Scenarios

\$/Ton	1 Large Larva per sweep (-0.06 slope)							
320	Y	N	N	N	N	N	N	N
310	Y	N	N	N	N	N	N	N
300	Y	N	N	N	N	N	N	N
290	Y	N	N	N	N	N	N	N
280	Y	N	N	N	N	N	N	N
270	Y	N	N	N	N	N	N	N
260	Y	N	N	N	N	N	N	N
250	Y	N	N	N	N	N	N	N
240	N	N	N	N	N	N	N	N
230	N	N	N	N	N	N	N	N
220	N	N	N	N	N	N	N	N
210	N	N	N	N	N	N	N	N
200	N	N	N	N	N	N	N	N
190	N	N	N	N	N	N	N	N
180	N	N	N	N	N	N	N	N
170	N	N	N	N	N	N	N	N
160	N	N	N	N	N	N	N	N
150	N	N	N	N	N	N	N	N
140	N	N	N	N	N	N	N	N
130	N	N	N	N	N	N	N	N
120	N	N	N	N	N	N	N	N
110	N	N	N	N	N	N	N	N
100	15	20	25	30	35	40	45	50
Cost of Treatment in \$								

\$/Ton	2 Large Larvae per sweep (-0.12 slope)							
320	Y	Y	Y	Y	Y	N	N	N
310	Y	Y	Y	Y	Y	N	N	N
300	Y	Y	Y	Y	Y	N	N	N
290	Y	Y	Y	Y	N	N	N	N
280	Y	Y	Y	Y	N	N	N	N
270	Y	Y	Y	Y	N	N	N	N
260	Y	Y	Y	Y	N	N	N	N
250	Y	Y	Y	Y	N	N	N	N
240	Y	Y	Y	N	N	N	N	N
230	Y	Y	Y	N	N	N	N	N
220	Y	Y	Y	N	N	N	N	N
210	Y	Y	Y	N	N	N	N	N
200	Y	Y	N	N	N	N	N	N
190	Y	Y	N	N	N	N	N	N
180	Y	Y	N	N	N	N	N	N
170	Y	Y	N	N	N	N	N	N
160	Y	N	N	N	N	N	N	N
150	Y	N	N	N	N	N	N	N
140	Y	N	N	N	N	N	N	N
130	Y	N	N	N	N	N	N	N
120	N	N	N	N	N	N	N	N
110	N	N	N	N	N	N	N	N
100	15	20	25	30	35	40	45	50
Cost of Treatment								

Action Threshold Scenarios – Cont...

\$/Ton	3 Large Larvae per sweep (-0.18 slope)							
320	Y	Y	Y	Y	Y	Y	Y	Y
310	Y	Y	Y	Y	Y	Y	Y	Y
300	Y	Y	Y	Y	Y	Y	Y	Y
290	Y	Y	Y	Y	Y	Y	Y	Y
280	Y	Y	Y	Y	Y	Y	Y	Y
270	Y	Y	Y	Y	Y	Y	Y	N
260	Y	Y	Y	Y	Y	Y	Y	N
250	Y	Y	Y	Y	Y	Y	Y	N
240	Y	Y	Y	Y	Y	Y	N	N
230	Y	Y	Y	Y	Y	Y	N	N
220	Y	Y	Y	Y	Y	N	N	N
210	Y	Y	Y	Y	Y	N	N	N
200	Y	Y	Y	Y	Y	N	N	N
190	Y	Y	Y	Y	N	N	N	N
180	Y	Y	Y	Y	N	N	N	N
170	Y	Y	Y	Y	N	N	N	N
160	Y	Y	Y	N	N	N	N	N
150	Y	Y	Y	N	N	N	N	N
140	Y	Y	Y	N	N	N	N	N
130	Y	Y	N	N	N	N	N	N
120	Y	Y	N	N	N	N	N	N
110	Y	N	N	N	N	N	N	N
100	15	20	25	30	35	40	45	50
	Cost of Treatment/Acre							

\$/Ton	4 Large Larvae per sweep (-0.24 slope)							
320	Y	Y	Y	Y	Y	Y	Y	Y
310	Y	Y	Y	Y	Y	Y	Y	Y
300	Y	Y	Y	Y	Y	Y	Y	Y
290	Y	Y	Y	Y	Y	Y	Y	Y
280	Y	Y	Y	Y	Y	Y	Y	Y
270	Y	Y	Y	Y	Y	Y	Y	Y
260	Y	Y	Y	Y	Y	Y	Y	Y
250	Y	Y	Y	Y	Y	Y	Y	Y
240	Y	Y	Y	Y	Y	Y	Y	Y
230	Y	Y	Y	Y	Y	Y	Y	Y
220	Y	Y	Y	Y	Y	Y	Y	Y
210	Y	Y	Y	Y	Y	Y	Y	Y
200	Y	Y	Y	Y	Y	Y	Y	N
190	Y	Y	Y	Y	Y	Y	Y	N
180	Y	Y	Y	Y	Y	Y	N	N
170	Y	Y	Y	Y	Y	Y	N	N
160	Y	Y	Y	Y	Y	N	N	N
150	Y	Y	Y	Y	Y	N	N	N
140	Y	Y	Y	Y	N	N	N	N
130	Y	Y	Y	Y	N	N	N	N
120	Y	Y	Y	N	N	N	N	N
110	Y	Y	Y	N	N	N	N	N
100	15	20	25	30	35	40	45	50
	Cost of Treatment/Acre							

“Large Larvae” vs “Small Larvae” & Other Insects in the sweep net



Alfalfa Aphid Complex

- Damage



- Sucking plant sap
+
- injecting toxins
+
- secreting honeydew



- ↓
- Leaf curling, shortened internodes and yellowing
 - Sooty mold reduces photosynthesis and quality

- ↓
- Reducing growth and yield
 - Plant death

Alfalfa Aphids in the Southwest Desert

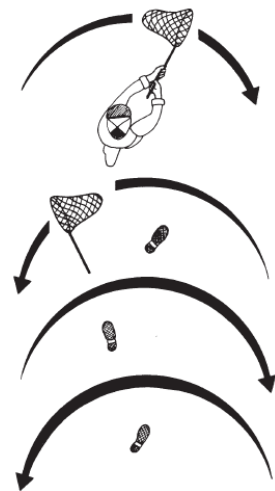
- **Pea aphid,**
Acyrtosiphon pisum
- **Blue alfalfa aphid,**
Acyrtosiphon kondoi
- **Cowpea aphid,**
Aphis craccivora
- **Spotted alfalfa aphid,**
Therioaphis maculata



Alfalfa Aphid Complex

- **Monitoring**

- Divide field into 4 quadrants
- Randomly select 5 stems from each quadrant
- Record average stem height from each section
- Shake stem over sweep net or white cloth
- ID aphids and record number of each species
- Take additional 5 sweeps of each section and record number of lady beetle adults and larvae

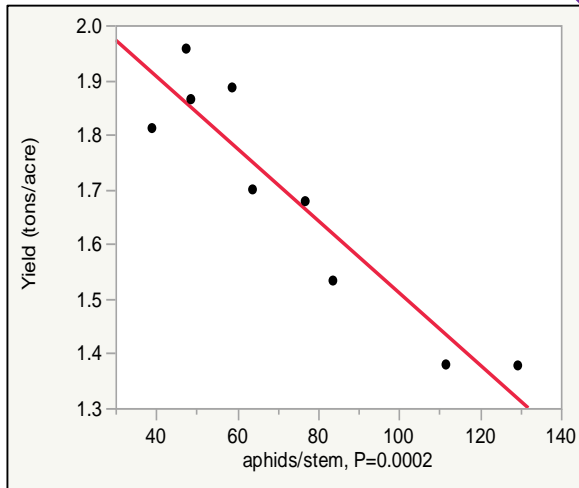


Alfalfa Aphid Research

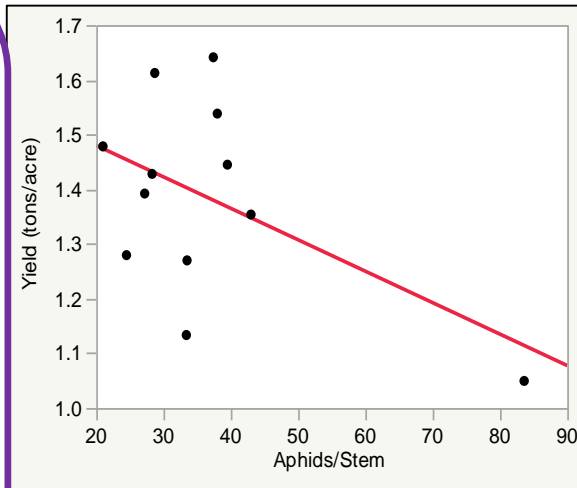
- Stem and sweep net sampling
- Establish action threshold.
 - Manipulating population using different insecticide applications
 - Economic analyses of different aphid populations vs yield
- Efficacy studies of different aphidicides
- Utilization of non-chemical control strategies

Aphids Threshold Results

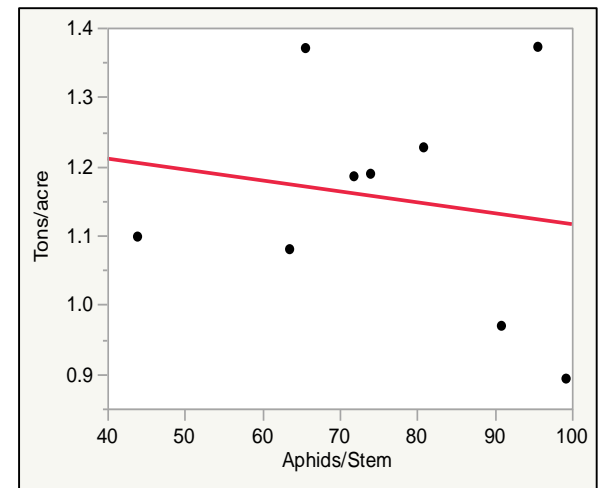
2014



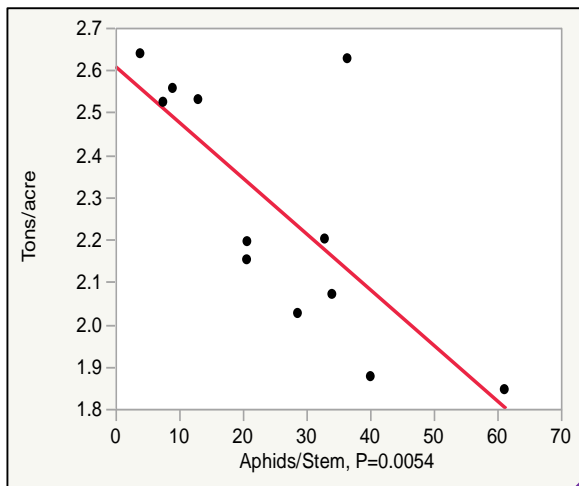
2015



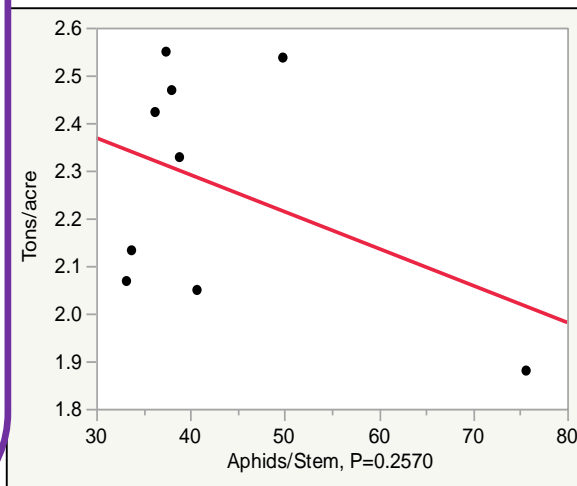
2016



2017



2018



The negative interaction was significant in 2014, and almost significant in 2017.

More
Blue Alfalfa Aphid



***Isaria* sp &
Zoophthora sp.
Entomopathogenic
Fungus**



Cultural Control

- **Cultural Control**

- **Resistant Varieties**

ALMOST LIKE GETTING MARRIED!!

You'll have to live with your decision for a long time, so take a little time to investigate the potential performance of your alfalfa varieties.

- **Strip Cutting**



- **Early harvest**

- **Proper irrigation**





UC Statewide IPM Project
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G251-16

Natural Enemies ... Your Friends in IPM



G254-37



G130-17



Progression of Pest Management Strategies

Parasitism

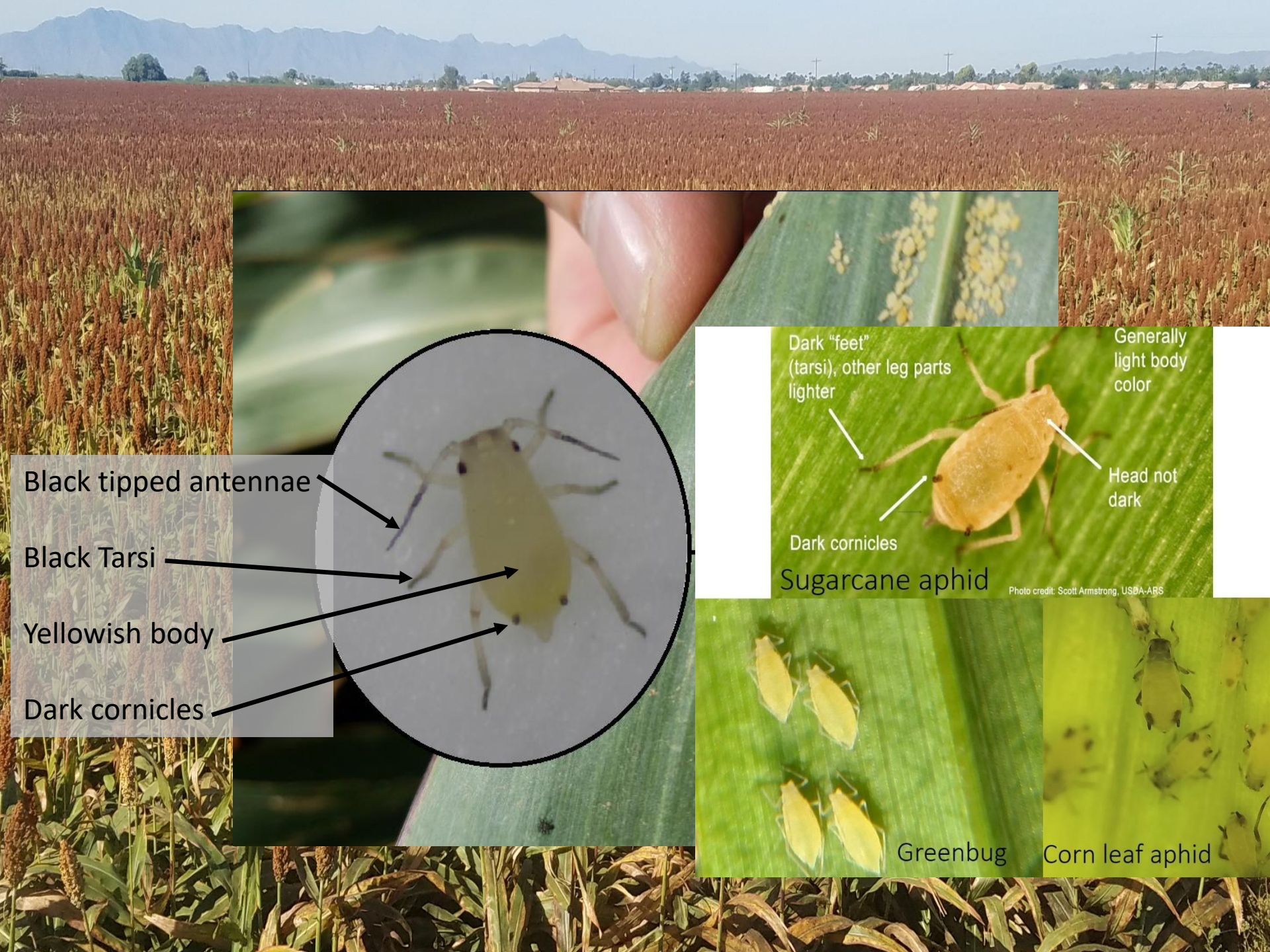
Hollowed out mummy

Blue Alfalfa Aphid



Sugarcane Aphid in Sorghum



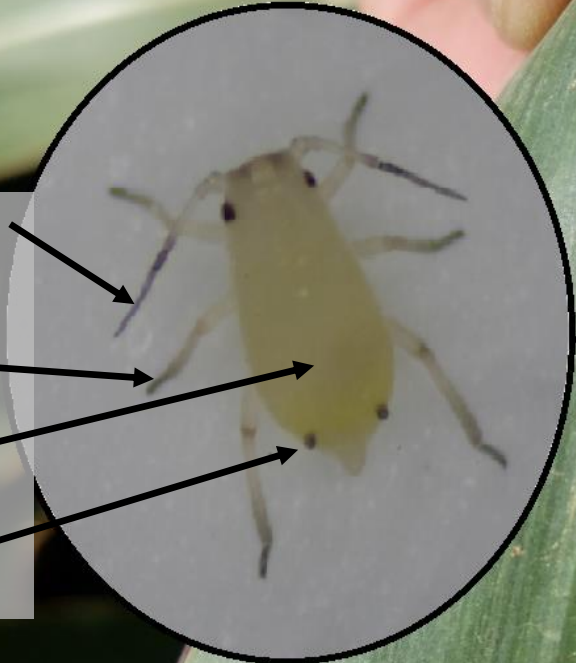


Black tipped antennae

Black Tarsi

Yellowish body

Dark cornicles

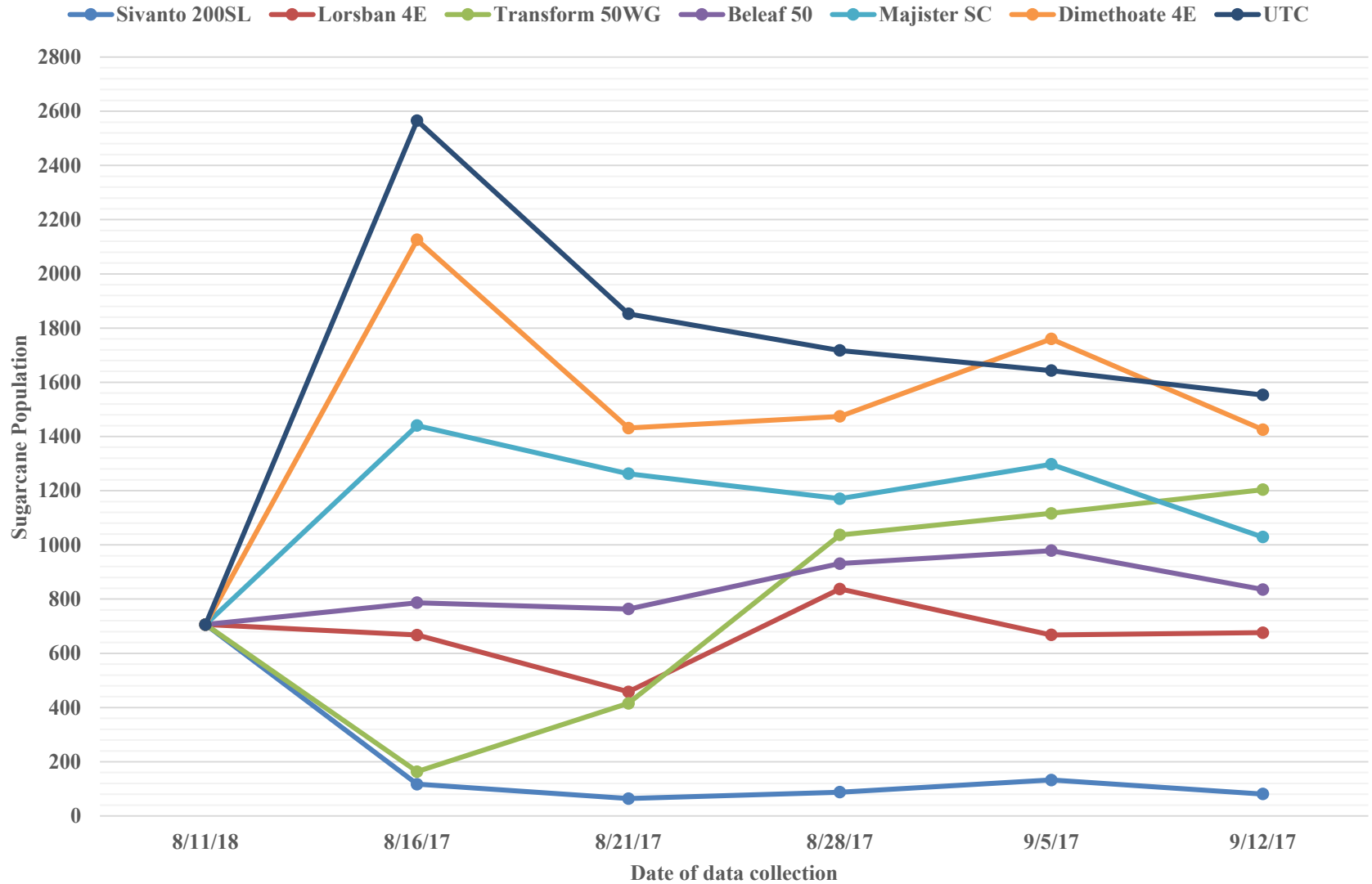


Greenbug

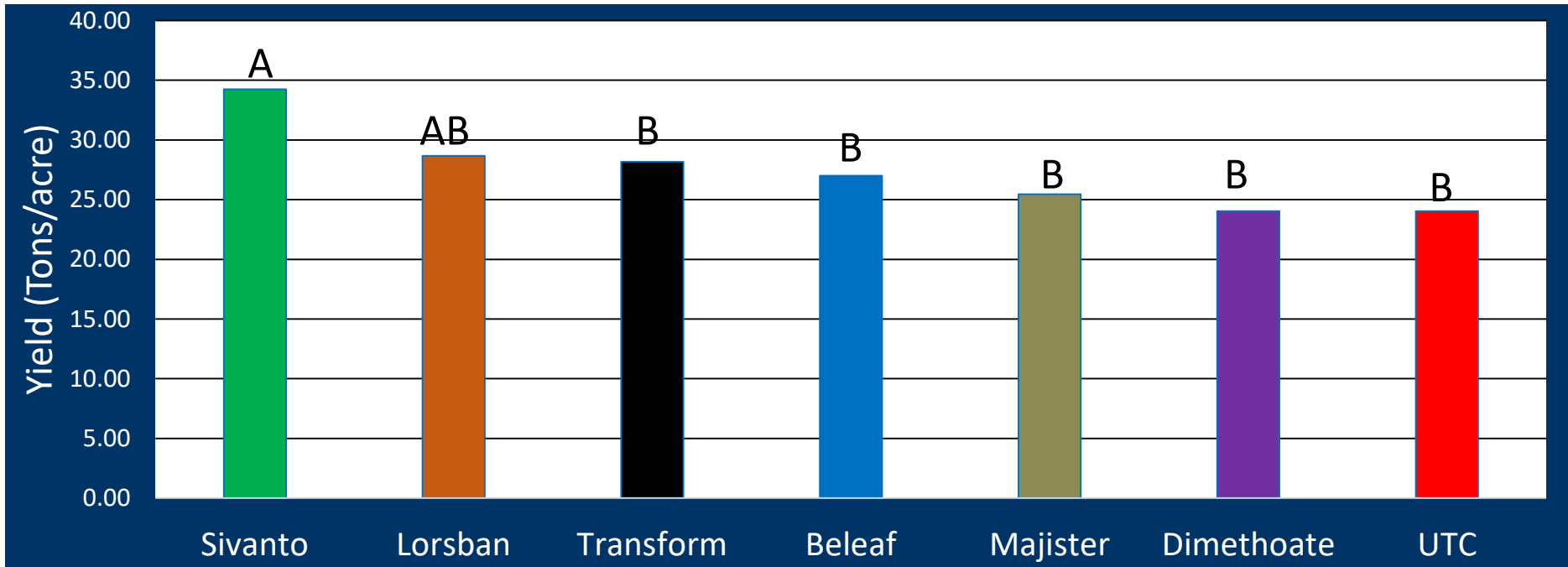


Corn leaf aphid

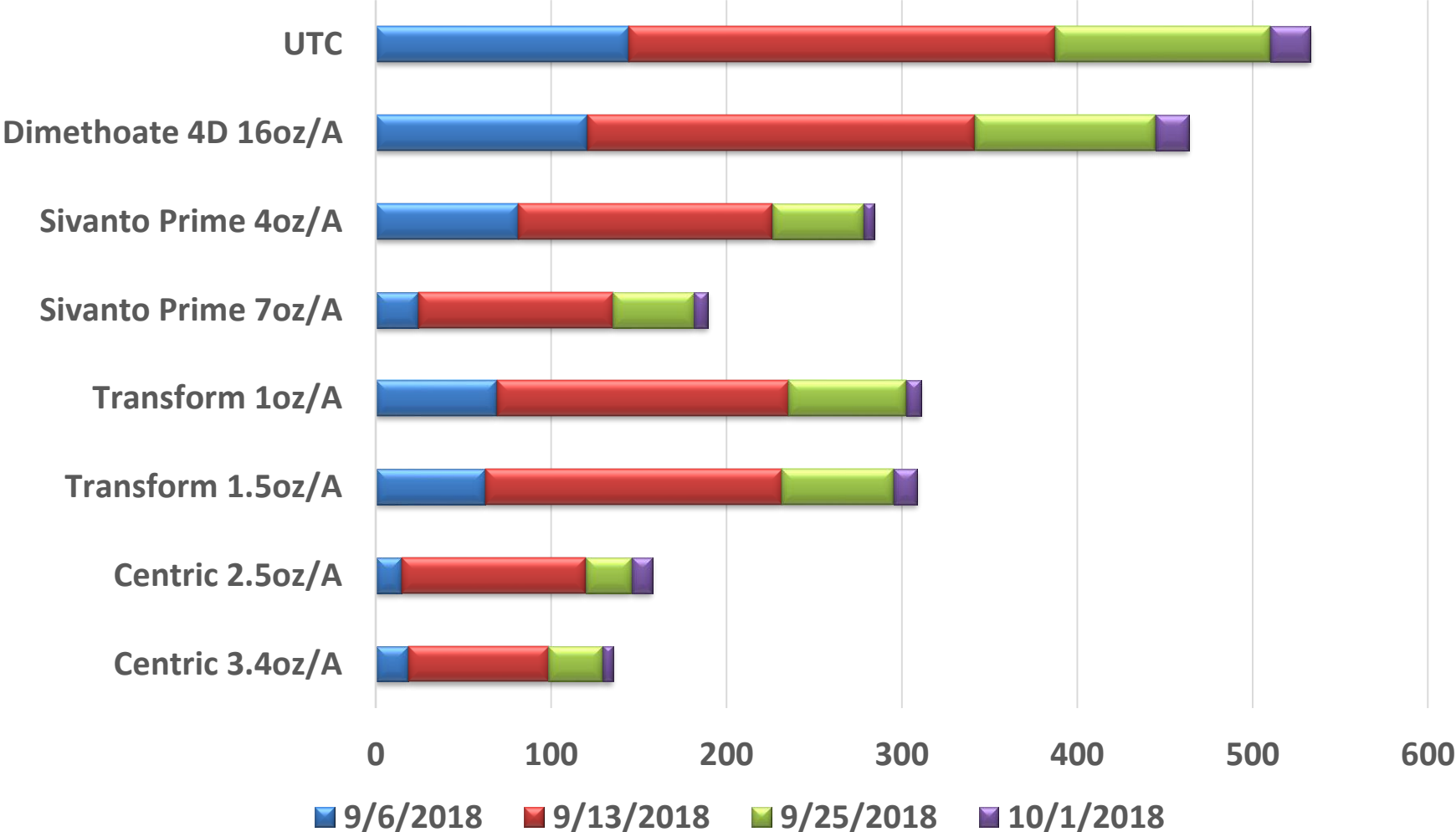
2017 foliar trial, Sugarcane Aphids in Forage Sorghum



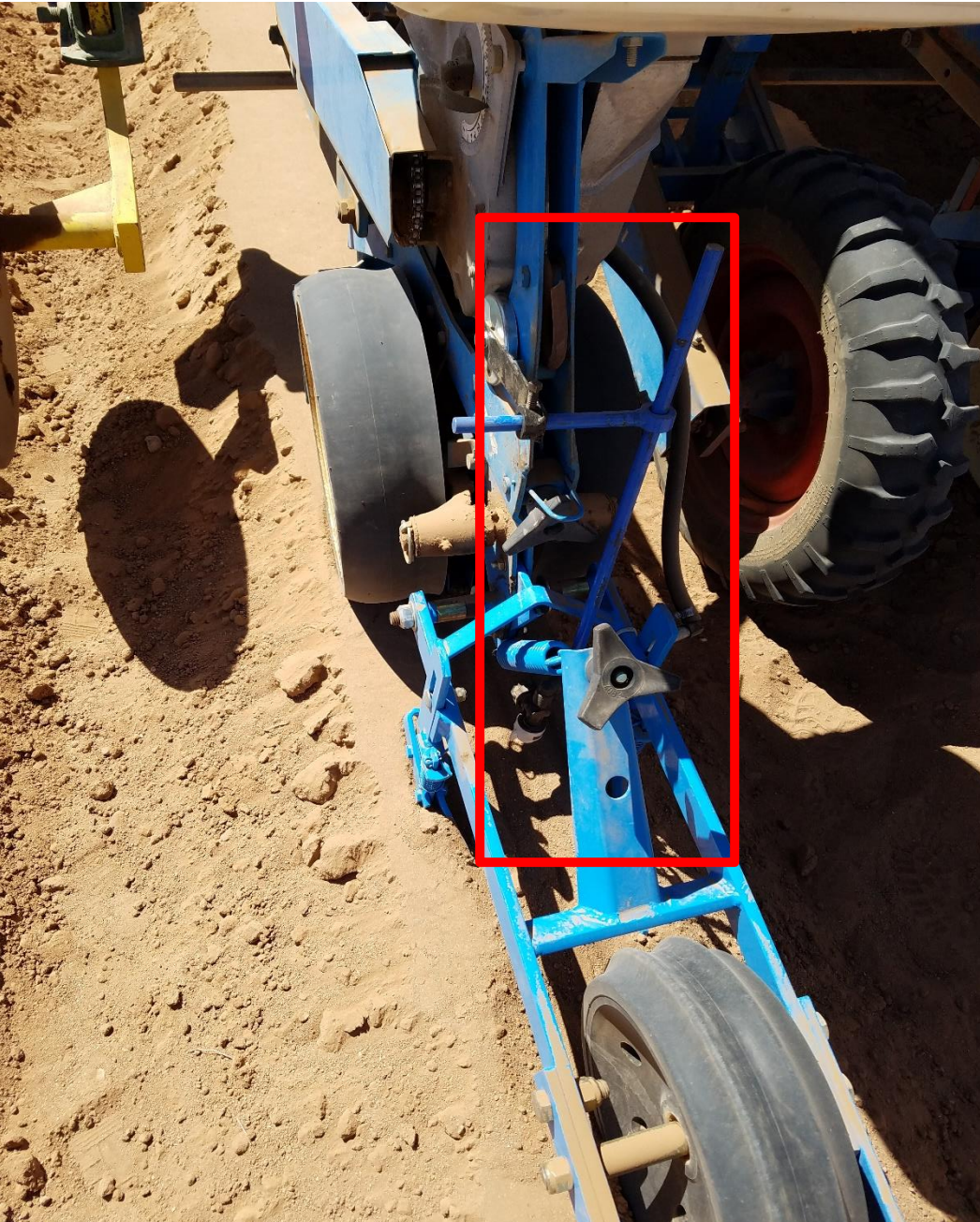
2017 Foliar Trial at MAC



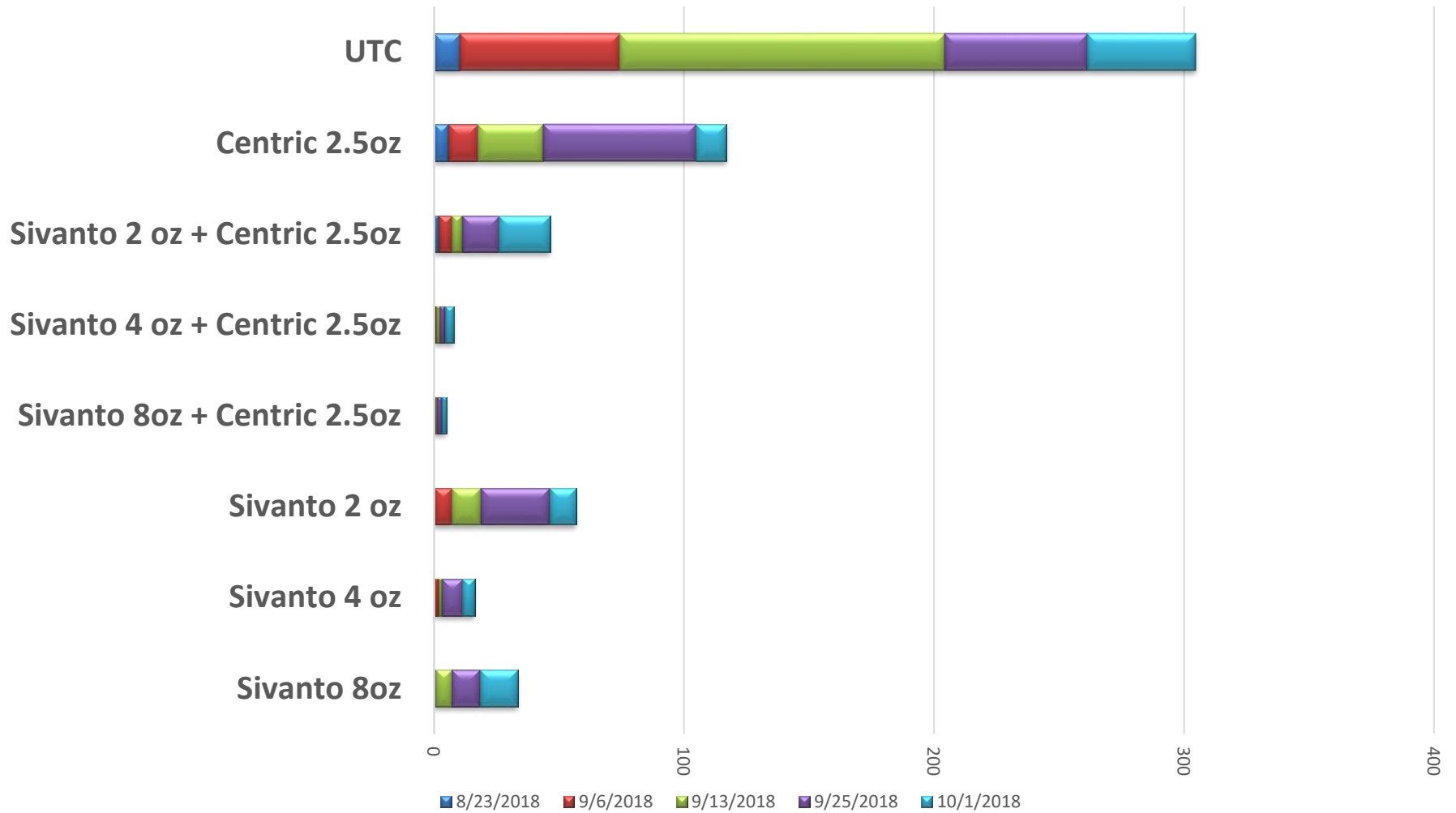
Accumulative Number of SCA per leaf in foliar application efficacy trial in 2018 sorghum season at MAC



Application Method

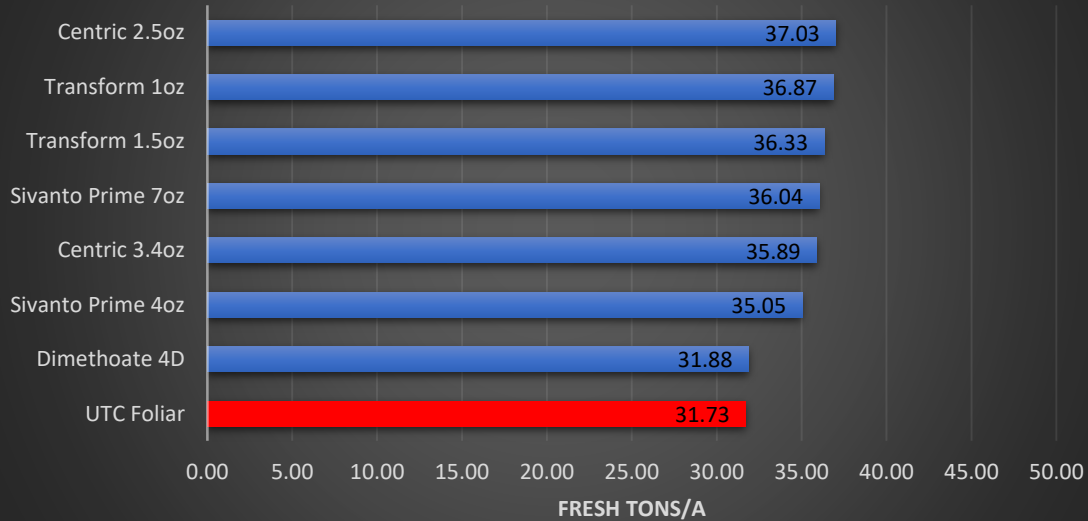


Accumulative Number of SCA per leaf in in-ferrow efficacy trial in 2018 sorghum season at MAC



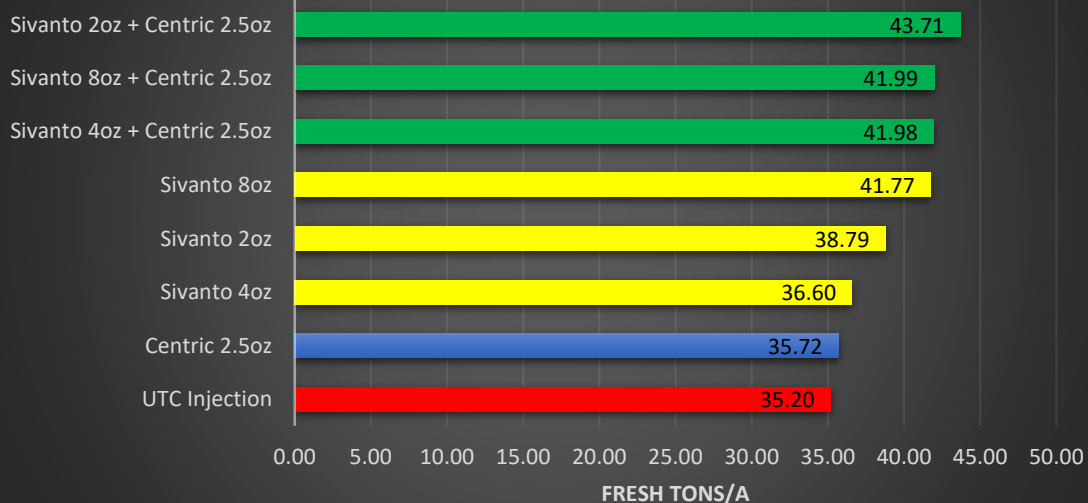
2018 Foliar & Injection Trial

Ton/A (Foliar)



Centric 2.5oz	A	170.1
Transform 1oz	A	169.4
Transform 1.5oz	A	166.9
Sivanto Prime 7oz	A	165.55
Centric 3.4oz	A	164.89
Sivanto Prime 4oz	A	161
Dimethoate 4D	A	146.45
UTC Foliar	A	145.75

Ton/A (Injection; Injection + Foliar)



Sivanto 2oz + Centric 2.5oz	A			200.8
Sivanto 8oz + Centric 2.5oz	A	B		192.9
Sivanto 4oz + Centric 2.5oz	A	B		192.85
Sivanto 8oz	A	B		191.9
Sivanto 2oz		B	C	178.2
Sivanto 4oz			C	168.15
Centric 2.5oz			C	164.1
UTC Injection			C	161.7

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