Sugarcane Aphid - A new pest of California Sorghum

Larry Godfrey,
Dept. of Entomology and Nematology, UC-Davis

and

David Haviland, UCCE Kern Co.
History of sugarcane aphid

• Sugarcane aphid (SCA) known in the south for many years as a pest of sugarcane

• In 2013 SCA was reported to attack sorghum in Texas and Louisiana
History of sugarcane aphid

- By 2014 found in 11 southern states to Florida
- 2015 SCA moved north and westward
- 2016 (Aug./Sept) Found in Arizona and Central and Imperial Valleys
## Impacts in 2014

<table>
<thead>
<tr>
<th>State</th>
<th>Acre Infested by Sugarcane Aphid</th>
<th>Sorghum Production Losses from SA Infestations</th>
<th>Monetary Loss in production from SA</th>
<th>Sorghum Acres Treated for SA Infestations</th>
<th>Cost for Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>LA</td>
<td>100%</td>
<td>15% (1.8mm bu)</td>
<td>$7.2mm</td>
<td>75%</td>
<td>$1.1 mm</td>
</tr>
<tr>
<td>AL</td>
<td>100%</td>
<td>20% (0.22mm bu)</td>
<td>$0.88mm</td>
<td>75%</td>
<td>$0.20 mm</td>
</tr>
<tr>
<td>OK</td>
<td>10%</td>
<td></td>
<td></td>
<td>10%</td>
<td>$0.39 mm</td>
</tr>
<tr>
<td>GA</td>
<td>90%</td>
<td>15% (0.3mm bu)</td>
<td>$1.2mm</td>
<td>80%</td>
<td>$0.56mm</td>
</tr>
<tr>
<td>AR</td>
<td>90+%</td>
<td>15% (1.9mm bu)</td>
<td>$7.7mm</td>
<td>70%</td>
<td>$0.42mm</td>
</tr>
<tr>
<td>MS</td>
<td>100%</td>
<td>15% (0.87mm bu)</td>
<td>$3.5mm</td>
<td>70%</td>
<td>$1.1mm</td>
</tr>
<tr>
<td>TX</td>
<td>60%</td>
<td>5% (6.4mm bu)</td>
<td>$34.8mm</td>
<td>35%</td>
<td>$10.5mm</td>
</tr>
<tr>
<td>South TX</td>
<td>100%</td>
<td>15% (8.7mm bu) w/o management: 10 to &gt;50%</td>
<td>$25.6mm</td>
<td>60%</td>
<td>$8.1mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$30-120mm</td>
<td>in yield savings</td>
<td></td>
</tr>
<tr>
<td>South TX 2015</td>
<td>50-75%</td>
<td></td>
<td>30-40%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Courtesy of M. Brewer, Texas A&M AgriLife
Hosts

• Sorghum sp.
  • Grain sorghum
  • Forage sorghum
  • Sweet sorghum
  • Sudangrass
  • Sorghum-sudangrass
  • Johnsongrass

• Corn is NOT a host

• Other species
  • Temporary (poor) hosts after harvest
  • Alates common
Identification

• Pale yellow, gray or tan
• Black cornicles
• Black tips of antennae and feet
• Underside of leaves
• Most commonly by midrib
• Lots of honeydew, sooty mold
Identification
Black cornicles
Black tips of antennae
Black tips of legs
Identification

Sugarcane Aphid

Cotton aphid

Corn stunt aphid

Greenbug
Biology

• All females
• Born pregnant
• 1-3 offspring per day
• Can become adults in 5 days
• Live an average of 28 days
• Field populations reported to go from 50 to 500 per leaf in two weeks
• Winged forms can disperse

Source: TAMU
Damage

• Sap feeding and honeydew
  • Extraction of nutrients
  • Leaf necrosis

• Black sooty mold
  • Blocks sunlight
  • Reduces photosynthesis
  • Leaves turn yellow and die

• Overall plant stress
  • Uneven head emergence
  • Poor grain set
  • Decreased moisture

• Reduced yields
• Reduced quality
• Cannot be used as silage
• Shift away from dairy forage to dry stock feed
Grain Yield Loss from SCA (uncontrolled)

<table>
<thead>
<tr>
<th>Crop Stage at 20% Infestation</th>
<th>Percent Yield Loss with No Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-boot</td>
<td>81-100%</td>
</tr>
<tr>
<td>Boot</td>
<td>52-69%</td>
</tr>
<tr>
<td>Panicle Emergence</td>
<td>67%</td>
</tr>
<tr>
<td>Soft Dough</td>
<td>21%</td>
</tr>
</tbody>
</table>

Data from Mississippi State University
Treatment thresholds

• Not available for CA
• Developed only for grain sorghum
• Texas A&M
  • Scout fields 1-2 times per week
  • Treat when 25% of plants have 50 aphids per leaf
• Mississippi State
  • Scout fields 1-2 times per week
  • Pre-boot & boot- 20% of plants with localized heavy honeydew and established aphid colonies
  • Heading, soft dough and dough- 30% as described above
  • Black layer- Heavy honeydew and aphids established on flag leaf or in head. Treat only to avoid harvest problems.
Treatment thresholds

50 or More Aphids on the Leaves of 25% of the Plants
Insecticide options - preplant

- Seed treatments (Check CA labels)
  - Gaucho
  - Poncho
  - Nipsit
  - Cruiser
- Provide good early-season protection
- 24-40 day residual
- Most important on late-planted sorghum

![Aphids per 3 row-ft chart]

Jackson, TN 2015

S. Stewart, University of Tennessee
Insecticide options- postplant

• Sivanto (flupyradifurone)
  • Effective but expensive
  • 4 oz works as well as 7 oz

• Sulfoxaflor (NOT Registered in CA)
  • 19 states with Section 18 Exemptions in 2016
  • Full Federal Label available in Fall of 2016
  • CDPR working on label, probably not for 2017
  • Discussions underway to request a 24c SLN for 2017

• Lorsban, Dimethoate, Malathion
  • Inexpensive
  • Poor efficacy
  • Kill beneficials
Sivanto plot

Courtesy of Robert Bowling, TAMU
SCA 7 to 10 DAT, 12 trials

N = 12 tests  P < 0.0001  Source: Scott Stewart, U. of Tenn
SCA Trial at Milan, Texas

Bushels/Acre

- Sivanto (4)
- Sivanto (7)
- Centric (2)
- Transform (1)
- Lorsban Adv. (32)
- Transform (1.5)
- Lorsb (16)+ Dimeth (16)
- Dimethoate (16)
- Untreated

S Stewart, U. of Tenn
SCA trial at Milan, TN, 2015

S Stewart, U. of Tenn
Texas Section 18 Label for Transform®

- Application by ground or air (no chemigation).
- Wind speed not to exceed 10 mph.
- Droplet Size: Use only medium to coarse spray nozzles for ground and non-ULV aerial application. In conditions of low humidity and high temperatures, applicators should use a coarser droplet size.
- Boom height for ground application: Not to exceed 4 feet.
- Carrier volume for ground application: A minimum of 5 to 10 gallons per acre - to be increased with increasing crop size and/or pest density.
- Carrier volume for aerial application: A minimum of 3 gallons per acre, but a minimum of 5 gallons per acre is recommended.
Other control options

• Predators
  • Beneficial, but not stand-alone
  • Ladybugs
  • Syrphid fly larvae
  • Lacewing larvae

• Parasitoids
  • Effective on native aphids
  • Rarely seen on sugarcane aphid

• Resistant varieties
  • Many studies in the south on grain sorghum
  • Resistance/tolerance among CA forage varieties unknown
Best Management Practices
Adapted from sorghum checkoff

• Control johnsongrass and other sorghum around field
• Plant early to avoid infestations
• Use seed treatments, especially on late plantings
• Scout early and often
• Treat as soon as threshold is reached
• Use the recommended insecticide, rate and volume of water
• Avoid use of organophosphates and pyrethroids that are harmful to beneficials and may cause aphid numbers to increase rapidly
• Consider planting tolerant hybrids adapted to the region
• Consider whether or not to shift acreage to corn
Questions - California

• thresholds on forage sorghum
  • yield
  • nutrient quality
• insecticide efficacy
  • aerial
  • ground
  • balancing costs
• variety susceptibility
• overwintering of SCA--role of Johnsongrass
Acknowledgements

• Brent Beene, Sorghum Checkoff
• Central Valley sorghum growers
• Texas, Tennessee, Louisiana, Mississippi researchers