Robert Bowling\textsuperscript{1}, Michael Brewer\textsuperscript{2}, and Stephen Biles\textsuperscript{1}

\textsuperscript{1}Agrilife Extension Entomology, Corpus Christi

\textsuperscript{2}Agrilife Research Entomology, Corpus Christi
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Travis Aherns, Del Mar College and Texas A&M AgriLife Research, Corpus Christi

Stephen Biles, Texas A&M AgriLife Extension, Department of Entomology, Lavaca County, Port Lavaca

Robert Bowling, Texas A&M AgriLife Extension, Department of Entomology, Corpus Christi

Michael Brewer, Texas A&M AgriLife Research, Department of Entomology, Corpus Christi

David Kerns, Department of Entomology, Louisiana AgCenter, Winnsboro, LA

Pat Porter, Texas A&M AgriLife Extension, Department of Entomology, Lubbock

Xanthe Shirley, Department of Entomology, Texas A&M University, College Station

Raul Villanueva, Texas A&M AgriLife Extension, Department of Entomology, Weslaco
The Sugarcane Aphid: A New Pest of Sorghum in the United States

Occurrence on Sorghum in 2013.

- In 2013, first reported on sorghum in Beaumont TX
- Confirmed on sorghum in the LRGV, Coastal Bend into North Central TX
- Also confirmed on sorghum in LA, MS, and OK
- 4 states and 38 counties
- Yield losses up to 50% due to lack of effective control options

Occurrence on sorghum in 2014

- In 2014, confirmed on sorghum in 12 states and over 300 counties
- Moved northward into the northern High Plains of TX and KS and eastward into Florida and South Carolina; also in states of Tamaulipas, Nuevo Leon, Coahuila, Mexico
- Section 18 on Transform

Overwintering populations in 201

- In 2015, overwintering populations found primarily on Johnsongrass but also on volunteer sorghum and forage sorghum
- Populations noted as far north as McLennan and Hill counties in TX
- Section 18 on Transform re-issued
- New registration for Sivanto
**Identification:**

Unwinged forms (immatures and large adults) are most common forms in the field.

Alatoid: Fourth instar that will become a winged adult following molt.

Winged adult:

**Hosts:**
• Johnsongrass
• Grain Sorghum
• Forage Sorghum
  ➢ Sudangrass
  ➢ Haygrazer

Biology:

• All are females
• Females live, on average, 28 days (range 14-37 days)
• Live birth, born pregnant (viviparous)
• 4 nymphal molts (all unwinged) and last molt to adult (winged or unwinged)
• Nymphs develop to adults in 5 days on average during growing season (4.3 to 12.4 days range)
• Ca. 1-3 offspring born/day for ca. 30 days...exponential growth
• Piercing-sucking mouth parts

Colonization:

• Underside of lower leaves
• May move to sorghum head
• Rapid population growth from pre-flowering through head development
Damage:

Primary Injury:

- General plant decline from large sugarcane aphid populations

Secondary Yield Reductions:

- Honeydew – A waste product
  - Interferes w/harvest operations
- Sooty mold black fungal growth on honeydew
  - Disrupts plant physiology, such as photosynthesis
- Secondary issues – stalk rots
- No detection of acute plant toxicity or severe disease introduction
- Once grain is filled, yield loss concerns shift from loss due to plant decline to loss due to disruption of harvest caused by honeydew

Aphid Movement to Sorghum Head:

- Aphids move to sorghum heads under severe aphid infestation and following harvest aids
  - Glyphosate and sodium chlorate
  - Adding Transform to the harvest aid when the aphid is present has prevented the issue
Management:

Biological Control: Abundant Natural Enemies

- Predators – Lady Beetles, hover flies, and many others
- Parasitoids—Black mummies visible (hardened skin of aphid with immature parasitoid inside)
- Most active after head emergence
- These beneficial insects limit aphid growth but currently after significant aphid population increase and plant decline

Notes:
Yield Impact has been demonstrated in replicated experiments in Corpus Christi, TX and Winnsboro, LA. Results were consistent and used to calculate an economic threshold of 50 to 125 aphids per leaf, depending on insecticide control costs and grain market value. See ‘Scouting Sugarcane Aphids’ card for field use.

Yield—Aphid (peak count) Regression → Economic Injury Level

South Texas

Northern Louisiana

Loss estimates per 100 aphids/leaf:

South TX: 2.54 bu/ac  Northern LA: 4.11 bu/ac  Ave: 3.325 bu/ac
Scouting Sugarcane Aphids

Timing effective treatment to control sugarcane aphids (SCA) in sorghum depends on the size of the SCA population. To estimate the number of SCA in a field, follow these steps for scouting the field and use the Sampling Protocol (below) and the Quick Aphid Checker (on back) to make treatment decisions.

First Detection: Is the Field at Risk?

- Once a week, walk 25 feet into the field and examine plants along 50 feet of row.
- If honeydew is present, look for SCA on the underside of a leaf above the honeydew.
- Inspect the underside of leaves from the upper and lower canopy from 15–20 plants per location.
- Sample each side of the field as well as sites near Johnsonsgrass and tall mutant plants.
- Check at least 4 locations per field for a total of 60–80 plants.

If no SCA are present, or only a few wingless/winged aphids are on upper leaves, continue once-a-week scouting.

If SCA are found on lower or mid-canopy leaves, begin twice-a-week scouting. Use the Sampling Protocol and the Quick Aphid Checker to determine if aphid densities exceed the economic threshold.

Sampling Protocol: Making Treatment Decisions

Examine the underside of one completely green leaf from the lower canopy and the uppermost leaf (or the leaf below the flag leaf at boot to heading) and estimate the number of SCA per leaf, using the Quick Aphid Checker. Examine 2 leaves from each of 5 random plants per location. Repeat at 4 locations, for a total of 40 leaves. Use the Quick Aphid Checker to calculate the mean number of aphids per leaf.

- If the field average SCA infestation is **50–125 aphids or more per leaf**, apply an insecticide within 4 days and evaluate control after 3–4 days. Consider treatment at 50 aphids per leaf if limited to once-a-week scouting.
- If the SCA infestation is less than the threshold level, continue scouting twice a week.
Monitoring Sorghum for the Sugarcane Aphid:

Quick Aphid Checker

Estimate the number of sugarcane aphids (SCA) per leaf to help time foliar insecticides for SCA control on sorghum. Each photo represents an estimate from the table. For example, photo A shows about 12 aphids.

<table>
<thead>
<tr>
<th>Photo</th>
<th>Range</th>
<th>Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1–25</td>
<td>12</td>
</tr>
<tr>
<td>B</td>
<td>26–50</td>
<td>38</td>
</tr>
<tr>
<td>C</td>
<td>51–100</td>
<td>75</td>
</tr>
<tr>
<td>D</td>
<td>101–500</td>
<td>300</td>
</tr>
<tr>
<td>E</td>
<td>501–1000</td>
<td>750</td>
</tr>
<tr>
<td>F</td>
<td>&gt;1000</td>
<td>1500</td>
</tr>
</tbody>
</table>

Field Average = Total of All Estimates
Total # of Leaves Examined

Learn more about sugarcane aphids at http://txscan.blogspot.com

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Notes:
Insecticide Options:

Chlorpyrifos:
- 1 qt/acre rate provided very good control but only low suppression at 1 pt/A rate in AgriLife Extension and Research plots.
- 60 day PHI @ 1 qt./A
- BMP – Spray at flowering/seed development for midge and headworm protection if aphid is present.
- Should provide sugarcane aphid suppression

Transform:
- Section 18 for sugarcane aphid on all sorghum crops in 2015
- Registration good until the last day of October
- May receive Section 3 label late in 2015
- Rate is 0.75 to 1.5 oz/A, suggested rate is 1 oz/A based on excellent control results in AgriLife Extension and Research plots
- No more than 3 oz/A or 2 applications in current year (Texas)
- 7 day PHI for forage or hay
- 14 day PHI for grain or stover

Sivanto:
- Labeled for sugarcane aphid on all sorghum crops in 2015
- Section 2(ee1) label rate is 4 to 7 oz/A for sugarcane aphid on sorghum. Excellent control results in AgriLife Extension and Research plots at 7 to 10 oz/A, lower rates were not tested.
- Must not exceed 28 oz/A per season
- 7 day PHI for forage
- 21 ay PHI for grain, stover, or straw
Summary:

- This aphid likes many of our grain sorghums and survives on limited other related plants like Johnson grass.
- Initial infestations come from overwintering and wind-aided movement of winged aphids in southern locations.
- Natural enemies are abundant but after heads appear.
- Sorghums with aphid resistant hold promise.
- For pest management, divide sampling effort:
  - Focus weekly **Fast Detection** for first detection in many fields.
  - Focus twice weekly **Sampling using the Quick Aphid Checker** (aphid estimates) in infested fields. Compare with thresholds for in-season decision-making.
  - **Regional ET of 50—125 aphids/leaf pre-head emergence under most current economics, use the ‘Scouting Sugarcane Aphids’ card for field use.**
  - Following a three week window of rapid aphid growth is critical.