The Sugarcane Aphid: A New Pest of Grain and Forage Sorghum

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Introduction. The sugarcane aphid (SCA) has recently become one of the most important insect pests of grain sorghum and forage sorghums in Texas and the southern US. The sugarcane aphid originally fed only on sugarcane in the US. In 2013, this insect was found for the first time feeding on sorghum in the US. This sorghum-feeding biotype of the sugarcane aphid resulted from either a genetic change in the existing US population or a new introduction into the US. In 2013, the sugarcane aphid, first found near Beaumont, TX, infested sorghum in the Rio Grande Valley and regions of north Texas, Oklahoma, Louisiana and Mississippi. Sugarcane aphids survived the 2013-2014 winter in south Texas and during the spring and summer of 2014, dispersed throughout much of Texas and 12 southern states. In 2015, the sugarcane aphid is expected to again be a concern throughout Texas. This pest can be controlled, but growers must frequently assess infestations to properly time an insecticide, if needed, to prevent crop loss and harvest difficulties due to honeydew accumulation.

Identification. Sugarcane aphids are pale yellow, gray or tan. The cornicles or "tailpipes", feet and antennae are black. The SCA feeds on the underside of sorghum leaves. Initial colonies consist of only a few aphids but can increase such that aphid colonies cover much of the lower leaf surface. Once the sorghum head emerges, SCA can also feed in the grain head. Sugarcane aphids produce large amounts of honeydew which collect on leaves, leaving them sticky and shiny.

The greenbug is another common aphid that feeds on the underside of sorghum leaves. It has a dark green stripe down its back, unlike the sugarcane aphid. The corn leaf aphid is also found in sorghum but it is a dark green color, feeds in the whorl of the sorghum plant and is rarely a pest. Finally, the sugarcane aphid should not be confused with the yellow sugarcane aphid, which is bright yellow with rows of dark spots and short cornicles. A guide to recognizing sugarcane aphid is available at: http://txscan.blogspot.com/2015/02/recognizing-sugarcane-aphid.html .

Life Cycle. All SCA are females and give birth to live young. Immature aphids mature to adults in about five days and live for about 4 weeks. Aphid numbers can increase very rapidly during the summer. At Corpus Christi, an infestation of 50 SCA per leaf increased to 500 per leaf in 2 weeks. For this reason, once SCA are found in a field, it should be monitored twice a week to determine if infestations exceed the treatment threshold at which an insecticide application should be considered to prevent crop loss.

Sugarcane aphids need living sorghum or Johnsongrass plants to persist. Small colonies of SCA can be found on Johnsongrass throughout the winter in the Rio Grande Valley and Gulf Coast of Texas and in northern Mexico. In 2015, small colonies were found on Johnsongrass in early April near Waco and Hillsboro, suggesting that SCA can overwinter as far north as central Texas in some years. As SCA colonies become crowded and food quality declines, adults with wings begin to appear. These winged adults can then disperse from Johnsongrass into nearby sorghum fields. Although weak fliers, winged aphids can be carried on the wind across long distances.

Host Plants. Sugarcane aphids are known to feed on grain and forage sorghum (Sudan grass, sorghum/Sudan hybrids) and Johnsongrass. All of these hosts are in the genus *Sorghum*. Laboratory

tests show that SCA does not feed on wheat, oats, or on seedling foxtail millet or proso millet. There is no evidence to date that SCA reproduces on any other crop in Texas.

Damage. Sugarcane aphids feed by sucking plant sap. Feeding causes leaves to turn yellow, purple and finally brown as leaf tissue dies. Infestations on pre-boot sorghum can result in significant grain loss, but infestations present during grain development can also reduce yields. Large infestations can stunt growth and result in uneven head emergence from the boot. The sticky leaves and stalks clog combines at harvest and reduce separation of the grain from the plants. Combines may require service time to wash off the honeydew and remove stalks and grain heads. Infestations in forage sorghums also kill leaves, slow growth and reduce forage yields. Honeydew contaminating leaves and stems can also gum up cutter bars and machinery at harvest. Honeydew is composed primarily of plant sugars and water and eventually dries to a harmless residue. A black sooty mold often grows on the honeydew on leaves. This black mold inhibits light absorption needed for photosynthesis and may reduce the effectiveness of insecticides and herbicides. Sorghum stressed by SCA feeding may be more susceptible to stalk rots.

Managing SCA Infestations in Grain Sorghum. Sorghum fields should be scouted for SCA one-two times per week. Look for colonies on the underside of leaves and for honeydew which can indicate a SCA colony on the leaf above. Once SCA colonies are found on lower leaves, begin scouting the field twice a week as aphid numbers can rapidly increase. The "First Detection" sampling plan detailed below is designed to determine if sugarcane aphids are present in the field and therefore the field is at risk. This sampling does not require counting aphids. If SCA aphids are found in the field, then it is necessary to begin the second sampling protocol which requires counting or estimating aphid densities. This protocol is designed to determine if the infestation is at or above the treatment threshold when an insecticide application should be considered to avoid crop loss. This treatment threshold is when the field averages 50-125 or more SCA per leaf and is based on research conducted on pre-boot sorghum.

First Detection: Is the Field at Risk of Sugarcane Aphid Damage?

1. Once a week, walk 25 feet into the field and examine 15-20 plants along 50 feet of row. Inspect underside of leaves from both the upper and lower canopy. If honeydew is present, look for sugarcane aphids on the underside of the leaf above the honeydew.
2. Repeat this sampling in at least four locations (total 60-80 plants per field). Include locations on each side of the field and sites near Johnsongrass and tall plants in the field.
3. If no sugarcane aphids are present, or only a few individual wingless or winged aphids are present on upper leaves, then continue once a week scouting.
4. If sugarcane aphids are found on lower or mid-canopy leaves, begin twice a week scouting to determine if aphid densities exceed the economic threshold using the sampling protocol below.

Sampling Protocol for Making Treatment Decisions.

1. Walk 25 feet into the field and examine the underside of one completely green leaf from the lower canopy and the upper most leaf (or leaf below flag leaf at boot to heading) and estimate and record the number of SCA per leaf.
2. Examine 2 leaves from each of 5 randomly selected plants (10 leaves) per location.
3. Repeat at 4 locations (or more for large fields) for a total of at least 40 leaves per field.
4. Calculate the average number of aphids per leaf for the field (total aphids counted/total leaves inspected).
5. If the field average is 50-125 sugarcane aphids/leaf or greater, apply an insecticide within 4 days and evaluate control after 3-4 days (refer to insecticide labels for re-entry intervals). Consider treatment at 50 aphids/ leaf if limited to only once a week scouting.

6. If the field average is less than the threshold level, continue scouting twice a week.

Managing SCA Infestations in Forage Sorghum. Treatment thresholds for SCA infesting forage sorghums and Johnsongrass meadows have not been determined. Until those thresholds are available, the thresholds used for grain sorghum can provide a guide to making treatment decisions. Like grain sorghum fields, forage sorghum fields should be monitored as described above at least weekly for SCA and an insecticide treatment should be considered if aphid numbers exceed the treatment threshold of 50-125 aphids/leaf. Control of SCA with insecticides requires good coverage of the entire canopy, including lower leaves, which is difficult to achieve in forage sorghum due to the dense canopy and especially if the crop is tall. For this reason, early harvest or grazing may be the best option if good insecticide coverage cannot be achieved. If a second cutting is desired, the field should again be scouted once a week (as described above) to determine if SCA re-infest the field after harvest. If SCA are found, the field should again be scouted twice per week to determine if the infestations exceed the threshold of 50-125 aphids per leaf.

Insecticides. The insecticide Transform WG (Dow AgroSciences) is labeled under a Section 18 Emergency Exemption in Texas for control of sugarcane in sorghum in 2015. Sivanto 200SL (Bayer CropScience) insecticide has been issued a Section 2(ee) label for use on sorghum to control sugarcane aphid in 2015. Both insecticides can be applied to grain and all types of forage sorghums (all in the genus *Sorghum*). Good coverage is necessary for effective control. Information below is for educational purposes. Read and follow label directions.

	Sivanto 200 SL	**Transform WG**
Use Rate for Sugarcane Aphid	4-7 oz / acre	0.75-1.5 oz / acre
Minimum interval between applications	7 days	14 days
Minimum application volume	10 GPA by ground 2 GPA by air	Full plant coverage by ground 5 GPA by air
Maximum rate per year	28 oz per acre	3.0 oz per acre, 2 applications
Pre-harvest interval	21 days for dried grain or straw or stover. 7 days for grazing, forage, fodder or hay harvest	14 days for grain or straw, 7 days for grazing or forage, fodder or hay harvest
Restricted entry	4 hours	24 hours

Chlorpyrifos (Lorsban®, Nufos®), dimethoate and malathion are also labeled for aphid control in sorghum. Although these products provide some control of SCA, university trials demonstrate that these products are not as effective as Transform or Sivanto.

Seed Treatments. Insecticide seed treatments provide control of aphids, including SCA, and some other early season insects for about 4-5 weeks after planting. Their value for control of SCA will depend on how soon after planting the SCA infests the field.

Beneficial Insects. Lady beetles and other beneficial insects feed on SCA but in most cases populations of these natural enemies cannot increase rapidly enough to help control SCA infestations. Later in the season, beneficial insect populations may increase to levels that can suppress SCA once the initial infestation has been reduced by an insecticide treatment. However, the parasitic wasp, *Lysiphlebus testaceipes*, which is a very effective natural enemy of greenbug, does not parasitize the SCA. While

beneficial insects may not be able to prevent SCA populations from reaching the treatment threshold, they still provide some suppression of aphid numbers. For this reason, the application of pyrethroid insecticides, which are toxic to most beneficial insects, is discouraged in sorghum fields infested with SCA.

Managing Sugarcane Aphids Prior to Harvest. Although sugarcane aphid infestations present after head emergence may have less impact on yield, these infestations can continue to produce large quantities of honeydew which can interfere with harvest. Rain can help wash honeydew from leaves. Insecticides can be applied at this time but their use is limited by their pre-harvest restrictions. Harvest aid chemicals such as glyphosate and sodium chlorate have been used to kill sorghum leaves and therefore reduce SCA infestations prior to harvest. Unfortunately, if plants are slow to desiccate, SCA may have time to move up into the sorghum head where they continue to feed and produce honeydew. For this reason, high rates of harvest aids that kill leaves quickly may be necessary. Read and follow label directions for these products.

Sorghum Hybrids Resistant to SCA. Laboratory trials have shown that some commercial sorghum varieties exhibit less leaf damage or host fewer aphids in the seedling stage. Additional evaluations are needed to characterize this genetic resistance during later crop growth stages and under field conditions. Breeding lines of sorghum with high levels of resistance to SCA have been identified, but several years will be necessary to move this genetic resistance into commercial hybrids. Ask your seed dealer about the availability of grain sorghum hybrids with resistance to SCA. Commercial hybrids with resistance are not immune to SCA and therefor SCA damage to these hybrids could still cause economic losses if fields are not scouted and insecticides are not applied at threshold levels.

Managing Sorghum Midge and Headworms. Pyrethroid insecticides are commonly used to control sorghum midge, headworms and stinkbugs in sorghum, but their use may be followed by an increase in SCA infestations. This increase may result due to the reduction in beneficial insect populations that feed on SCA or may be a physiological response of the SCA that results in greater reproduction. Avoid automatic applications of pyrethroids and other insecticides for these sorghum pests and instead base treatment decisions on pest densities, as determined by field scouting, relative to treatment thresholds. Closely monitor SCA if fields are treated with a pyrethroid insecticide. If alternative insecticides are available for control of midge and headworms that are less destructive to beneficials, consider using them.

Expectations for 2015. The sugarcane aphid overwintered in south and central Texas and winged aphids are again expected to be carried by winds into north and west Texas during the 2015 growing season. Grain and forage sorghum fields should be closely monitored every week to detect infestations early. Once SCA are present on lower leaves, monitor fields twice a week and consider an insecticide treatment if infestations increase to an average of 50-125 aphids per leaf. Continue to monitor grain and forage sorghum until harvest to determine if an insecticide treatment is needed to protect yield or prevent the accumulation of honeydew at harvest. Look for new sorghum hybrids from your seed dealer that may have resistance to sugarcane aphid.

Learn more at Texas Sugarcane Aphid News: http://txscan.blogspot.com

There are about 100 SCA aphids within the circle above. Treatment threshold is an average of 50-125 per leaf. (Photo: Dr. Jourdan Bell, Texas A&M AgriLife Extension)

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