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Sugarcane Aphid, a New Pest of Grain Sorghum in Arkansas

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Background

The sugarcane aphid (*Melanaphis sacchari*) was first found in southeastern Arkansas in June 2014, and by the end of the growing season, had been found in most of the grain sorghum-producing areas of the state. Sugarcane aphid has been found in the U.S. for some time as a minor and sporadic pest of sugarcane in Florida and Louisiana. However, sugarcane aphid began infesting grain sorghum at economically damaging levels in Texas and Louisiana in 2013. This could be due to a shift in host plants by populations of the aphid already present in the country, or to an invasion from another part of the world by sugarcane aphids adapted to feeding on sorghum. Some taxonomists suggest the aphid may be an entirely new species. In addition to grain sorghum, these aphids commonly infest sorghum grown for forage, sweet sorghum and johnsongrass. Sugarcane aphid has now been confirmed in grain sorghum in at least 11 states (Figure 1) and appears likely to spread further.

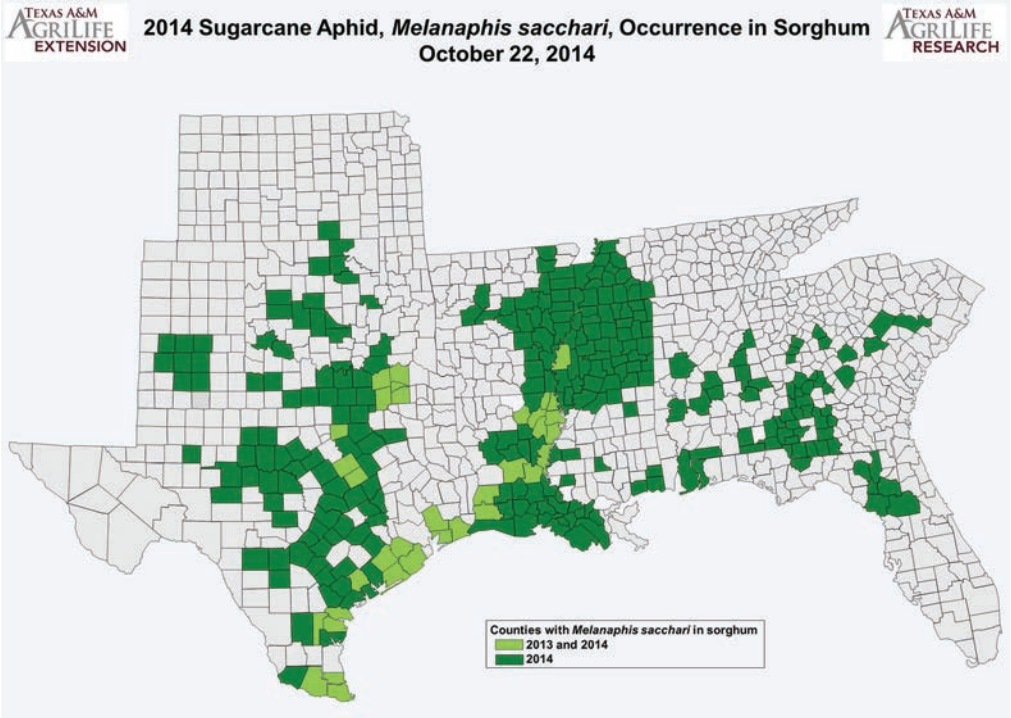

Figure 1. Sugarcane aphid distribution in grain sorghum by county in 2013 and 2014.
(map compiled by Robert Bowling, Texas A&M AgriLife, and printed with permission)

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Identification

This pest is sometimes referred to as the "white" sugarcane aphid to distinguish it from the yellow sugarcane aphid, a relatively minor pest for Arkansas grain sorghum that seldom requires treatment. Wingless sugarcane aphids have a pale yellow to whitish coloration and dark cornicles, the "stove pipe" structures located at their rear end (Figure 2). The winged, or "alate," sugarcane aphids that first migrate into fields are darker in coloration. Sugarcane aphids give birth to live young rather than laying eggs and can reproduce without mating. They can multiply quite rapidly, covering the undersides of leaves (Figure 3) before they move to other parts of the plant. Several other aphids, including greenbug, yellow sugarcane aphid and corn leaf aphid, feed and develop on grain sorghum, but they are rarely economic pests in Arkansas.

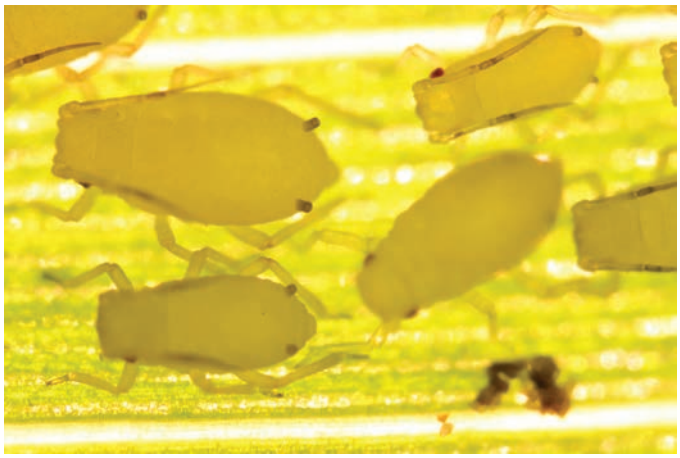

Figure 2. Wingless sugarcane aphids. ***(photo by Gus Lorenz)***

Figure 3. Sugarcane aphids colonizing the underside of a grain sorghum leaf. ***(photo by Jason Kelley)***

Figure 4. Honeydew coating the top of a grain sorghum leaf. ***(photo by Jason Kelley)***

Figure 5. Black sooty mold caused by honeydew buildup. **(photo by Jason Kelley)**

Damage

Often the first sign that aphids are in a field is the presence of sticky honeydew, the sugary excrement of the aphids, on leaf surfaces (Figure 4), as well as yellow to reddish-brown leaf discoloration. Black sooty mold sometimes grows in the honeydew, which can reduce photosynthesis (Figure 5). Heavy infestations can kill grain sorghum plants or reduce or prevent head emergence, leading to a complete loss of the crop in severe cases. If the plant growth is disrupted by aphids during heading, plants often do not head normally even if aphids are controlled afterward. Feeding by large populations of the aphids during grain fill reduces grain yields by reducing

grain size and reduces grain quality by lowering test weight (Figure 6). In addition, large amounts of sticky honeydew can cause harvest losses, as well as increased equipment cleaning and repair costs. This is especially problematic in cases where sugarcane aphids have infested the grain head (Figure 7). Plants that are prematurely killed by aphids are also more prone to late-season lodging.

Figure 6. Reduced grain fill caused by sugarcane aphid feeding. Plants in the background with normal, reddish orange grain heads were treated with Transform® insecticide, while plants in the foreground with reduced, grayish brown heads were left untreated. (photo by Jason Kelley)

Figure 7. Sugarcane aphids infesting a grain sorghum head. (photo by Gus Lorenz)

Scouting

Proper management of the sugarcane aphid in grain sorghum should begin with routine scouting of fields. The population development of this insect is very rapid, and small infestations can escalate out of control in less than one week in some cases. Therefore, two or more visits to the field per week are recommended, particularly if sugarcane aphids have recently been reported in your area. Infestations often begin on field margins but can begin anywhere, and the aphids are usually found on the undersides of leaves. The honeydew, which causes leaves to appear shiny and slick, is often visible on top of leaves just below an aphid colony and is useful in scouting for sugarcane aphids.

Population development of the sugarcane aphid often becomes even more rapid in cases where a broad-spectrum insecticide, especially from the pyrethroid class, has been used for management of sorghum midge or other pests. Therefore, scouting and informed decision making for midge and other pest control are critical to avoid unnecessary applications that will increase population growth of sugarcane aphids due to removal of natural enemies.

Action Threshold

Because sugarcane aphid is a new pest for grain sorghum production in the U.S., current recommendations are based on limited field trials. An insecticide application is recommended once a preliminary action threshold of 25% of plants infested with 50 or more sugarcane aphids per leaf is reached. While this threshold might seem low, the goal is to prevent aphid populations from reaching higher levels that are not only economically damaging but much more difficult to control. Applications targeted to the early stages of an infestation are likely to be more effective and prevent escalating population growth. Action threshold development and validation will be a major research focus in Arkansas and in other states where the sugarcane aphid has become a pest of grain sorghum. Therefore, be on the lookout for changes to action thresholds and sampling methodology as more information is gathered on this pest. Many producers in 2014 used harvest aids to kill grain sorghum plants prior to harvest to help decrease aphid populations and reduce the likelihood of harvest problems due to aphids.

Chemical Control

Insecticides labeled for use against other aphid pests in sorghum are largely ineffective for control of sugarcane aphid (Table 1). A Section 18 label exemption was granted for the 2014 growing season in Arkansas for Transform® WG at a rate of 0.75-1.5 oz of product per acre for control of sugarcane aphid. This product has provided effective control in trials and field situations throughout the affected region and has a favorable pre-harvest interval (PHI) of 14 days. Increasing application volume can help to improve insecticide coverage, which has been an issue with this insect in the lower plant canopy. At least 5 gallons per acre spray volume by air or 10 gallons per acre by ground should be used to ensure adequate coverage, and higher volumes should be considered. Note that even an effective application could leave aphids in the lower canopy where adequate coverage is difficult to achieve. In addition, residual activity of Transform® against the sugarcane aphid appears to be relatively short, with as little as 8 days of residual control when aphid populations are actively developing. Two or more sprays might be needed over the course of the season. Keep in mind that the Section 18 label exemption for Transform® currently only applies to 2014, and additional materials that are not yet labeled in grain sorghum are being examined as options for future sugarcane aphid control. Because the label status for Transform® and other chemistries is not yet confirmed for 2015, **be sure to verify that an insecticide is labeled for use before applying it to control sugarcane aphids**. Look for further updates on insecticide availability, efficacy and management recommendations from Extension personnel and other sources going into the 2015 growing season and beyond.

Table 1. Results of insecticide trials conducted at the Southeast Research and Extension Center near Rohwer, Arkansas, in 2014. Treatments for both trials were applied to flowering grain sorghum on July 29, 2014. Aphid populations on 25 plants per plot were rated 6 and 14 days post-application (the 4th leaf from the top was rated on each plant) using a 0-3 rating scale: 0 = 0 aphids per leaf; 1 = 1-100 aphids per leaf; 2 = 101-300 aphids per leaf; and 3 = greater than 300 aphids per leaf. Plots were harvested on September 10, 2014.

Material (oz/acre)	Mean Aphid Rating, 6 DAT[1]	Mean Aphid Rating, 14 DAT	Yield in Bushels Per Acre (14% moisture)
Trial 1			
Untreated	2.65 a[3]	2.78 a	49.5 c
Transform (0.75)[2]	1.18 c	2.28 b	83.9 ab
Transform (1.0)[2]	0.93 c	2.33 b	83.1 ab
Transform (1.5)[2]	0.68 d	2.05 b	99.0 a
Lannate (24.0)	1.88 b	2.85 a	66.9 b
Trial 2			
Untreated	2.63 a	3.00 a	51.5 b
Transform (0.75)[2]	0.75 c	1.65 b	107.2 a
Transform (1.5)[2]	0.65 c	1.33 b	124.1 a
Lorsban Adv. (24.0)	0.93 c	1.58 b	110.8 a
Cobalt Adv. (24.0)	2.28 ab	2.85 a	68.5 b
Dimethoate (16.0)	2.00 b	2.95 a	68.9 b

[1]DAT = days after treatment applied.

[2]Transform was approved under a Section 18 emergency label exemption for the 2014 growing season; exemption status for 2015 is currently unknown. Be sure to verify label status before using this or any insecticide materials for sugarcane aphid control in 2015.

[3]Numbers within a trial and column followed by the same letter are not statistically different (Fisher's LSD, $\alpha = 0.05$).

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