July, 2014, version 4. M. Brewer (mjbrewer@ag.tamu.edu)

Sugarcane aphid on Sorghum: Monitoring and Threshold Research Update

Compilation by Michael Brewer, Texas A&M AgriLife Research, Corpus Christi

Thanks to many colleagues including the Sugarcane aphid task force.

Detection survey first: Check all fields for both types of infestation (early infestations low in the plant traveling upward, and recent infestations of winged aphids middle and top leaves of plant). Walk into fields (all sides) and part plants to detect established colonies on leaves with honeydew/aphids in the lower part of the plant)(check 50 plants). Next, turn over 50 leaves on the upper part of the plant to detect winged aphids/new colonies). Follow detection surveys in **fields with aphids** with delineation surveys (see below), and continue detect surveys weekly in fields with no aphids.

Delineation surveys in fields with lower plant infestations and lower/upper plant infestations: These fields need a lot of attention to make a best assessment of whether aphids are very abundant (patches of plants with thousands of aphids) possibly causing some direct damage and likely to cause honeydew contamination of the heads. These fields are at risk and decision-making based on good observations is needed. Note that these aphids have not been associated with injecting plant toxins and plant disease, but the population increase and associated honeydew issues are a concern here.

Delineation surveys in fields with only upper plant new infestations: These fields need watching, but less time critical in making a spray decision. I advise sampling twice weekly possibly flagging sections of fields to check on how the infestation is advancing. Note that these aphids have not been associated with injecting plant toxins and plant disease, but the population increase and associated honeydew issues may possibly result in late season issues, particularly harvest problems. These fields are worth regular inspection, twice weekly if possible to determine the extent of aphid colony increase in the field.

Fields with no detections in detection survey. In counties where these aphids are found, it is worthwhile to continue detection surveys weekly in fields where aphids were not detected.

Update on thresholds, insecticide efficacy, and integrating IPM tactics:

In 2014, a replicated field experiment was designed to evaluate several potential economic thresholds to time foliar insecticides (50, 100, 250, and 500 test thresholds along with a no-spray control) to control sugarcane aphids). The experiment also included incorporation of two sorghum lines: one sorghum susceptible to the aphid and one putatively resistance to the aphid. To date all experimental thresholds have triggered an insecticide application in the 'susceptible'

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line. Also, the insecticide used (Transform, an insecticide with sucking bug specificity) held the densities to below 5 aphids per leaf for a two or three week window (Table 1). Parasitoid activity was reduced at the low thresholds, but only modestly reduced or no reduction seen at the 250 aphids/leaf threshold (Table 1), indicating possible insecticide/natural enemy compatibility (Fig. 1). Striking was that no insecticide applications have been triggered on the resistant sorghum.

Table 1. Threshold triggers for insecticide use were 50, 100. 250, and 500 aphids per leaf and an UTC, using a susceptible sorghum (S) and a putative resistance sorghum (R). Data are aphid density mean counts per leaf (aphid/leaf), percent of leaves with aphelinid mummies (parasitoids), and percent of leaves with sooty mold (mold). Yield to be measured in July, 2014.

	UTC	UTC	50	50[1]	100	100[1]	250	250[2]	500	500[3]
	(R)	(S)	(R)	(S)	(R)	(S)	(R)	(S)	(R)	(S)
Aphid/leaf	33	633	27	3	22	3	40	1	48	567
Parasitoids	22.5	32.5	25	5	32.5	15	37.5	32.5	20	35
Mold	28	67	18	10	40	5	30	40	20	50

[1] threshold triggered Transform application two weeks previously, [2] threshold triggered Transform application one week previously, [3] threshold triggered Transform application the day after data collection. Plants were at flag leaf stage at time of data collection.

Stephen Biles, IPM Agent on the upper coast, had the following suggestions in his weekly newsletter. If leaf death has begun to occur toward the bottom of the plant, treat based on the greenbug economic thresholds (but remember the sugarcane aphid does not inject a toxin, so these levels may be conservative):

- Preboot: treat at 20% of plants with leaves thick with aphids and/or leaves with honeydew/sooty mold topic for research, see above).
- Boot through heading: same above, watch for infestations moving up the heads.

In a replicated insecticide efficacy trial at the Corpus Christi Center, our plots are a full month post application. The control with these products tested was variable (note I have only included registered products, please feel free to contact me or Stephen Biles on other non-registered products included in the test). The insecticides were applied at an aphid population density of about 500 aphids per leaf, at 13 gallons per acre, and when plants had 7 to 8 true leaves (rates are listed below table 2 footnote). These data shown are at 7 days post-application, the numbers were very similar 14 days post application, and a full decline of aphids in all plots (including the control) was seen 21 days post-application.

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Table 2. Preliminary results from a 2014 replicated field experiment comparing foliar insecticides Transform, dimethoate, chlorpyrifos, and an unsprayed control (UTC) using a susceptible sorghum, Corpus Christi, TX. Data are aphid density mean counts per leaf (aphid/leaf), percent of leaves with aphelinid mummies (parasitoids), and percent of leaves with sooty mold (mold). Plants were at flag leaf stage at time of data collection, 7 days post application. Insecticide was applied when sugarcane aphid populations reached 500 aphids per leaf, at 13 gallons per acre, and when plants had 7 to 8 true leaves.

	UTC	Transform	Lorsban	Dimethoate
Aphid/leaf	655	2	54	57
Parasitoids	85.5	80	60	60
Mold	92.5	80	82.5	75

Transform (sulfoxaflor), 0.75 oz/A
Lorsban (chlorpyrifos), 1 pt/A
Dimethoate (dimethoate), 1 pt/A

Fig. 1. Natural enemies observed in sugarcane aphid research plots at the Texas A&M AgriLife Research and Extension Center, Corpus Christi.

Lady bug and syrphid fly adults

Syrphid fly larva in an aphid colony

Lady bug larvae

Black parasitized aphids (see black mummies especially along the mid-vein) in an aphid colony.

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Notes on pesticides from the Texas Department of Agriculture:

The Texas Department of Agriculture has obtained a Section 18 label from the Environmental Protection Agency so that pesticide applications of Transform WG can be made to control this pest. Dimethoate has also received a Section 2ee.

Resources:

Villanueva, R.T., M. Brewer, M.O. Way, S. Biles, D. Sekula, E. Bynum, J. Swart, C. Crumley, A. Knutson, P. Porter, R. Parker, G. Odvody, C. Allen, D. Ragsdale, W. Rooney, G. Peterson, D. Kerns, T. Royer, and S. Armstrong. 2014. Sugarcane aphid: a new pest of sorghum, 4 pp. Texas A&M AgriLife Extension, College Station, TX. ENTO-035 "Sugarcane Aphid: A New Pest of Sorghum.

Brewer, M., M. Way, S. Armstrong, D. Kerns, S. Biles, C. Crumley, D. Sekula, J. Swart, A. Knutson, R. Villanueva, R. Parker, G. Odvody, and D. Ragsdale. 2013 Outbreak of sorghum/sugarcane aphid on sorghum: first detections, distribution, and notes on management. Texas Plant Protection Conference, Bryan, TX, December 2013 (pdf is available at, http://ccag.tamu.edu/files/2013/12/2013-Poster-TPPA-aphid.pdf). A **Webinar is available at the same location.**

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