The sugarcane aphid (Melanaphis sacchari) causes yield loss from reduced seed weight and harvest complications due to honeydew in the heads. Our Economic Threshold Study evaluated four aphid density action threshold levels, 50, 100, 250, and 500 aphids per leaf plus an untreated control (UTC). The trial also included a host plant resistance component comparing one hybrid with a greenbug (Schizaphis graminum) resistant background (TXB3), and the other hybrid did not have (TX2763) resistance to greenbug. One application of Transform (sulfoximate) (0.75 oz/acre at 14 GPA) was applied on the susceptible hybrid on June 2 (VT8) to the 50 and 100 threshold, June 5 (VT8) to the 250 threshold, and June 11 to the 500 threshold. We detected a significant yield decline (harvesting by hand) when aphid numbers exceeded the 500 aphids per leaf action level and in the UTC. We detected significant sooty mold and honeydew at 250 aphids per leaf action level. Using South Texas data and information from a duplicate test in Winnubos, LA, a regional economic threshold of 50 to 125 aphids/leaf was justified for most current economic, aphid growth, and natural enemy conditions. The results also showed that the resistant sorghum hybrid never reached this threshold.

The sugarcane aphid (Melanaphis sacchari) is an invasive aphid species on sugarcane that moved into grain sorghum in 2013 resulting in injury to sorghum in 5 states. In 2014, the infestation grew to 10 states. Field research trials began across the affected regions especially in South Texas where the most damage has been detected so far. The sugarcane aphid is destructive on sorghum because they are prolific honeydew producers that can gum up harvesting equipment and the sorghum heads. Also sooty mold that grows on honeydew can hinder proper photosynthesis delaying, and stunting crop growth and production which can lead to yield reduction. We conducted an Economic Threshold Study at the Texas A&M AgriLife Research and Extension Center at Corpus Christi in 2014. Combination with companion studies, we wanted to setregional guidelines for insecticide use.

### Materials and Methods

**Economic Threshold Study**
- **Plot Design:**
  - 4 Replications (26 rows by 40 ft. plots, (n=91) per row, two rows were served as buffers)
  - Randomized complete block of two factors with 4 Recesses
- **Action Thresholds:**
  - Transform (sulfoximate) was sprayed at a rate of 0.75 oz/acre when aphid populations reached action levels of 50, 100, 250, 500 aphids per leaf and a untreated control (UTC)
- **Hybrid Background:**
  - Texas A&M hybrid AT32572 x RT42763 (Y resistance to greenbug)
  - Texas A&M hybrid RT42752 x RT4250 (N resistance to greenbug)
  - Planting seed was not treated with systemic insecticides.
- **Data and Measurements:**
  - Data taken weekly
  - 10 leaves per plot, 10 leaves from top to bottom of plant
  - 10 leaves from bottom half of plant
  - Aphid density (aphid/leaf)
- **Aphid and yield information was used to calculate economic injury level and threshold using a method by Dr. L. L. Pedigo**

\[
\text{EI} = \left(\frac{C}{\text{D}}\right)\left(\frac{V}{\text{K}}\right)
\]

where:
- \(\text{EI}\): economic injury level
- \(C\): control cost
- \(V\): value of grain
- \(K\): A ratio of the proportion of the insect population controlled

**Detailed results**
- **Aphid counts estimated**
  - Quick AphisRead ok.
  - (20-48 leaves per spot, half top, half bottom)
  - 0-10 actal count
  - A: 11-25 aphids (18)
  - B: 26-50 aphids (38)
  - C: 51-100 aphids (75)
  - D: 101-500 aphids (300)
  - E: 501-1,000 aphids (750)
  - F: 1,000 aphids (1,000)

**Results in Pictures**
- **Action levels of 50 to 250 aphids/leaf resulted in low aphids for 2 weeks on the non-resistant hybrid and good yield**
  - Pink bars
- **Spraying at 500 aphids/leaf resulted in poor aphid control**
  - Green bars
- **The resistant hybrid was never sprayed and had good yields**
  - (green bars)

**Calculating an Economic Level and Threshold**

\[
\text{EI} = \left(\frac{C}{\text{D}}\right)\left(\frac{V}{\text{K}}\right)
\]

- **Regional ET of 50—125 aphids/leaf pre-head emergence is justified under most current economics, aphid growth & natural enemies.** See chart above for adjustments under different grain market values and insecticide treatment costs of one or two sprays.

**In conclusion the data shows that aphid loads between 50—125 aphids per plant may lead to yield loss and should be controlled with insecticide.** Sorghum with the green bug resistance had far fewer aphids per plant, so host plant resistance may prove to play an important role in controlling sugarcane aphids in the future. Natural enemies were also detected in our study and may also become more important in the future if we use insecticides only when needed.

### Acknowledgments

Many thanks to Justin Schmidt, Luke Prutker, James Glover and Loyd Mbulwe, Isaac Espquivel, Dr. Bill Rooney and his staff for the large amount of help provided with harvest. Many thanks to Dr. Juan Landivar, Kenneth Schaefer and the rest of A&M AgriLife staff for their support on this project. Special thanks to Drs. Daisy Zhang and Rob Hatherill for their guidance and assistance. Thanks also for financial support from the Texas Grain Sorghum Board (M. Brewer and others), the USDA/INIFAP HSI Grant “STEP UP to USDA Career Success” (J. Halcombe and S. Nelson), the National Science Foundation, ATE Grant (R. Hatherill and D. Zhang), and USDA Southern Region IPM Program Enhancement Grants Program (M. Brewer and others).

Additional information is available at [http://ccag.tamu.edu/sugarcane-aphid](http://ccag.tamu.edu/sugarcane-aphid)