

Evaluating if Grain Sorghum Hybrids with Seed Company Designation of Tolerance/Resistance to Sugarcane Aphid Are Right for You in 2016

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In 2016 Texas grain sorghum producers will find more information from seed companies and other sources about grain sorghum hybrids that may offer potentially increased—or better documented—tolerance/resistance to sugarcane aphid (SCA). I provide a link to a list of recent seed company designated SCA-tolerant/resistant hybrids on page 3, but I recommend caution in evaluating information regarding sugarcane aphid tolerance/resistance. I offer several tips below. Foremost, at this time,

- 1) Assume all grain sorghum hybrids—even if designated tolerant/resistant to SCA—have some level of susceptibility (and all would be viewed as highly susceptible in some fields) to sugarcane aphid.
- 2) **All grain sorghum hybrids must be scouted, and at this time the same SCA treatment thresholds apply to these hybrids as any other.** No sorghum hybrid is immune to SCA. *Some Texas farmers made the mistake of assuming too much about early purported tolerant hybrids for 2015, and they failed to treat SCA in timely fashion, or even scout their fields regularly if at all.*

Dr. Ron Schnell, AgriLife cropping systems agronomist, College Station, suggests the oft-cited USDA grain sorghum seedling screenings—an important initial component of evaluating hybrid response to SCA—may be best viewed as better at identifying susceptible hybrids rather than identifying tolerance or resistance. Yes, positive (low) scores in these seedling screenings suggest these hybrids in the seedling stage may have some tolerance or even resistance. The history of this type of test used on different aphids finds that seedling tolerance/resistance is commonly indicative of aphid response of older plants, but field conditions will determine if that tolerance indeed translates to meaningful field reaction to SCA.

Among Texas A&M AgriLife staff and our assessments across Texas in 2014 and 2015, individual observations have suggested that some purported favorable hybrids may lack sufficient tolerance/resistance to meaningfully reduce risks of SCA to grain sorghum. In contrast, I know of no hybrid (yet) that has scored poorly in these USDA seedling screening tests that has in fact fared well in the field under significant SCA pressure. Bottom Line #1 is, as noted above, Texas sorghum producers should view all hybrids as susceptible at some level and follow standard scouting and treatment thresholds for every sorghum hybrid.

A case in point: Evidence from seedling screening, field SCA damage assessments, aphid number counts, yield trials, and yes, anecdotal field evidence suggests that DeKalb medium-early DKS 37-07 is tolerant to resistant to SCA; it has often performed better than other grain sorghum hybrids in the presence of SCA. This hybrid has a major SCA resistance gene, which appears to be dominant (is expressed by the hybrid). Yet for some individual producers in Texas fields DKS 37-07 has appeared fully susceptible, and in many cases, depending on the severity of SCA infestation, it has required insecticide treatment to control SCA like all other hybrids.

A Texas A&M AgriLife Breeder's Experience with SCA Assessment in Sorghums

Dr. Bill Rooney, Texas A&M AgriLife Research sorghum breeder, College Station, is active in evaluating sorghum germplasm for SCA tolerance and resistance. Dr. Rooney notes that to date many observations

and assessments of sorghum SCA tolerance in the field are not actual direct simultaneous comparisons of different hybrids and resistant controls where yield data has also been collected.

“What we don’t have, other than Dr. Michael Brewer’s work (AgriLife Research entomologist, Corpus Christi), are solid documented field trials that truly demonstrate sorghum SCA tolerance in a meaningful way. We need research aphid assessments (numbers, activity, injury levels) and yields of both susceptible and resistant hybrids in side-by-side situations with and without insecticide treatment,” Rooney states. “Unfortunately these types of comparisons have been elusive—several AgriLife staff have tried—because it is challenging to get the sugarcane aphid to cooperate.” (You have to have heavy aphid pressure to get good evaluations, and these populations did not develop at several South and Central Texas A&M research sites in 2015.)

Dr. Rooney further notes that visual observations are just that: visual; and these are subject to a range of error, especially when SCA pest pressure is not uniformly distributed (which is usually the case) or severe. “It’s actually easy to get good comparisons when SCA pressure is severe, because SCA-susceptible sorghum lines and hybrids just die.”

So Bottom Line #2, this one from Dr. Rooney, is that many field reports of SCA field activity in different hybrids (including a few of my own) are simply observations that someone has seen tolerance at some point. It certainly doesn’t mean that you can ignore the SCA without implication.

Do SCA Tolerant/Resistant Grain Sorghum Hybrids Sacrifice Yield Potential?

Dr. Schnell has conducted initial comparisons of seed company designated tolerant/resistant SCA hybrids vs. hybrid checks common to all Texas A&M AgriLife Research sorghum hybrid trials in our statewide Crop Testing Program. The CTP has independent yield data, either in 2015 or previous years, of less than half of these designated tolerant/resistant hybrids. The comparisons that Dr. Schnell will provide—see the SCA Resources section below—use regional summaries (South Texas, Central Texas, High Plains) to average performance over several locations by year.

The initial take home message from these regional summaries appears to be that hybrids reported tolerant/resistant may not have satisfactory yield potential for your regional production environment. This is particularly so for early and medium-early hybrids (naturally in most cases their yield potential is lower than longer-season hybrids). This AgriLife data suggests well-adapted hybrids will likely increase net returns even if they require multiple sprayings for SCA. (One exception could be dryland sorghum production in West Texas when yield potential is low.)

Now Bottom Line #3, Texas A&M AgriLife suggests producers consider planting adapted high-yielding grain sorghum hybrids then expect and plan to manage the sugarcane aphid, because even if you plant a tolerant/resistant hybrid, **you likely still have to manage it** and you may be giving up significant yield potential with an SCA-tolerant/resistant hybrid if it doesn’t yield well.

Although planting a grain sorghum hybrid with proven SCA-tolerance/resistance is part of an integrated pest management (IPM) strategy, until we have more information about SCA-tolerant/resistant hybrids, their regional adaptation, and their yield potential it is likely that your timely management of SCA may be more important than which hybrid you plant.

Understand the Potential Caveats of Designated SCA-Tolerant/Resistant Hybrids

- Some of the information regarding purported sorghum SCA tolerance/resistance is derived only from seedling tests conducted in a controlled setting in a growth chamber or greenhouse. Real life conditions in your field are not a guarantee that the hybrid will demonstrate the same level of tolerance/resistance.

- Several of these hybrids also have documented favorable reactions to SCA in field conditions, and additionally, there may be numerous reports from producers, Extension staff, field scouts, and crop consultants noting an individual hybrid performed well relative to other neighboring hybrids, etc.
- You may hear a producer or other agriculturalist disagree with a hybrid being included on the below list. Know that any of these hybrids probably cannot tolerate/resist heavy SCA infestations on their own. For example, as noted above, DeKalb DKS 37-07—with a known SCA-resistant gene in its parentage and numerous documented and anecdotal observations of reduced SCA activity (not sprayed as soon, sprayed once instead of twice relative to other hybrids, not sprayed at all), can still have the same level of problems with SCA as any fully susceptible hybrid.
- Visit with the seed company about the grain sorghum hybrids they have designated as SCA tolerant/resistant, which you are interested in. Here are some questions you can ask:
 - 1) *“What hybrid(s) do you have with a proven SCA resistance gene in its parentage?”*
 - 2) *“If you do, does that genetic background transfer actual hybrid resistance to SCA in the field?”*
 - 3) *“What field evidence do you have for this hybrid’s substantial tolerance/resistance? Seedling tests? Field observations? Field insect counts? Yield data?”*
 - 4) *“Is at least some of your field data from independent or external sources?”* (If so, who?)
 - 5) *“How does the yield of your current SCA tolerant/resistant hybrid(s) compare to your company’s best grain sorghum hybrids?”* (Agronomically, you want to understand the grain yield potential of good grain sorghum hybrids even if susceptible to SCA vs. tolerant/resistant hybrids. If there are significant yield differences be sure to ask/understand if those differences may be due to likely lower-yielding shorter maturity in a hybrid.)

Seed Company Initial List of Designated Tolerant/Resistant Grain Sorghum Hybrids
Summarized by United Sorghum Checkoff Program

Dr. Brent Bean, agronomist, United Sorghum Checkoff Program, has compiled a list (Jan. 19, 2016) of grain sorghum hybrids where each seed company has confirmed their designation of individual hybrids they believe demonstrate evidence of notable tolerance/resistance to sugarcane aphid. See <http://sorghumcheckoff.com/pest-management/> Dr. Bean further sought additional information from outside sources to support company designations. These visits and data evaluation across the Sorghum Belt include state university staff (entomologists, breeders, agronomists); farmers; crop consultants; and published research reports.

(Texas A&M AgriLife Disclaimer: Though AgriLife staff have contributed to the information Dr. Bean compiled with our own hybrid trial data, aphid and damage ratings, and field observations—all limited, we have not verified the company information as well as other sources ourselves, and we have no AgriLife data of any kind on about half of these hybrids.)

Based on the information Dr. Bean has received, in most cases these hybrids have evidence of increased ability to withstand higher infestation populations of SCA while retaining their yield potential, or observed to have much slower increase in SCA numbers than in susceptible hybrids. Dr. Bean’s focus emphasizes potentially stronger SCA tolerance/resistance—the hybrids each company has the most confidence in, and hybrids that at this time are regarded as ‘moderately’ tolerant/susceptible are not included. I reiterate: all producers should use this information cautiously.

Producers, consultants, etc. may regularly consult this USCP link for seed company hybrid additions or deletions beginning January 2016.

Current Sugarcane Aphid Resources for Texas Grain Sorghum Producers

- Texas Sugarcane Aphid News, a regular online blog coordinated by Texas A&M AgriLife Extension entomologists, <http://txscan.blogspot.com/>
- Regional independent Texas AgriLife Research grain sorghum hybrid trial summaries for company designated tolerant/resistant hybrids vs. susceptible checks; 2015 data summarized, soon to be posted at <http://varietytesting.tamu.edu/grainsorghum/> (For further information, contact Dr. Ron Schnell, extension cropping systems agronomist, College Station, (979) 845-2935, ronschnell@tamu.edu)
- United Sorghum Checkoff Program resources for SCA management in grain sorghum, <http://sorghumcheckoff.com/pest-management/>
- “Defense against the Sugarcane Aphid,” 20-page summary pocket guide from United Sorghum Checkoff Program, <http://sorghumcheckoff.com/wp-content/uploads/2015/06/SugarcaneAphidPocketBookWeb.pdf>
- Sorghum insect information resources, Texas A&M AgriLife Research & Extension Center, Corpus Christi, <http://ccag.tamu.edu/sorghum-insect-pests/>
- “Sorghum Tips,” a regular feature of Texas Sorghum Producers’ “Texas Sorghum Insider” newsletter compiled by Texas A&M AgriLife Extension staff, <http://texassorghum.org/sorghum-tips>

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