"Development of Effective Weed Control Programs in Grain Sorghum with Crop Safety"

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Jason K. Norsworthy and Tom Barber

Weed Control in ALS-Resistant Grain Sorghum

Trials were conducted at Fayetteville, Rohwer, and Marianna, AR in 2014 to assess the effectiveness of nicosulfuron for controlling weeds in ALS-resistant grain sorghum. DuPont will likely first sale ALS-resistant grain sorghum in Arkansas in 2015. This is our second year to evaluate the new technology, and grass control with the herbicide (nicosulfuron – Trade name of Zest) appears very effective (Figure 1). Nicosulfuron also provides some broadleaf weed control, but it is unlikely that Palmer amaranth will be controlled because of its wide-spread resistance to the ALS-inhibiting herbicides. Although the experimental grain sorghum lines that we are testing are not likely to be the ones commercialized, we have not observed any negative crop response to the herbicide. With that said, non-ALS-resistant (conventional) grain sorghum is controlled with Zest, indicating the importance of differentiating fields with and without the trait similar to current strategies being used to differentiate traits in other crops.

Gene Flow from ALS-Resistant Grain Sorghum to Johnsongrass

Two acres of ALS-resistant grain sorghum were planted at Keiser and johnsongrass has been planted at varying distances radiating in all directions from the resistant grain sorghum. Wind speed during grain sorghum pollination was monitored. Seed was harvested from johnsongrass plants that bordered ALS grain sorghum plots and are currently being screened for resistance to nicosulfuron. Additionally, johnsongrass was collected from within and adjacent (10 ft from field edge) to a field of ALS-resistant grain sorghum near Lonoke this summer. These samples have been screened for ALS resistance relative to a known susceptible. All of the susceptible plants were controlled with a 2X rate of nicosulfuron. Johnsongrass plants that were originating from seed collected in the field were completely controlled with nicosulfuron whereas all but one plant originating from seed collected adjacent to the field were completely controlled. The one plant that did survive the initial 2X rate of nicosulfuron was resprayed with a 2X rate and it did survive the second application; albeit, the plant exhibited 70% injury from the two applications. Based on these observations, it does not appear likely that gene flow will occur from ALS-resistant grain sorghum to johnsongrass, but we are still not able to rule out the possibility.

Weed Control in Grain Sorghum with Huskie

Trials evaluating the utility of Huskie alone or the use of Huskie in combination with other herbicides were conducted at Fayetteville and Rohwer. Huskie will most likely be applied in combination with atrazine. Huskie provides very little grass control, but does provide a high level of control of certain broadleaf weeds. Huskie has good activity on Palmer amaranth if applied in a timely manner, but timing of utmost importance.

Other Research

We are evaluating a new HPPD-inhibiting herbicide for possible use in grain sorghum. The herbicide is currently not registered in any crop. Grain sorghum did show some tolerance to preemergence applications of the herbicide but postemergence applications caused significant bleaching.

We are also evaluating postemergence weed control programs in the absence of a preemergence herbicide or when the preemergence herbicide is not activated. Weed control in the postemergence programs appears to be much more challenging.

Figure 1. A) Nontreated control plot of Inzen (ALS-resistant) grain sorghum heavily infested with grasses as light density of Palmer amaranth. B) A plot of Inzen grain sorghum treated with Cinch ATZ preemergence followed by a tank-mixture of Zest, Weedar, and Aatrex. Note the excellent grass control in the Inzen grain sorghum late in the growing season.