

RESISTANCE TO ACETYL-COENZYME A CARBOXYLASE-INHIBITING HERBICIDES IN SORGHUM SPECIES. Kellan S. Kershner, Mitchel R. Tuinstra, and Kassim Al-Khatib, Graduate Research Assistant, Department of Agronomy, Kansas State University, Manhattan KS 66506, Professor, Department of Agronomy, Purdue University, West Lafayette, IN 47907, and Professor, Department of Agronomy, Kansas State University, Manhattan, KS 66506.

Grain sorghum (*Sorghum bicolor*) is the third-most common cereal planted in the United States trailing corn and wheat around a factor of ten. Grain sorghum is planted as a drought and heat tolerant cereal in challenging environments. Under these conditions, weed control is very important and escalates into a major problem if the preemergent herbicide application does not provide adequate control. Unfortunately sorghum has not observed the increase in flexible options for weed control enjoyed by soybean, corn and wheat in recent years. There is not a single herbicide option available for post-emergence control of grass species.

This study sought to identify natural sources of herbicide resistance that could be deployed in grain sorghum. Four sources with resistance to Acetyl-Coenzyme A Carboxylase-inhibiting herbicides were evaluated for the possibility of incorporating the trait into *S. bicolor*. This included using embryo rescue and tissue culture on wide crosses.

The first source was a johnsongrass (*S. halepense*) population that is resistance to clethodim. This source was dropped out once it became apparent that the level of resistance was not adequate. The second source was derived by mutagenesis of an elite sorghum parent line. Again, the level of resistance was not adequate. The third resistance source was a johnsongrass population from Mississippi. Wide-crosses were made onto elite sorghum parents and embryos rescued. Fertility problems plagued this source and work focused on the final source. The fourth source was *S. sudanense* from South America. It expressed a level of resistance and genotype similar to the third source. It was fully fertile with elite sorghum parents and the trait is being introgressed into several elite parents. Two populations with this trait were released to the sorghum breeding community in Fall 2007.