

MANAGEMENT GUIDELINES FOR INZEN™ GRAIN SORGHUM

Dr. Ronnie Schnell, Cropping Systems – College Station

Dr. Josh McGinty, Agronomist – Corpus Christi

Dr. Paul Baumann, Weed Science – College Station

INTRODUCTION

Grain sorghum breeding lines with tolerance to a specific acetolactate synthase (ALS)-inhibiting herbicides were first developed by scientists at Kansas State University in 2005 (Tuinstra and Al-Khatib, 2008). A gene for tolerance to specific ALS-inhibitor herbicides was discovered in a wild genotype of sorghum. This trait was then moved into advanced breeding lines for production of commercial grain sorghum hybrids through collaborations with commercial seed companies. DuPont™ has commercialized the technology, now known as Inzen™, and has an agreement with Advanta™ to produce grain sorghum hybrids with Inzen™ technology. Other seed companies have signed agreements with Dupont™ as well. Inzen™ grain sorghum differs from many other herbicide tolerant crop traits because it is a not transgenic trait, and is thus not a genetically modified organism (GMO). However, some of the same principles for managing this technology will apply. This document provides guidelines for using Inzen™ technology on your farm to maximize the longevity and productivity of this technology.

HERBICIDE PROGRAM

Inzen™ grain sorghum is tolerant to specific ALS-inhibiting herbicides. There are 5 chemical families within the ALS group and each family has many unique active ingredients and trade names that provide excellent control of many grass and broadleaf weed species. The Inzen™ sorghum will tolerate postemergence applications of Zest™ (nicosulfuron), a sulfonyleurea herbicide, which provides excellent grass weed control. Applications should be made when weeds are small (2 to 4 inches tall) and when sorghum is in the 3-leaf to 7-leaf growth stage. Refer to product label for specific rates and timing to control specific weeds and for suggestions on spray adjuvants and carrier volume. Always read and follow label directions.

Inzen™ technology is intended to be a component of a comprehensive weed management strategy and should never be used as a stand-alone method of weed control. Combinations of pre-emergence and early-postemergence applications of soil active herbicides (such as atrazine) and tank mixes with other labeled post-emerge herbicides for broad leaf weed control should be included as needed. Robust herbicide programs will enable better weed control and contribute to better yields (Figure 1), while reducing the risk of weed resistance to herbicides.

Figure 1. ALS tolerant grain sorghum (top) that received atrazine (pre) atrazine + nicosulfuron + 2,4-D (early post) compared to untreated check (bottom).



RESISTANCE MANAGEMENT

Resistance management will be essential to prolong the utility of Inzen™ technology. It is possible for pollen to move from grain sorghum to compatible weedy relatives such as Johnsongrass and shattercane. This could lead to the development of ALS-inhibitor resistant weeds. Johnsongrass and shattercane will not be on the Zest™ herbicide label under the list of weeds controlled, therefore, Inzen™ approved ALS-inhibitor herbicides should not be used to control these species. Several steps should be taken to reduce the potential for development of resistant weeds.

- Use appropriate rates of ALS-inhibitor herbicides for weed species and size of weeds present.
- Use broad spectrum, soil active herbicides for early-season and residual control and to introduce alternative modes of action.
- Use sequential applications of herbicides with alternative modes of action. Avoid using other Group 2 herbicides within the same growing season.
- Where possible, use cultivation and cover crops to control weeds.
- Control Johnsongrass and shattercane in road ditches and fence-lines to prevent cross pollination of sorghum and weedy relatives.
- Look carefully for escapes and report any suspected cases of resistance to a DuPont™ representative.
- Treat escapes with an alternative product (different mode of action) or remove through mechanical means immediately.

STEWARDSHIP REQUIREMENTS

Proper stewardship of this technology will be mandatory. Potential stewardship requirements of growers may include:

- Must complete training on Inzen™ stewardship.
- Must sign a trait license agreement.
- Must follow BMP's on seed and herbicide labels.
- Growers cannot plant in fields known to have ALS-inhibitor resistant shattercane or Johnsongrass.
- Must rotate to crops other than sorghum (all sorghums) for 18 months.
- Cannot use Zest™ or other group 2 herbicides for control of Johnsongrass the year following application of Zest™ to Inzen™ sorghum.
- Cannot use Group 2 herbicides (ALS) to control Johnsongrass in consecutive years.
- Currently there is an export market restriction (2016).

REFERENCES

Tuinstra, Mitchell R., and Kassim Al-Khatib. "Acetolactate synthase herbicide resistant sorghum." U.S. Patent Application No. 11/951,629.

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