

## 2008 RESEARCH SUMMARY

### ARKANSAS CORN and GRAIN SORGHUM BOARD

**TITLE:** Weed Control Programs in Arkansas Corn

**INVESTIGATOR:** Lawrence R. Oliver, Department of Crop, Soil and Environmental Sciences; 479-575-3976, [oliver@uark.edu](mailto:oliver@uark.edu)

Kenneth L. Smith, Southeast Research and Extension Center, Monticello; 870-460-1091, [smithken@uamont.edu](mailto:smithken@uamont.edu)

**CROP:** Field corn

**STATUS:** New Project

#### **OBJECTIVES and ACCOMPLISHMENTS:**

The funding has allowed the Weed Science crews to conduct 23 excellent field trials in 2008 (five at the Northeast Research and Extension Center, Keiser, 17 at Southeast Branch Experiment Station, Rohwer, and one at the Main Experiment Station, Fayetteville). Specific objectives to be answered in the field trials were:

#### **1. Develop single-application weed control programs for full-season corn production systems.**

The objective of this study is to assess one-shot herbicide programs (only one herbicide application in the season) in corn for effective season-long weed control. Twenty-six treatments were evaluated at three locations, Fayetteville, Keiser, and Rohwer, AR, for the past 3 years.

Atrazine (Aatrex) applied at 2 lb ai/A preemergence was used as the standard treatment, since atrazine is the most commonly used herbicide in corn. Glyphosate (Roundup OriginalMax) at 0.77 lb ae/A plus atrazine 1.5 lb/A + COC (Agri-dex). 1% v/v applied at 1- to 3-inch weed growth, atrazine + S- metolachlor + mesotrione, (Lumax or Lexar with different formulations),

flufenacet + isoxafutole (Radius), topramezone (Impact) + atrazine, mesotrione (Callisto) 0.188 lb ai/A applied preemergence were all effective treatment. For the less effective treatments, pitted and entireleaf morningglories were the most difficult species to control, especially late in the growing season. All treatments outperformed the untreated check and 12 treatments had no significant difference in yield when compared to the highest yielding treatment. The recommended herbicide program would be a tank mixture of many of the herbicides tested as long as they are applied by 2- to 4-inch weed growth.

**2. Evaluate new herbicide tank mixtures and determine the best herbicide programs for newly developing resistant weed problems.**

Evaluations of glyphosate, mesotrione, and S-metolachlor (Halex GT), tembotrione (Laudis), tembotrione + thiencazone + isoxafutole (Capreno), cyprosulfamide + isoxafutole (Balance Flexx), and Impact show that all can be successfully used in a weed control program. Our weed spectrum, soil, environment, and economics dictate that atrazine is still our base corn herbicide. However, in fields where atrazine is not an option, Impact plus glyphosate will provide acceptable weed control. Laudis is an effective early-postemergence herbicide for full-season weed control. Three new numbered compounds, BAS 800, BAS 78102H, and IR 8116 were evaluated. They appear to have sufficient crop safety, but weed spectrum and “fit” into a program will need to be identified prior to either reaching the market.

Unfortunately, each year environmental factors seem to force some farmers to replant poor stands. Removing the original partial stands of glyphosate and/or glufosinate tolerant corn has been a major problem. Our research proved that we can utilize paraquat (Gramoxone Inteon) and diuron (Karmex), metribuzin (Sencor), or atrazine to increase death of existing corn. In our plots, control rose from 20% with Gramoxone Inteon alone to 98% when a low rate of one of the

above herbicides was included. Other herbicides did not increase the control over parquat alone. It seems that the modes of action of Gramoxone Inteon and the PSII inhibitors (Karmex, atrazine, and Sencor) are synergistic. In order to insure this technology is available with multiple companies without additional costs to farmers, the University of Arkansas has applied for a patent on the synergism.

**3. Compare efficacy and yield potential of glyphosate (Roundup Ready), glufosinate (Liberty Link), and Gene Amplification Technology (GAT) cultivar technology for season-long weed control and management of weed resistance.**

In 2008, our comparison studies could not be conducted due to industry restrictions on GMO seed supply and types of experiments that could be conducted. Hopefully, next year these restrictions will be lifted. Our Liberty Link and GAT studies did show excellent potential. Split application in previous studies continue to show the economical benefits versus a single application of either Roundup or Ignite.

**4. Further evaluate corn leaf orientation and yield as influenced by early-season weed control.**

A preliminary study was initiated, but results were inconclusive.

**PUBLICATIONS:**

Sivils, G.J., L.R. Oliver, and K.L. Smith. 2007. One-shot weed control programs in corn. Abstr. AR Crop Prot. Assoc. 11:6-7.

Lyons, IV, F.H., L.R. Oliver, M.T. Bararpour, and C.E. Brewer. 2007. Weed control in corn. Proc. Southern Weed Sci. Soc. 60:3.

Bararpour, M.T., L.R. Oliver, and C.E. Brewer. 2007. Weed control in corn. Proc. Southern Weed Sci. Soc. 60:67.