

2009 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
Kenneth L. Smith, Southeast Research and Extension Center, Monticello; 870-460-1091, smithken@uamont.edu

CROP: Field corn

STATUS: Second year

OBJECTIVES and ACCOMPLISHMENTS:

The funding from this board has allowed the Weed Science crews to conduct 21 excellent field trials in 2009 (six at the Northeast Research and Extension Center, Keiser; 14 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. A smaller test was conducted in 2009 at Keiser.

Aatrex (atrazine) applied at 2 lb ai/A preemergence was used as the standard treatment, since atrazine is the most commonly used herbicide in corn. Roundup OriginalMax (glyphosate) 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, Lumax or Lexar (atrazine + *S*-metolachlor + mesotrione) with different formulations, Radius (flufenacet + isoxafutole), Impact (topramezone) + atrazine, or Callisto (mesotrione) 0.188 lb ai/A applied preemergence (PRE) were all effective treatments. 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 PRE or by 2- to 4-inch weed growth, especially in 2009 under the high rainfall conditions.

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

Evaluations of the new HPPD inhibitors (bleachers) Corvus (thiencarbazone + isoxaflutole + cyprosulfamide), Laudis (tembotrione), Capreno (tembotrione + thiencarbazone + isoxaflutole), Balance Flexx (cyprosulfamide + isoxaflutole), and Impact show that all can be

successfully used in a weed control program. Laudis does not appear to have quite the residual control as Callisto (mesotrione) and may be similar to Impact. Authority MTZ (sulfentrazone + metribuzin) provided good early-season weed control with no crop injury. We will continue to evaluate this product as a PRE that keeps options open for soybean if the corn stand fails. Split applications of Ignite 280 in Liberty Link corn were as effective as split applications of glyphosate in Roundup Ready corn. Our weed spectrum, soil, environment, and economics dictate that atrazine is still our standard base corn herbicide.

Each year environmental factors seem to force some producers 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 Gramoxone Inteon (paraquat) and Karmex (diuron), Sencor (metribuzin), 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 Gramoxone Inteon alone. It seems that the modes of action of Gramoxone Inteon and the PSII inhibitors (Karmex, Aatrex, and Sencor) are synergistic. The best timing of application was late afternoon.

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 2009, our comparison studies could not be conducted because of industry restrictions on GMO seed supplies and types of experiments that could be conducted. A GAT study was conducted at Keiser, but corn had to be destroyed prior to tasseling. The experimental ALS herbicide mixtures + glyphosate or fb glyphosate late postemergence (POST) all provided excellent control of Palmer amaranth, prickly sida, pitted and entireleaf morningglory, velvetleaf, and broadleaf signalgrass.

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

Tremendous effort has been placed on determining physiological explanation(s) for yield losses associated with early-season weed competition; however, no conclusive data are available.

PUBLICATIONS:

Bell C., D. Oliver, and M. Bararpour. 2008. Laudis (tembotrione) weed control programs in corn. Abstr. AR Crop Prot. Assoc. 12:14.

Oliver, L.R., K.L. Smith, M.T. Bararpour, and F.H. Lyons, IV. 2009. One-shot weed control programs in corn. Combined Abstr. Weed Sci. Soc. Am. and South. Weed Sci. Soc. 49 and 62: Presentation #458.