

**2005 RESEARCH SUMMARY**  
**ARKANSAS CORN AND GRAIN SORGHUM BOARD**

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

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**CROP:** Field Corn

**STATUS:** Funded in 2002 for 3 years.

**OBJECTIVES AND ACCOMPLISHMENTS:**

The funding allowed Chad Brewer, a half-time Graduate Assistant, and the Weed Science crews to conduct 14 excellent field trials in 2004 (seven at the Northeast Research and Extension Center, Keiser, and seven at Southeast Branch Experiment Station, Rohwer). Specific objectives to be answered in the field trials were:

- 1) **To develop late-season morningglory control programs that allow maximum crop rotations (Oliver and Smith).** Morningglories and pigweeds germinating after the last herbicide application may not offer enough competition to reduce yields, but can cause problems at harvest and add to the weed seedbank in the soil. When atrazine was tankmixed with the last application (12 to 20 inch corn) of glyphosate, late-season morningglory control was greatly improved in the Roundup Ready system. Liberty herbicide is slightly better than glyphosate on morningglory and slightly weaker on pigweed. Over the past four years the more consistent morningglory control has been maintained with conventional herbicide programs. Effective control (>90%) of pitted and entireleaf morningglory was maintained throughout the season by Facet (quinclorac) preemergence (PRE), Bicep II Manum (metolachlor/atrazine) PRE followed by (fb) Callisto (mesotrione) (POST) postemergence, Callisto PRE, Callisto + Aatrex (atrazine) PRE, Callisto PRE fb POST applications of Accent (nicosulfuron), Callisto, and Roundup Ultra Max (glyphosate), Callisto EPOST fb Callisto LPOST, Callisto POST alone or tank-mixed with Aatrex or Accent. There was no significant injury from any of the treatments tested. All treatment yields were similar except Facet PRE, which failed to provide mid- to late-season Palmer amaranth control.
  
- 2) **To determine efficacy of Roundup UltraMax, Liberty, and Lightning applied alone and with residual herbicides in transgenic cultivars for season-long weed control with and without Aatrex (Oliver and Smith).**  
A corn producer has two production system options, conventional or Roundup Ready®. In past years, the yield potential of herbicide-tolerant corn has been somewhat less than conventionally grown hybrids; however, the genetic potential relating to yield of Roundup Ready® corn has increased to average nearly the same as conventional corn. Thus, weed control programs in Roundup Ready® vs.

conventional corn hybrids need to be compared.

Several herbicide options are available in conventionally grown corn. Our study focused on nicosulfuron + rimsulfuron (Steadfast) and metolachlor + atrazine (Cinch ATZ) compared to glyphosate (Roundup WeatherMax). The study was conducted from 2003 through 2005 at the Northeast Arkansas Research and Extension center in Keiser, AR. The experiment was randomized complete block with 17 treatments. In 2003, Pioneer 31B13BT and DeKalb C64-10RR were chosen for yield. In 2004 and 2005, the varieties used for the test in 2003 were unavailable, so Pioneer 32P76BT and DeKalb C69-71BT/RR were utilized. Hybrid selection influenced yield potential of conventional and Roundup Ready® hybrids. At the 7 WAE rating, Steadfast applied alone to 2- to 4-inch weeds in corn provided 63 and 75% control of velvetleaf and pitted morningglory, respectively. However, when tank mixed with Aatrex and Callisto, weed control was at least 95% for pitted morningglory, velvetleaf, and broadleaf signalgrass, 95, 98, 99%, respectively, at the 7 WAE rating. Two applications of Roundup WeatherMax at 4- and 12-inch corn gave at least 89% control of weed species in the field, while two applications at 12- and 20-inch corn gave at least 94% control. Because of the yield reduction due to weed regrowth, two applications of Roundup WeatherMax should be applied at 12- and 20-inch corn as opposed to 4- and 12-inch corn. The addition of Aatrex at 1.5 lb/A to the second application of Roundup WeatherMax or three applications of Roundup WeatherMax at 4-, 12-, and 20-inch corn did not improve control or yield.

Data suggest that the yield potential for Roundup Ready® corn is comparable to that of conventional hybrids. Weed control options for both production systems are effective; however, Steadfast should be tank mixed with another herbicide such as Callisto or Aatrex for best results.

- 3) **To determine costs of transgenic weed control systems and compare with cost of standard herbicide programs (Oliver and Smith).** A cost analysis will be conducted at the conclusion of the three-year studies.
- 4) **To evaluate new herbicides and the best herbicide programs for newly emerging weed problems (Oliver and Smith).** Of the new products tested, Callisto appears to be the closest to an atrazine replacement. It is similar to atrazine in grass activity but is slightly less effective on morningglory. It is very versatile in that it can be applied PRE or POST up to 30-inch-tall corn. Callisto is an excellent tank-mix herbicide to use in a weed control program. Steadfast is a new product containing rimsulfuron and nicosulfuron and is similar to Basis Gold, except for the additional atrazine in Basis Gold. However, there is more nicosulfuron (the strong grass component) in Steadfast than in Basis Gold. Weed control has been slightly inconsistent but is still very good. Steadfast does offer an alternative to atrazine for control of triazine-resistant pigweeds. Option (formasulfuron) and Equip Corn Herbicide (mesosulfuron + iodosulfuron) are effective broadleaf herbicides but are weak on grasses such as broadleaf signalgrass. Lexar or Lumax (metolachlor + mesotrione + atrazine) applied PRE improved residual weed control over that of Bicept II Magnum and Lexar has

been added to MP-44 as an option for a total PRE program.

At present, numerous formulations of metolachlor are in the marketplace, our testing indicates Dual II magnum is more active on an active ingredient (ai) bases but all are comparable products with rate adjustments.

- 5) **To develop weed control programs in early short-season corn so that multiple crops (soybean followed by wheat) can be planted in the same year (Oliver).**

Research completed in 2004.

#### **PUBLICATIONS:**

Stephenson, IV, D.O., J.A. Bond, E.R. Walker, M.T. Bararpour, and L.R. Oliver. 2004. Evaluation of mesotrione in Mississippi Delta corn production. *Weed Technol.* (18:1111-1116).

Brewer, C.E. 2004. Weed control strategies for a triple-crop production system and late-season glyphosate applications to reduce weed seed rain. Master of Science Thesis. Univ. of Arkansas. 74 pgs.