

**2007 RESEARCH SUMMARY  
ARKANSAS CORN and GRAIN SORGHUM BOARD**

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

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**CROP:** Field corn

**STATUS:** Renewal (Third year)

**OBJECTIVES and ACCOMPLISHMENTS:**

The funding allowed Greg Sivils, a half-time Graduate Assistant, and the Weed Science crews to conduct 10 excellent field trial in 2007 (four at the Northeast Research and Extension Center, Keiser, five at Sountheast Branch Experiment Station, Rohwer, and one at the Main Experiment Station, Fayetteville). Specific objectives to be answered in the field trial were:

1. **To develop late-season morningglory control programs that allow maximum crop rotations (Oliver and Smith)**

Research completed in 2006.

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)**

Research completed in 2006.

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 preemergence (PRE) or postemergence (POST) up to 30-inch

corn. Callisto is an excellent tank-mix herbicide to use in a weed control program. New Resolve (rimsulfuron + thifensulfuron + isoxadifen-ethyl) applied at V2 to V3 corn shows excellent potential for weed control without corn injury. Landis (tembotrione + isoxadifen) applied at 4 inch weeds is an excellent potential product for full-season weed control without atrazine. Option (foramsulfuron) and Equip Corn Herbicide (foramsulfuron + iodosulfuron) are effective broadleaf herbicides but are weak on grasses such as broadleaf signalgrass. Lexar or Lumax (metolachlor + mesotrione + atrazine with different formulations) applied PRE improved residual weed control over that of Bicept II Magnum (S-methoachlor + atrazine) and Lexar has been added to MP-44 as an option for a total PRE program. Impact and glyphosate applied early postemergence have also shown promise as a single application for season-long weed control.

##### **5. To develop single application weed control programs for full-season corn production systems (Oliver and Smith)**

As corn acreage increases throughout the United States, alternative herbicide methods are being implemented to reduce input costs. 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. Both soil and foliar-applied herbicides were evaluated, either alone or in tank mixtures. Data were pooled for Fayetteville and Keiser. The Rohwer experiment had inadequate weed pressure and was not included in the analysis.

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. Corn treated with atrazine yielded 210 bu/A, which was comparable to yield of the weed-free check of 216 bu/A. 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 represented the highest numerical yield at 234 bu/A with total weed control rating of 98%. Treatments, such as Lumax and Lexar, Radius (flufenacet + isozfutole), or Resolve (rimsulfuron), that included glyphosate in the tank mixture had equal weed control and corn yield. Callisto (mesotrione) 0.1875 lb ai/A applied PRE, was the next highest treatment with a yield of 231 bu/A and weed control of 96%. The herbicide treatment with the lowest yield and weed control was Impact (topramezone) 0.016 lb ai/A tank mixed with methylated seed oil (MSO) 1% v/v and ammonium sulfate (AMS) at 1.28 lb ai/A applied at 2- to 4-inch weed growth. This treatment yielded 162 bu/A and had 68% weed control. Balance Pro (isozflutole) at 0.07 lb ai/A tank mixed with Define (flufenacet) at 0.64 lb ai/A also showed poor results as a PRE herbicide, with 189 bu/A corn yield and 75% weed control. For the less effective treatment, pitted and entireleaf morningglories were the most difficult species to control, especially late in the growing season.

All treatments outperformed the untreated check, which yielded only 123 bu/A. Statistically 12 treatments had no significant difference in yield when compared to the highest yielding treatment. Glyphosate, both alone and in tank mixtures, provided high yields and excellent weed control. Herbicides tank mixed with atrazine also provided equivalent yield and weed control. After one summer of research, the recommended herbicide program would be a tank mixture of any of the herbicides tested plus atrazine, glyphosate, or both when applied by 2- to 4-inch weed growth.