

HERBICIDE SYSTEM COMPARISONS IN NO-TILLAGE CORN FOR BROADLEAF SIGNALGRASS CONTROL

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ABSTRACT: A no-tillage corn trial was established to compare broadleaf signalgrass *Brachiaria platyphylla* control systems in a no-tillage environment. Weed control systems included preemergence (PRE) and postemergence (POST) herbicides applied alone, sequentially, and as tank-mix partners at different timings. At 52 days after planting (DAP), a sequential application of 26 oz/ac followed by (fb) 20 oz/ac Roundup Ultramax 5 SL (glyphosate) controlled broadleaf signalgrass 100%, which was greater than all other treatments. Broadleaf signalgrass control was greater with systems that included a POST treatment compared to the PRE alone system. Grain yield was 197.3 bu/ac with a sequential POST application of 26 oz/ac followed by 20 oz/ac Roundup Ultramax to Dekalb 6410RR and was greater than all other treatments except 1.8 qt/ac Bicep II Magnum 5.5 EC (metolachlor + atrazine) plus 0.5 qt/ac Aatrex 4 SC (atrazine) applied PRE to Pioneer 3223. However, grain yield was not different for PRE alone systems applied to Pioneer 3223 and Dekalb 6410RR. Grain yield was 160.5 bu/ac with a single application of 26 oz/ac Roundup Ultramax and the addition of a residual herbicide did not improve yield.

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KEYWORDS: broadleaf signalgrass, corn, no-tillage

MATERIALS AND METHODS: Research was conducted to evaluate herbicide systems for broadleaf signalgrass control in no-tillage corn. The experimental design was a randomized complete block with 4 replications. Plot size was 20 x 50 ft with eight 30-in rows. The soil type was a Falkner silt loam (fine-silty, siliceous, thermic Typic Hapludults). Fertilizer and lime were applied in the spring according to soil test recommendations. A preplant burndown application of 26 oz/ac Roundup Ultramax was applied to the entire trial area 2 weeks before planting. Corn varieties Dekalb 6410RR and Pioneer 3223 were planted on April 15. An application of 8.7 lb/ac Lorsban 15G (chlorpyrifos) was t-banded at planting. A side-dress application of 150 lb N/ac (32% UAN solution) was applied 6-in from row and 2-in deep at the 6 to 8 leaf stage. Herbicide treatment application timings were PRE, 21 DAP, 31 DAP, and 46 DAP. All treatments were applied with a tractor-mounted CO₂ sprayer. Weed control ratings were conducted at 21, 38, 52, and 65 DAP. Herbicide systems included a tank-mixture of 1.8 qt/ac Bicep II Magnum plus 0.5 qt/ac Aatrex PRE; 0.9 qt/ac Bicep II Magnum plus 0.25 qt/ac Aatrex PRE fb 20 oz/ac Roundup Ultramax POST (2 inch weeds, 11 inch corn); a tank-mixture of 1.5 qt/ac Aatrex plus 26 oz/ac Roundup Ultramax POST (3 inch weeds, 8 inch corn); a tank-mixture

of 1.5 qt/ac Aatrex plus 26 oz/ac Roundup Ultramax POST fb 26 oz/ac Roundup Ultramax POST (weeds sprouting); 26 oz/ac Roundup Ultramax POST (3-8 inch weeds, 11 inch corn); and 26 oz/ac Roundup Ultramax POST (3-8 inch weeds, 11 inch corn) fb 20 oz/ac Roundup Ultramax POST (2 inch weeds, 26 inch corn). The two center rows of each plot were mechanically harvested on August 27. Corn grain from each plot was weighed and seed moisture was determined using a MT3 Farmex grain moisture tester. Yield was adjusted to 15.5% moisture. Analysis of variance was conducted and means were separated using Fisher's protected LSD ($\alpha=0.05$).

RESULTS AND DISCUSSION: This research evaluated broadleaf signalgrass control systems in a no-tillage environment. The PRE treatment of 1.8 qt/ac Bicep II Magnum plus 0.5 qt/ac Aatrex was included to represent a one-pass soil applied residual herbicide system approach. This PRE system was applied to Dekalb 6410RR and Pioneer 3233 to compare crop performance of a genetically enhanced hybrid to a conventional hybrid. Each hybrid received the same treatments and weed control was not different throughout the growing season. At 38 DAP, all treatments had been applied for at least 7 days, except a sequential Roundup Ultramax application to be applied at 46 DAP. At this time, all systems that included a POST application of Roundup Ultramax controlled broadleaf signalgrass at least 99%, which was greater than systems that included only PRE treatments (Table 1). At 52 DAP, a sequential application of 26 fb 20 oz/ac Roundup Ultramax controlled broadleaf signalgrass 100% and was greater than all other treatments. Treatments that included a residual herbicide plus Roundup Ultramax or Roundup Ultramax alone were not different in the degree of weed control, but were greater than PRE alone systems.

Grain yield ranged from 144.8 to 197.3 bu/ac for all herbicide treatments and was greater than 123 bu/A for the untreated check (Table 1). The highest yield was 197.3 bu/ac with a sequential application of 26 fb 20 oz/ac Roundup Ultramax applied to Dekalb 6410RR. This yield was greater than all treatments except for the PRE alone system of 1.8 qt/ac Bicep II Magnum plus 0.5 qt/ac Aatrex applied to Pioneer 3223. This would suggest that Pioneer 3223 could have greater yield potential than Dekalb 6410RR, since weed control was less effective for the PRE alone compared to the sequential Roundup Ultramax system. However, grain yield was not different for PRE alone systems applied to Pioneer 3223 and Dekalb 6410RR (Table 1). Grain yield was 160.5 bu/ac with a single application of 26 oz/ac Roundup Ultra and the addition of a residual herbicide did not improve yield. Therefore, preliminary research indicates that grain yield with a one-pass PRE herbicide system in conventional corn hybrid production can be equivalent to a sequential POST herbicide system in genetically enhanced corn production.

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Table 1. Broadleaf signalgrass (*Brachiaria platyphylla*) control and grain yield influenced by herbicide systems in no-tillage corn at the Pontotoc Ridge-Flatwoods Experiment Station in 2002.

| Treatment | Rate | Application Timing | Broadleaf Signalgrass Control | | | | Yield Bu/ac |
|----------------------------|-----------|-----------------------|-------------------------------|--------|--------|--------|----------------|
| | | | 21 DAP ¹ | 38 DAP | 52 DAP | 65 DAP | |
| | | | ----- (%)----- | | | | |
| Dekalb 6410RR Untreated | | | 0 | 0 | 0 | 0 | 123.0 |
| Pioneer 3223 | | | | | | | |
| Bicep II Magnum 5.5 EC | 1.8 qt/ac | PRE | 100.0 | 90.8 | 75.0 | 70.0 | 177.3 |
| Atrazine 4 SC | 0.5 qt/ac | PRE | | | | | |
| Dekalb 6410RR | | | | | | | |
| Bicep II Magnum 5.5 EC | 1.8 qt/ac | PRE | 100.0 | 87.5 | 68.8 | 68.8 | 165.8 |
| Atrazine 4 SC | 0.5 qt/ac | PRE | | | | | |
| Dekalb 6410RR | | | | | | | |
| Bicep II Magnum 5.5 EC | 0.9 qt/ac | PRE | 100.0 | 99.5 | 91.3 | 82.5 | 144.8 |
| Atrazine 4 SC | 0.25qt/ac | PRE | | | | | |
| Roundup Ultramax 5.0 SL | 20 oz/ac | 31 DAP | | | | | |
| Dekalb 6410RR | | | | | | | |
| Roundup Ultramax 5.0 SL | 26 oz/ac | 21 DAP | 0.0 | 99.0 | 85.0 | 83.3 | 166.5 |
| Atrazine 4 SC | 1.5 qt/ac | 21 DAP | | | | | |
| Dekalb 6410RR | | | | | | | |
| Roundup Ultramax 5.0 SL | 26 oz/ac | 21 DAP | 0.0 | 100.0 | 90.0 | 88.0 | 145.7 |
| Atrazine 4 SC | 1.5 qt/ac | 21 DAP | | | | | |
| Roundup Ultramax 5.0 SL | 26 oz/ac | 31 DAP | | | | | |
| Dekalb 6410RR | | | | | | | |
| Roundup Ultramax 5.0 SL | 26 oz/ac | 31 DAP | 0.0 | 100.0 | 89.5 | 82.5 | 160.5 |
| Dekalb 6410RR | | | | | | | |
| Roundup Ultramax 5.0 SL | 26 oz/ac | 31 DAP | 0.0 | 100.0 | 100.0 | 97.5 | 197.3 |
| Roundup Ultramax 5.0 SL | 20 oz/ac | 46DAP | | | | | |
| LSD (0.05) | | | NS | 4.16 | 8.46 | 11.68 | 25.34 |

¹ DAP = days after planting