

HERBICIDE SYSTEMS IN NO-TILLAGE CORN

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ABSTRACT: A corn herbicide trial was established to evaluate broadleaf signalgrass (*Brachiaria platyphylla*) and pigweed (*Amaranthus sp.*) 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 155 DAP (days after planting), all herbicide systems with a PRE followed-by (fb) POST application, sequential Roundup WEATHERMAX (glyphosate) applications, or Roundup WEATHERMAX plus residual herbicide tank-mix controlled broadleaf signalgrass at least 94%. Pigweed was controlled at 100% for all treatments except for a single application of Roundup WEATHERMAX. The addition of a residual herbicide (PRE OR POST) or a sequential application of Roundup WEATHERMAX improved weed control compared to a single application of Roundup WEATHERMAX. Yield with all herbicide treatments was at least 195 bu/ac and higher than the untreated checks of Dekalb 69-71 RR/YG and Pioneer 31B13 YG, which yielded 175 and 172 bu/ac, respectively. The highest yielding treatment was Pioneer 31B13 YG with a standard herbicide treatment of 1.8 qt/ac Bicep II Magnum plus 0.6 qt/ac Atrazine fb 0.66 oz/ac Accent, which yielded 216 bu/ac. This was not different compared to the same treatment applied to Dekalb 69-71 RR/YG. There were no differences in yield among herbicide treatments applied to the Dekalb 69-71 RR/YG corn hybrid. Grain yield with the addition of a residual herbicide or a sequential application of Roundup WEATHERMAX was not different compared to a single application of Roundup WEATHERMAX.

CITATION: Shankle, M.W., T.F. Garrett and J.L. Main. 2005. Herbicide systems in no-tillage corn. Annual Report 2004 of the North Mississippi Research & Extension Center. Mississippi Agriculture & Forestry Experiment Station Information Bulletin 419:49-54.

KEYWORDS: broadleaf signalgrass, pigweed, corn, no-tillage

MATERIALS AND METHODS: A herbicide study was conducted in 2004 to evaluate broadleaf signalgrass and pigweed in no-tillage corn at the Pontotoc Ridge-Flatwoods Experiment Station. The soil type was a Bude silt loam (fine-silty, mixed, thermic Glossaquic Fragiudalfs). The experimental design was a randomized complete block with 4 replications. Plot size was 10 x 40 ft. Fertilizer and lime were applied in the spring according to Mississippi State Soil Testing Laboratory recommendations.

Dekalb 6971 RR/YG and Pioneer 31B13 YG hybrids were planted no-tillage in 30-in rows on April 5 with a seeding rate of 32,000 seed/ac. A side-dress application of 180 lb N/ac (32% UAN solution) was applied 6-in from row and 2-in deep at the 6 to 8 leaf stage. A preplant burndown application of 21.4 oz/ac Roundup WEATHERMAX (glyphosate) was applied to the

entire trial area 2 weeks before planting. An application of 8.7 lb/ac Lorsban 15G (chlorpyrifos) was T-banded at planting. Herbicide treatment application timings were preemergence (PRE), 36 days after planting (DAP) and 57 DAP. All treatments were applied with a tractor-mounted CO₂ sprayer. Weed control ratings were conducted at 36, 43, 50, 57, 65, 71, 78 DAP, and pre harvest. Only ratings made at 36, 50, 71, and 155 DAP are discussed in this report.

Corn and weed heights for early postemergence applications (E-POST) were 10 inches and 2 to 4 inches, respectively. Late postemergence (L-POST) applications were made at less than 2 inch weeds and 35 inch corn. Herbicide systems included a tank-mixture of 1.8 qt/ac Bicep II Magnum (metolachlor + atrazine) plus 0.6 qt/ac Atrazine PRE fb 0.66 oz/ac fb Accent (nicosulfuron) plus 1 % v/v crop oil concentrate (COC) L-POST; a tank-mixture of 1.8 qt/ac Bicep II Magnum plus 0.6 qt/ac Atrazine PRE; 0.9 qt/ac Bicep II Magnum plus 0.3 qt/ac Atrazine PRE fb 16 oz/ac Roundup WEATHERMAX E-POST; a tank-mixture of 1.5 qt/ac Atrazine plus 21.4 oz/ac Roundup WEATHERMAX E-POST; a tank-mixture of 1.5 qt/ac Atrazine plus 21.4 oz/ac Roundup WEATHERMAX E-POST fb 16 oz/ac Roundup WEATHERMAX L-POST; 21.4 oz/ac Roundup WEATHERMAX E-POST; 21.4 oz/ac Roundup WEATHERMAX E-POST fb 16 oz/ac Roundup WEATHERMAX L-POST; 1.3 pt/ac Cinch ATZ (metolachlor + atrazine) PRE fb a tank-mixture of 0.75 oz/ac Steadfast (nicosulfuron + rimsulfuron), 2.0 qt/ac Atrazine 4 SC, 2 lb/ac ammonium sulfate, and 1 % v/v COC E-POST; 0.8 pt/ac Cinch (metolachlor) PRE fb a tank-mixture of 0.75 oz/ac Steadfast, 2.0 qt/ac Atrazine 4 SC, 2 lb/ac ammonium sulfate, and 1 % v/v COC E-POST; 2.5 pt/ac Atrazine 4 SC PRE fb a tank-mixture of 0.75 oz/ac Steadfast, 2.5 pt/ac Atrazine 4 SC, 2 lb/ac ammonium sulfate, and 1 % v/v COC E-POST; a tank-mixture of 0.75 oz/ac Steadfast, 2.0 qt/ac Atrazine 4 SC, 2 lb/ac ammonium sulfate, and 1 % v/v COC E-POST; a tank-mixture of 0.75 oz/ac Steadfast, 2.0 pt/ac Cinch ATZ (metolachlor + atrazine), 2 lb/ac ammonium sulfate, and 1 % v/v COC E-POST; 1.2 qt/ac Bicep II Magnum plus 0.4 qt/ac Atrazine PRE fb 21.4 oz/ac Roundup WEATHERMAX E-POST; 0.9 qt/ac Bicep II Magnum plus 0.3 qt/ac Atrazine PRE fb 21.4 oz/ac Roundup WEATHERMAX E-POST; a tank-mixture of 0.75 oz/ac Steadfast, 2 oz/ac Callisto (mesotrione), 1.5 qt/ac Atrazine 4 SC, 2 lb/ac ammonium sulfate, and 1 % v/v COC E-POST; a tank-mixture of 0.66 oz/ac Steadfast, 3.0 oz/ac Callisto, and 1 % v/v COC E-POST; 3.0 qt/ac Lexar (metolachlor + atrazine + mesotrione) applied PRE. The two center rows of each plot were mechanically harvested on September 10 with a plot combine equipped with a corn header. 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 was conducted to evaluate broadleaf signalgrass and pigweed control in a no-tillage environment. Insect and weed pressure was minimal and environmental growing conditions were good for corn production in 2004. Rainfall during the growing season was 4.10, 9.77, 9.03, 4.61, 3.45, and 0.28 inches for April, May, June, July, August, and until harvest on September 7, respectively.

The treatment of 1.8 qt/ac Bicep II Magnum plus 0.6 qt/ac Atrazine fb 0.66 oz/ac Accent was included to represent a standard herbicide system approach. This system was applied to Dekalb 69-71 RR/YG and Pioneer 31B13 YG to compare crop performance of a glyphosate tolerant hybrid to a conventional hybrid. Each hybrid received the same treatments and weed control was

not different throughout the growing season. At 36 DAP only PRE applications had been applied. At 50 DAP all treatments had been applied for at least 14 days, except for two sequential Roundup WEATHERMAX applications and an Accent application which followed a PRE treatment of 1.8 qt/ac Bicep II Magnum plus 0.6 qt/ac Atrazine to be applied at 57 DAP

At 50 DAP all herbicide systems controlled broadleaf signalgrass at least 95% except for an E-POST treatment of 0.75 oz/ac Steadfast, 2.0 pt/ac Cinch ATZ, 2 lb/ac ammonium sulfate + 1 % v/v COC and an E-POST treatment of 0.66 oz/ac Steadfast + 3.0 oz/ac Callisto + 1 % v/v COC, which had a control of 89 and 91%, respectively. Pigweed control at this time was at least 99% for all treatments except for the E-POST treatment of 0.66 oz/ac Steadfast, 3.0 oz/ac Callisto, and 1 % v/v COC, which had control of 91% (Table 1).

At 155 DAP (harvest) all herbicide systems containing a PRE fb E-POST application, a sequential Roundup WEATHERMAX application, or a Roundup WEATHERMAX plus a residual herbicide application controlled broadleaf signalgrass at least 94%. Pigweed was controlled at 100% for all treatments except for a single application of Roundup WEATHERMAX. The addition of a residual herbicide (PRE OR POST) or a sequential application of Roundup WEATHERMAX improved weed control compared to a single application of Roundup WEATHERMAX.

All herbicide treatments yielded at least 195 bu/ac and was higher than the untreated checks of Dekalb 69-71 RR/YG and Pioneer 31B13 YG, which yielded 175 and 172 bu/ac, respectively. The highest yielding treatment was Pioneer 31B13 YG with the standard herbicide treatment of 1.8 qt/ac Bicep II Magnum plus 0.6 qt/ac Atrazine fb 0.66 oz/ac Accent, which yielded 216 bu/ac. This was not different compared to the same treatment applied to Dekalb 69-71 RR/YG. There were no differences among herbicide treatments applied to corn variety Dekalb 69-71 RR/YG. Grain yield with the addition of a residual herbicide or a sequential application of Roundup WEATHERMAX was not different compared to a single application of Roundup WEATHERMAX. Therefore, preliminary research indicates that grain yield with a single or sequential application of Roundup WEATHERMAX can be equivalent to a conventional PRE or POST herbicide system in Roundup Ready corn production.

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Table 1. Broadleaf signalgrass (*Brachiaria platyphylla*) control, pigweed (*Amaranthus sp.*) control, and grain yield influenced by herbicide systems in no-tillage corn at the Pontotoc Ridge-Flatwoods Experiment Station in 2004.

Treatment	Rate	Application Timing ¹	Broadleaf Signalgrass Control				Pigweed Control				Yield Bu/ac
			36 DAP ²	50 DAP	71 DAP	155 DAP	36 DAP	50 DAP	71 DAP	155 DAP	
Pioneer 31B13 YG	Untreated	Untreated	0	0	0	0	0	0	0	0	175
Dekalb 6971RR/YG	Untreated	Untreated	0	0	0	0	0	0	0	0	172
Pioneer 31B13 YG Bicep II Magnum 5.5 EC Atrazine 4 SC Accent 75 WG COC	1.8 qt/ac 0.6 qt/ac 0.66 oz/ac 1.0 % v/v	PRE PRE Late POST Late POST	100	98	100	100	100	100	100	100	216
Dekalb 6971RR/YG Bicep II Magnum 5.5 EC Atrazine 4 SC Accent 75 WG COC	1.8 qt/ac 0.6 qt/ac 0.66 oz/ac 1.0 % v/v	PRE PRE Late POST Late POST	98	98	100	97	100	100	100	100	206
Dekalb 6971RR/YG Bicep II Magnum 5.5 EC Atrazine 4 SC	1.8 qt/ac 0.6 qt/ac	PRE PRE	94	98	96	87	98	100	100	100	209
Dekalb 6971RR/YG Bicep II Magnum 5.5 EC Atrazine 4 SC Roundup Wmax 4.5 SL	0.9 qt/ac 0.3 qt/ac 16 oz/ac	PRE PRE Early POST	94	99	96	96	100	100	100	100	201
Dekalb 6971RR/YG Roundup Wmax 4.5 SL Atrazine 4 SC	21.4 oz/ac 1.5 qt/ac	Early POST Early POST	0	100	100	100	0	100	100	100	201
Dekalb 6971RR/YG Roundup Wmax 4.5 SL Atrazine 4 SC Roundup Wmax 4.5 SL	21.4 oz/ac 1.5 qt/ac 16 oz/ac	Early POST Early POST Late POST	0	100	100	100	0	100	100	100	201

Dekalb 6971RR/YG Roundup Wmax 4.5 SL	21.4 oz/ac	Early POST	0	98	88	85	0	99	95	96	195
Dekalb 6971RR/YG Roundup Wmax 4.5 SL Roundup Wmax 4.5 SL	21.4 oz/ac 16 oz/ac	Early POST Late POST	0	98	100	99	0	99	100	100	198
Dekalb 6971RR/YG Cinch ATZ 5.5 SC Steadfast 75 DF Atrazine 4 SC Ammonium Sulfate COC	1.3 pt/ac 0.75 oz/ac 2.0 qt/ac 2 lb/ac 1 % v/v	PRE Early POST Early POST Early POST Early POST	87	100	100	99	97	100	100	100	201
Dekalb 6971RR/YG Cinch 7.64 SC Steadfast 75 DF Atrazine 4 SC Ammonium Sulfate COC	0.8 pt/ac 0.75 oz/ac 2.0 qt/ac 2 lb/ac 1 % v/v	PRE Early POST Early POST Early POST Early POST	93	100	100	98	94	100	100	100	196
Dekalb 6971RR/YG Atrazine 4 SC Steadfast 75 DF Atrazine 4 SC Ammonium Sulfate COC	2.5 pt/ac 0.75 oz/ac 2.5 pt/ac 2 lb/ac 1 % v/v	PRE Early POST Early POST Early POST Early POST	93	98	99	97	100	100	100	100	195
Dekalb 6971RR/YG Steadfast 75 DF Atrazine 4 SC Ammonium Sulfate COC	14 oz/ac 1.39 lb/ac 2 lb/ac 1 % v/v	Early POST Early POST Early POST Early POST	0	95	93	91	0	100	100	100	201
Dekalb 6971RR/YG Steadfast 75 DF Cinch ATZ 5.5 SC Ammonium Sulfate COC	0.75 oz/ac 2.0 pt/ac 2 lb/ac 1.0% v/v	Early POST Early POST Early POST Early POST	0	89	94	92	0	100	100	100	200

Dekalb 6971RR/YG												
Bicep II Magnum 5.5 EC	1.2 qt/ac	PRE	97	99	93	94	100	100	100	100	209	
Atrazine 4 SC	0.4 qt/ac	PRE										
Roundup Wmax 4.5 SL	21.4 oz/ac	Early POST										
Dekalb 6971RR/YG												
Bicep II Magnum 5.5 EC	0.9 qt/ac	PRE	95	100	96	96	100	100	100	100	205	
Atrazine 4 SC	0.3 qt/ac	PRE										
Roundup Wmax 4.5 SL	21.4 oz/ac	Early POST										
Dekalb 6971RR/YG												
Steadfast 75 DF	0.75 oz/ac	Early POST										
Callisto 4 SC	2.0 oz/ac	Early POST	0	98	93	94	0	100	100	100	204	
Atrazine	1.5 qt/ac	Early POST										
Ammonium Sulfate	2.0 lb/ac	Early POST										
COC	1 % v/v	Early POST										
Dekalb 6971RR/YG												
Steadfast 75 DF	0.66 oz/ac	Early POST	0	91	88	86	0	91	100	100	201	
Callisto 4 SC	3.0 oz/ac	Early POST										
COC	1 % v/v	Early POST										
Dekalb 6971RR/YG			100	98	89	91	100	100	100	100	204	
Lexar	3 qt/ac	PRE										
LSD (0.05)			5.8	3.7	4.0	8.9	2.7	2.8	1.8	1.5	17.8	

¹Application time: PRE= preemergance at planting; Early POST=36 days after planting; Late POST= 57 days after planting

² DAP = days after planting