

EVALUATION OF MESOTRIONE FOR WEED CONTROL IN NO-TILLAGE CORN

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ABSTRACT: This research evaluated Callisto (mesotrione) for weed control, crop injury and yield in no-tillage corn. Broadleaf signalgrass *Brachiaria platyphylla* and spiny amaranth *Amaranthus spinosus* control was higher with Callisto than to Distinct (diflufenzopyr + dicamba), Hornet (flumetsulam), and Northstar (primisulfuron + dicamba) herbicides, but not Touchdown (glyphosate). Early season crop injury was less than 6 percent. Corn yields ranged from 117 to 153 bu/ac for all herbicide treatments, which was greater than 83 bu/ac for the untreated check. Treatments of Callisto + 1.13 lb ai/ac Touchdown + UAN (32% N solution at 2.5% v/v) + COC (crop oil concentrate at 1% v/v) and Callisto + 0.25 lb/ac 2,4-D amine + UAN + COC produced the highest yields, but were only different than Hornet + UAN + NIS (non-ionic surfactant at 0.25% v/v).

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KEYWORDS: corn, mesotrione, no-tillage

MATERIALS AND METHODS: A corn herbicide trial was established to determine weed control and yield potential with Callisto alone and as a tank-mix partner in a no-tillage environment. The soil type was a Falkner silt loam (fine-silty, siliceous, thermic Typic Hapludults) with a pH of 6.3 and organic matter of 1.1%. The experiment design was a randomized block with 4 replications. Plot size was 10 x 40 ft. Dekalb DK64-10RR corn was planted in 30 inch rows on April 2. Fertilizer and lime were applied in the spring according to soil test recommendations. A preplant burndown application of 1 lb/ac glyphosate was applied 3 weeks before planting. Treatments were applied to 2 to 3 inch spiny amaranth and 3 inch broadleaf signal grass with a CO₂ tractor sprayer on May 7. A side-dress application of 150 lb N/ac (32% UAN solution) was applied 6 inches from the row and 2 inches deep at the 6 to 8 leaf stage. Ratings were collected at 7, 14, and 28 days after treatment (DAT) for crop injury, broadleaf signalgrass, and spiny amaranth control. Ratings taken at 56 DAT were for broadleaf signalgrass and crop injury (Table 1). 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:

Callisto plus Aatrex. Seven DAT, broadleaf signalgrass control was 50% with 0.094 lb/ac Callisto + UAN + COC compared to at least 93% with Callisto + Aatrex (atrazine) (Table 1). Spiny amaranth control was 91% for Callisto + UAN + COC and not different from Callisto + Aatrex as tank-mix partners. At 28 DAT, Callisto + UAN + COC controlled broadleaf signalgrass 73% compared to at least 93% with the addition of Aatrex. This reflects the need of Aatrex as a tank-mix partner for control of 3" broadleaf signalgrass. Spiny amaranth control was 100% with Callisto + UAN + COC, therefore the addition of Aatrex was not beneficial.

Callisto plus phenoxy, benzoic, and bentazon herbicides. At 28 DAT, broadleaf signalgrass control with Callisto alone and with a Banvel (dicamba) or 2,4-D amine tank-mix partner was less than 79% compared to 95% with Callisto + 0.25 lb ai/A Basagran (bentazon). This could suggest a possible synergistic effect since both Callisto and Basagran typically control broadleaf weed species. Spiny amaranth was controlled at least 98% with Callisto alone and with all tank-mix partners.

Callisto plus Touchdown with and without adjuvants. At 28 DAT, broadleaf signalgrass control improved to at least 94% with the addition of Touchdown, regardless of adjuvant. The addition of Touchdown as a tank-mix partner did not improve spiny amaranth control. Weed control was higher, but not different with the addition of UAN and COC to a Callisto + Touchdown tank-mix for most treatments. Tank-mixtures of these herbicides with and without adjuvants were not different than a single application of 0.75 lb ai/A Touchdown alone + NIS, which controlled broadleaf signalgrass 98% and spiny amaranth 89%.

Callisto and tank-mix partners. Preeminent tank-mix partner rates were interpreted at 28 DAT relative to broadleaf signalgrass control, since tank-mixtures did not improve control of spiny amaranth. The addition of 0.5 lb/A Aatrex + UAN + COC or 0.75 lb/A Aatrex to 0.094 lb/A Callisto controlled broadleaf signalgrass 99%. The addition of 0.75 lb/A Touchdown + UAN + COC or 1.13 lb/A Touchdown controlled broadleaf signalgrass at least 97%. The addition of Banvel or 2,4-D amine did not improve grass control. A tank-mix partner of 0.25 lb/A Basagran + UAN + COC with Callisto controlled broadleaf signalgrass 95%. Broadleaf signalgrass and spiny amaranth control with Callisto was superior compared to other standard herbicides evaluated in this trial, except for Touchdown.

Corn yields ranged from 117 to 153 bu/ac for all herbicide treatments, which was greater than 83 bu/ac for the untreated check. Treatments of Callisto + 1.13 lb/A Touchdown + UAN + COC and Callisto + 0.25 lb/A 2,4-D amine + UAN + COC produced the highest yields, but were only different than Hornet + UAN + NIS.

COOPERATORS: James Holloway with Syngenta Crop Protection, Inc.

Table 1. Weed control and crop injury with Callisto (mesotrione) herbicide in no-tillage corn at the Pontotoc Ridge-Flatwoods Experiment Station in 2002.

Treatment	Rate	7 DAT			14 DAT			28 DAT			56 DAT		Yield
		BRAPP ¹ Control	AMASP ² Control	Crop Injury	BRAPP Control	AMASP Control	Crop Injury	BRAPP Control	AMASP Control	Crop Injury	BRAPP Control	Crop Injury	
----- % -----												Bu/ac	
Untreated		0	0	0	0	0	0	0	0	0	0	0	83.2
Callisto 4 SC	0.094 lb ai/ac												
COC	1 % V/V	50	91	0	81	100	0	73	100	4	70	0	137.8
UAN	2.5 %V/V												
Callisto 4 SC	0.094 lb ai/ac												
Aatrex 4L	0.25 lb ai/ac												
COC	1 % V/V	95	100	1	100	100	0	93	100	0	88	0	145.9
UAN	2.5 %V/V												
Callisto 4 SC	0.094 lb ai/ac												
Aatrex 4L	0.5 lb ai/ac												
COC	1 % V/V	98	100	1	100	100	0	99	100	0	98	0	143.3
UAN	2.5 %V/V												
Callisto 4 SC	0.094 lb ai/ac												
Aatrex 4L	0.75 lb ai/ac												
COC	1 % V/V	93	100	4	96	100	0	99	100	0	96	0	148.8
UAN	2.5 %V/V												
Callisto 4 SC	0.094 lb ai/ac												
Touchdown	0.75 lb ai/ac												
COC	1 % V/V	100	100	0	100	100	0	94	89	0	73	0	149.7
UAN	2.5 %V/V												
Callisto 4 SC	0.094 lb ai/ac												
Touchdown	1.13 lb ai/ac												
COC	1 % V/V	100	100	0	100	100	0	97	94	0	91	0	151.2
UAN	2.5 %V/V												
Callisto 4 SC	0.094 lb ai/ac												
Touchdown	0.75 lb ai/ac												
COC	1 % V/V	100	100	1	100	100	0	98	92	4	90	0	152.6
UAN	2.5 %V/V												
Callisto 4 SC	0.094 lb ai/ac												
Touchdown	1.13 lb ai/ac												
COC	1 % V/V	100	100	0	100	100	0	94	100	0	88	0	156.6
UAN	2.5 %V/V												
Callisto 4 SC	0.094 lb ai/ac												
Banvel 4S	0.25 lb ai/ac												
UAN	2.5 %V/V	43	40	3	77	99	0	66	98	0	63	0	140.0
NIS	0.25 %V/V												
Callisto 4 SC	0.094 lb ai/ac												
Banvel 4S	0.5 lb ai/ac												
UAN	2.5 %V/V	55	65	1	71	100	0	78	98	0	61	0	140.7
NIS	0.25 % V/V												

Treatment	Rate	7 DAT			14 DAT			28 DAT			56 DAT		Yield Bu/ac
		BRAPP ¹ Control	AMASP ² Control	Crop Injury	BRAPP Control	AMASP Control	Crop Injury	BRAPP Control	AMASP Control	Crop Injury	BRAPP Control	Crop Injury	
----- % -----													
Callisto 4 SC 2,4-D Amine 4 COC UAN	0.094 lb ai/ac 0.25 lb ai/ac 1 % V/V 2.5 %V/V	39	59	0	68	100	0	78	98	0	78	0	156.3
Callisto 4 SC 2,4-D Amine 4 COC UAN	0.094 lb ai/ac 0.5 lb ai/ac 1 % V/V 2.5 %V/V	69	43	4	79	100	0	74	98	0	79	0	134.2
Callisto 4 SC Basagran 4 SL COC UAN	0.094 lb ai/ac 0.25 lb ai/ac 1 % V/V 2.5 %V/V	93	94	1	92	100	0	95	100	4	93	0	153.7
Callisto 4 SC Basagran 4 SL COC UAN	0.094 lb ai/ac 0.5 lb ai/ac 1 % V/V 2.5 %V/V	73	94	5	90	100	0	88	100	0	93	0	149.3
Distinct 70 WG NIS UAN	0.175 lb ai/ac 0.25 % V/V 2.5 %V/V	11	25	1	30	40	0	39	40	0	40	0	123.4
Hornet NIS UAN	0.128 lb ai/ac 0.25 % V/V 2.5 %V/V	25	81	0	30	----- ³	0	39	-----	0	39	0	116.9
Northstar NIS UAN	0.148 lb ai/ac 0.25 % V/V 2.5 %V/V	13	43	0	24	50	0	23	-----	0	30	0	122.0
Touchdown	0.747 lb ai/ac	100	100	0	100	100	0	98.3	89	0	94	0	153.6
LSD (0.05)		15.23	10.02	4.41	14.00	0.97	0.00	16.50	10.83	4.29	19.64	0.00	21.01

¹Broadleaf Signalgrass

²Spiny Amaranth

³Not rated due to low spiny amaranth plant density.