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Callisto Residual Evaluation Sweet Corn HerbicideTrial

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Abstract
Callisto (mesotrione) is a new grass herbicide for use in sweet corn. It is labeled for both PRE and POST application. Excellent control of most broadleaves is obtained, with the exception of purslane and common ragweed. Its efficacy can be extended by tank mixing with Dual and/or AAtrex. In 2005 we applied alone, or in combination, Callisto, Dual II Magnum, and AAtrex 4L to Precious Gem sweet corn grown on a Clarion loam soil at the Horticulture Station, Gilbert, IA. The normal Callisto rate is 6 oz/acre PRE or no more than two 3 oz/acre applications as POST. Our highest POST application of Callisto was 12 oz/acre, 6 oz on June 22 and 6 oz on June 29, 2005. Injury to sweet corn, in form of bleaching of 10% of leaves, on July 7 was noted. Nonetheless, yields were high, averaging 1,931 dozen/acre.

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Introduction

Callisto (mesotrione) is a new grass herbicide for use in sweet corn. It is labeled for both PRE and POST application. Excellent control of most broadleaves is obtained, with the exception of purslane and common ragweed. Its efficacy can be extended by tank mixing with Dual and/or AAtrex. In 2005 we applied alone, or in combination, Callisto, Dual II Magnum, and AAtrex 4L to Precious Gem sweet corn grown on a Clarion loam soil at the Horticulture Station, Gilbert, IA. The normal Callisto rate is 6 oz/acre PRE or no more than two 3 oz/acre applications as POST. Our highest POST application of Callisto was 12 oz/acre, 6 oz on June 22 and 6 oz on June 29, 2005. Injury to sweet corn, in form of bleaching of 10% of leaves, on July 7 was noted. Nonetheless, yields were high, averaging 1,931 dozen/acre. For complete details of the 2005 study as well as the research results at Muscatine see: http://www.public.iastate.edu/~taber/Extension/Progress%20Rpt%2005/Contents05.htm

Our objective for 2006 was to evaluate Callisto carryover injury potential to seeded snap beans and transplanted cucurbits.

Material and Methods

This experiment followed a crop of sweet corn treated with various herbicide combinations, both PRE and POST, of Callisto, Dual, and AAtrex applied in June 2005. The soil type was a Clarion loam with a CEC of 13, a pH of 6.5, and organic matter content of 2.3% located at the Horticulture Station, Ames, IA. After sweet corn harvest in 2005 the soil was not disturbed until spring 2006. A light disking was done to destroy sweet corn stalk residue and early weeds, and then the site rotovated 8 in. deep just prior to establishing the crops. Nitrogen at 60 lb/acre as urea was rotovated in just prior to planting. No herbicide was applied in 2006.

The tilled ground was seeded with Strike snap beans on May 16. Black plastic was laid for the vine crops. Cucumber (Turbo) was direct seeded on May 24. Watermelon (Crimson Sweet) and muskmelon (Eclipse) were transplanted through black plastic mulch on May 24. Irrigation was applied by overhead sprinkler to provide 1¼ in. per week if rainfall did not supply that amount. Tensiometers were used to monitor soil moisture.

Results and Discussion

Injury was noted at germination for both snap beans and cucumbers (stunted, chlorotic new leaves) from the 6 oz and 12 oz POST Callisto rate (treatments 8 and 10) (Table 1). Treatment 8, in addition to two 3 oz POST Callisto applications, contained AAtrex as a PRE. No symptoms were evident with 6 oz Callisto alone (treatment 6). Injury symptoms remained on snap beans until harvest while cucumbers improved growth by late June. Muskmelon transplants, compared with the control, also showed a stunting and leaf margin whitening until about July 1 when no further injury symptoms were noted. Watermelon did not show visible injury symptoms at any stage of growth.

All treatments were once-over harvested when the control treatment (No. 1) reached maturity. Snap bean growth, expressed as vine weight, was highest in the control treatment and lowest from the highest Callisto application. Weight of harvested beans was <½ that of the control with

the two 6 oz Callisto POST application (No. 10), but because of high variability of the data among the three reps the results were not different.

Cucumber plants showed visible injury to herbicide carryover (No. 8 and 10). The vine growth and fruit data indicate reduction in growth (Table 2). Treatments with at least 6 oz POST Callisto (No. 6, 8, and 10) had fewer fruit than the control, and fruit size was greatly reduced by the two 6 oz Callisto POST applications (No. 10). Muskmelon and watermelon showed the least visible injury symptoms and fruit data indicated little difference among the herbicide treatments.

Conclusion

Follow the label directions! The label restricts rotational crops of small grains to 6 months, potatoes and sweet corn to 10 months, and peas, snap beans, and cucurbits and some other crops to 18 months after the last Callisto application. Our one-year results showed that even at recommended rates and application timing, injury occurred to snap beans and cucumbers.

Table 1. Snap bean yield, fresh weight basis, per 100 ft of row as the result of herbicide residual from 2005 application to sweet corn. Dual II Magnum applied at 2 pt/acre PRE to all treatments.

Treatment	Rate/acre	Timing[1]	Plant density	Vine wt.	Fruit wt.
				--- lb/100 ft ---	
1. Control, Dual II Magnum	2 pt	Pre	792	287 A[2]	143
6. Callisto	3 oz	PO1, 2	733	213 AB	128
7. Callisto	5 oz	Pre	775	204 AB	87
+ AAtrex	2 pt	Pre			
+ Callisto	2.7 oz	PO2			
8. AAtrex	2 pt	Pre	675	255 AB	123
+ Callisto	6 oz	PO1			
10. Callisto	6 oz	PO1,2	683	168 B	71

[1]Pre=preemergence application on June 9, 2005 just before seeding sweet corn, PO1=June 22, PO2=June 29.
[2]Yield values within a column followed by the same letter are not different from one another, 5% level of significance.

Table 2. Cucumber, muskmelon, and watermelon yield, single plant basis, as the result of herbicide residual from 2005 application to sweet corn. Dual II Magnum applied at 2 pt/acre PRE to all treatments. Treatment numbers correspond to identification in Table 1.

	Cucumbers			Muskmelon		Watermelon	
Treatment	Fruit no.	Vine wt.	Fruit size	Total wt.	Fruit size	Total wt.	Fruit size
		(lb)	(oz each)	(lb)	(lb each)	(lb)	(lb each)
1.	11.7 A[1]	4.8	3.4 A	14.7 AB	3.9	36.7	18.4 B
6.	5.3 BC	4.5	2.2 AB	10.2 B	3.0	49.1	20.7 AB
7.	8.7 AB	3.7	3.4 A	14.1 AB	3.6	45.1	22.6 A
8.	4.7 BC	2.7	2.3 AB	15.7 AB	5.5	48.1	19.7 AB
10.	2.3 C	2.3	0.8 C	18.7 A	4.6	34.3	21.6 AB

[1]Yield values within a column followed by the same letter are not different from one another, 5% level of significance.