PR # 9700 Flumioxazin

Herbicide Evaluation in Newly-Planted Caneberries – Blackberry and Raspberry

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An experiment was conducted in 2006 to evaluate various herbicides on newly-planted blackberry and raspberry. This project was funded by IR-4 and this report constitutes the final report of this experiment. The purpose of this experiment was to evaluate currently-available herbicides known for their residual effectiveness or their safety on other small fruits, as potential herbicides suitable for registration in bramble production. Another purpose of this experiment was to evaluate the herbicides on newly-transplanted caneberries instead of bearing established plants, in response to grower needs and desired uses, if and when the herbicides are registered.

Materials and Methods

The experiment consisted of 6 herbicides, 3 replications, and 2 caneberry cultivars. The experimental design was a Randomized Complete Block Design with the herbicides as the only factor. The same design was repeated for the 2 caneberries and were considered as separate experiments. Plots consisted of 2 plants per plot. Plot size was 6 ft wide by 4 ft long, long enough to fit 2 plants per plot.

The herbicide treatment list is presented in the following table.

Trt No.	Treatment Name	Form Conc	Form Type	Rate	Rate Unit	Appl. Stage
1	Callisto	4	SC	0.18	lb ai/a	PRE
2	Callisto	4	SC	0.092	lb ai/a	OTT
3	Callisto	4	SC	0.092	lb ai/a	POST
4	Chateau	51	WG	0.383	lb ai/a	PRE
5	Chateau	51	WG	0.191	lb ai/a	POST
6	Matrix	25	WG	0.015	lb ai/a	PRE

Caneberries were hand transplanted on March 29, 2006. Preemergence (PRE) and over-the-top (OTT) treatments were applied on April 13, 2006. OTT treatments were applied as a broadcast foliar application with no intention to avoid spraying the plants. Plants have started to leaf out at time of OTT application. Postemergence (POST) treatments were applied on June 13, 2006 as a directed application.

Treatments were applied using a 2-nozzle shielded boom equipped with 11002 Teejet nozzles set to deliver 20 gpa at 30 psi. At 8" height of the nozzles above the ground, this 2 nozzle boom can spray a band width of 3 ft with very little drift outside the shield cones.

Plants were irrigated and fertilized per University of Kentucky's recommendations for growing brambles. No fungicides or insecticides were applied in the duration of this study.

Plots were rated for visual injury and for weed control effectiveness at 11, 39, and 61 days after PRE and OTT treatments, and at 10 days after POST treatments. At 42 days after POST treatments, plants were cut at soil level and fresh weight measured.

Weed control and crop injury are rated on a 1 to 10 scale; 1 = no visible injury or reduction in growth; 10 = complete kill of plants. The ratings can be roughly translated into percentages as follows:

10 = 100% kill, all the plants are dead or none are visible.
9 = 90-100% kill or reduction in growth and stand.
8 = 80-90% kill or reduction in growth and stand.
7 = 70-80% kill or reduction in growth and stand. This is still commercially acceptable.
6 = 60-70% kill or reduction in growth and stand.
5 = 50% kill or reduction in growth and stand.
4 = 30-40% kill or reduction in growth and stand.
3 = 20-30% reduction in growth and stand.
2 = 10-20% reduction in growth and stand.
1 = 0-10% reduction in growth, no obvious effect of herbicide.

Results

The following table lists the blackberry visual injury ratings taken at various dates after PRE/OTT and POST application and the plant weight taken at 42 days after POST application.

Callisto 0.092 lb ai applied OTT had the highest level of injury on blackberry up to 39 days after PRE. This injury was significantly higher than all other treatments, including Callisto 0.18, Chateau 0.38, and Matrix 0.015 lb ai applied PRE. This initial injury from OTT application of Callisto continued through plant harvest (about 110 days after application), with plants averaging 46 g. Callisto applied as a directed spray application PRE at 0.18 lb ai or POST at 0.092 lb ai, had no visual injury symptoms on blackberries, nor did it affect plant biomass at harvest.

The best plant growth (in terms of plant weight at harvest) was observed with Chateau 0.38 PRE and Chateau 0.19 PRE, with little visual injury observed throughout the season. Matrix 0.015 lb ai also had little injury and growth comparable to other treatments, except for OTT.

BLACKBERRY				PRE RATINGS			POST RATINGS	
				RATING 4/24/2006 11 DAT	RATING 5/22/2006 39 DAT	RATING 6/13/2006 61 DAT	RATING 6/23/2006 10 DAT	PLANT WEIGHT (G) 7/25/2006 42 DAT
Trt No.	Treatment Name	Rate Lb ai/A						
1	Callisto	0.18	PRE	2	2	1	1	117
2	Callisto	0.092	OTT	5.2	6	3	4	46
3	Callisto	0.092	POST	NA	NA	NA	1	182
4	Chateau	0.383	PRE	2.5	4	2	1	334
5	Chateau	0.191	POST	NA	NA	NA	1	238
6	Matrix	0.015	PRE	2.7	3	2	1	194
			LSD (P=.05)	1.15	2.8	2.3	2	163.7
			Standard Deviation	0.63	1.5	1.3	1.1	90
			CV	21.82	46.24	87.04	71.37	48.62

The following table lists the raspberry visual injury ratings taken at various dates after PRE/OTT and POST application and the plant weight taken at 42 days after POST application.

Overall, more injury was observed on raspberry with all treatments compared to those in the previous table on blackberry. In addition, all PRE and OTT treatments appear to have resulted in more significant plant injury than the POST treatments. The best treatment was Matrix 0.015 lb ai applied PRE. Chateau 0.38 lb ai applied PRE was worse than the PRE treatment of Chateau. Callisto 0.092 POST resulted in about 4 times more plant biomass than the OTT treatment at the same rate. The high rate of Callisto 0.18 lb ai appear to be better than the lower rate of 0.092 lb ai applied OTT.

It appears that OTT application of Callisto is not suitable for blackberry or raspberry.

RASPBERRY				PRE RATINGS			POST RATINGS	
				RATING 4/24/2006 11 DAT	RATING 5/22/2006 39 DAT	RATING 6/13/2006 61 DAT	RATING 6/23/2006 10 DAT	PLANT WEIGHT (G) 7/25/2006 42 DAT
Trt No.	Treatment Name	Rate Lb ai/A						
1	Callisto	0.18	PRE	5	8	7	7	19
692 – 2	Callisto	0.092	OTT	6	8	7	7	6
3	Callisto	0.092	POST	NA	NA	NA	5	23
700 – 4	Chateau	0.383	PRE	9	10	8	8	10
5	Chateau	0.191	POST	NA	NA	NA	4	27
7661 – 6	Matrix	0.015	PRE	2	2	1	2	51
			LSD (P=.05)	3.3	4.5	5.5	5.2	25.9
			Standard Deviation	1.8	2.4	3	2.9	14.3
			CV	33.58	41.56	61.34	53.74	62.41

The following table presents the effectiveness of the various treatments on control weeds in the plots. The cleanest plots were obtained with the high rate of Chateau 0.38 lb ai applied PRE, with 100% weed-free plots 71 days after application, when the last rating was taken. Callisto PRE or OTT had very good weed control in the first 2 weeks after application, but lost its effectiveness by 39 days after application when the 2nd rating was taken. Callisto had better control of broadleaves (including velvetleaf) than grasses, a fact supported by its label information. On 6-23-06, or about 70 days after PRE, Chateau 0.38 PRE had better overall weed control than Chateau 0.19 POST.

WEEDS = GRASSES + BROADLEAVES BL = BROADLEAVES				PRE RATINGS			POST RATINGS	
				WEEDS 4/24/2006 11 DAT	WEEDS 5/22/2006 39 DAT	GRASS 6/13/2006 61 DAT	GRASS 6/23/2006 10 DAT	BL 6/23/2006 10 DAT
Trt No.	Treatment Name	Rate Lb ai/A						
1	Callisto	0.18	PRE	8	3	2	1	7
2	Callisto	0.092	OTT	8	3	2	1	8
3	Callisto	0.092	POST	NA	NA	NA	5	10
4	Chateau	0.383	PRE	10	10	9	10	10
5	Chateau	0.191	POST	NA	NA	NA	7	10
6	Matrix	0.015	PRE	10	6	2	4	10
			LSD (P=.05)	5.1	5.7	2.4	1.8	3.8
			Standard Deviation	2.8	3.1	1.3	1	2.1
			CV	35.83	69.92	41.97	21.78	23.17

In conclusion, all 3 herbicides evaluated (Callisto, Chateau, and Matrix) appear to have a great potential for use in blackberries and raspberries both as a PRE and POST treatments, but not as an over-the-top treatment.