

Project No: 13C 3419 5229

Title: Perennial Weed Control in Blueberries

Reporting Period: FY 2005-06

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Accomplishments: Two studies were conducted in 2005-06: a herbicide screen, and a comparison of four management systems for controlling established perennial weeds in blueberries. These systems were (1) an organic system, (2) a low herbicide input system, (3) a high herbicide input system, and (4) a combination conventional/organic system.

Results:

Herbicide Screen: Blueberries were treated with directed sprays of several herbicides April 20, 2005. Tested products were Chateau, Prowl H₂O, Outlook, Dual Magnum, Spartan, Axiom, Callisto, Sandea, Matrix, Matrix + Karmex, and Sinbar. No products caused obvious injury to any of the cultivars tested, indicating that all products show promise for registration in blueberry. The purpose of this trial was primarily to gain insight on crop safety; weed control was excellent for all treatments, but since the block was not highly infested, there were no significant differences between the tested herbicides. Of these products, Syngenta is actively investigating Callisto for registration and Sandea is an A priority for IR4 residue trials in 2006.

Management System Trial: 'Elliott' was used in the first iteration of this two-year trial (which concluded in 2004) and 'Nelson' was used in the second iteration (which concluded in 2005). Each plot included one row of blueberry bushes and was 30 feet long. Specified plots received initial sawdust mulch and diuron application, pine oil, flame, Stinger, or Roundup. Berries were picked by hand twice each year in 'Elliott' plots and three times each year in 'Nelson' plots.

Yield data differed significantly between blueberry varieties, so data are presented separately for the two trials (Tables 2 and 3). Weed cover differed significantly between the two varieties, so data are presented separately for 'Elliott' and 'Nelson' trials (Tables 4 and 5).

There were no significant differences in blueberry yield or fruit size between systems for 'Elliott' during either year or for the two-year average yield parameters (Table 2). Increasing herbicide inputs did not result in significantly more or larger fruit, although those trends were apparent in the data. Perhaps more importantly, it did not appear that any system caused reductions in fruit yield or size during the either year of implementation.

The 'Nelson' yield data was also similar between treatments, except for the third pick fruit weight of 2004 which was reduced with high herbicide and combination programs compared to the low herbicide program, and the two-year average fruit weight in the high herbicide program producing significantly less fruit than the low herbicide program (Table 3). Fruit size did not significantly vary among treatments.

Weed cover did not greatly differ between systems. In 'Elliott', Canada thistle cover increased in organic plots during the study, but decreased or stayed roughly the same in all other programs (Table 4). Field horsetail cover during the first season was greatest in the high herbicide system for both iterations, but cover in the second year did not differ. This likely resulted because none of the herbicides in that system used to date (diuron, Stinger, or Roundup) typically provide much control of that field horsetail. By the second year, field horsetail had been reduced to less than 10% cover in all programs. Other perennials and seedling/annual weeds were not generally a problem in 'Elliott', accounting for less than 10% cover in all programs in both years. There was a trend, however, toward increasing populations of these weeds in organic plots.

Growth of Canada thistle and other established perennials was reduced in herbicide systems during the first year in 'Nelson' plots compared to the organic program, but there was no difference in cover of annual weeds (Table 5). Canada thistle cover was the same or reduced in all programs over the two years, with the largest reduction occurring in organic plots (from 25% to 13% cover in fall of year 1 to summer of year 2, respectively). Field horsetail cover did not change much between years, except in the high herbicide program where the population decreased from 20% to 8% from year 1 to year 2. The cover of other perennial weeds were generally reduced in the organic program over the same time program, but they still constituted 30% cover in that system, and 27% cover in the combination program by August of the second year.

Appendix. Data tables.

Table 1. Blueberry yield and fifty-berry weights blueberry for four weed control systems in ‘Elliott’.

Treatment	Yield			Fifty-berry weights		
	1 st pick	2 nd pick	total	1 st pick	2 nd pick	Average
	kg/plot	kg/plot	kg/plot	g/50 berries	g/50 berries	g/50 berries
2003 Pick						
Organic	7.06	6.60	13.67	70.7	61.7	66.2
Low herbicide	6.21	8.00	14.21	72.7	65.0	68.8
High herbicide	7.38	8.67	16.04	75.7	62.3	69.0
Combination	6.33	5.91	12.24	76.3	57.0	66.7
LSD _{0.05}	ns	ns	ns	ns	ns	ns
2004 Pick						
Organic	10.71	2.14	12.85	69.7	55.7	62.7
Low herbicide	13.22	3.17	16.39	68.0	55.0	61.5
High herbicide	15.04	3.57	18.61	77.7	56.7	67.2
Combination	10.08	1.76	11.84	61.7	58.7	60.2
LSD _{0.05}	ns	ns	ns	ns	ns	ns
Total						
Organic	17.77	8.74	26.51	70.2	58.7	64.4
Low herbicide	19.42	11.18	30.60	70.3	60.0	65.2
High herbicide	22.41	12.24	34.65	76.7	59.5	68.1
Combination	16.41	7.67	24.08	69.0	57.8	63.4
LSD _{0.05}	ns	ns	ns	ns	ns	ns

Table 2. Blueberry yield and fifty-berry weights blueberry for four weed control systems in ‘Nelson’.

Treatment	Yield				Fifty-berry weights			
	1 st pick	2 nd pick	3 rd pick	total	1 st pick	2 nd pick	3 rd pick	Average
	kg/plot	kg/plot	kg/plot	kg/plot	g/50 berries	g/50 berries	g/50 berries	g/50 berries
2004 Pick								
Organic	0.18	4.57	2.89	7.63	79.0	81.3	79.0	79.8
Low herbicide	0.20	4.76	3.82	8.78	71.0	86.7	70.1	76.1
High herbicide	0.24	2.58	1.17	3.99	75.7	84.3	74.7	78.2
Combination	0.20	3.69	1.57	5.45	75.0	83.3	80.3	81.5
LSD _{0.05}	ns	ns	1.84	ns	ns	ns	ns	ns
2005 Pick								
Organic	6.29	1.96	None	8.25	65.8	64.5	None	65.2
Low herbicide	6.24	2.12	None	8.37	57.7	60.1	None	58.9
High herbicide	3.22	0.99	None	4.20	60.9	57.1	None	59.0
Combination	4.23	1.24	None	5.47	67.8	56.0	None	61.9
LSD _{0.05}	ns	ns	---	ns	ns	ns	---	ns
Total								
Organic	6.46	6.53	2.89	15.88	72.4	72.9	79.0	73.9
Low herbicide	6.44	6.89	3.82	17.15	64.4	73.4	70.1	69.2
High herbicide	3.46	3.56	1.17	8.20	68.3	70.7	74.7	70.5
Combination	4.43	4.93	1.57	10.92	70.2	70.0	80.3	72.9
LSD _{0.05}	ns	ns	1.84	7.68	ns	ns	ns	ns

Table 3. Weed control for four weed management systems in ‘Elliott’ blueberries.

Treatment	Canada thistle		Field horsetail		Other perennials		Annuals	
	10/24/03	8/16/04	10/24/03	8/16/04	10/24/03	8/16/04	10/24/03	8/16/04
	% cover	% cover	% cover	% cover	% cover	% cover	% cover	% cover
Organic	25	45	2	8	1	10	2	8
Low herbicide	30	13	18	4	0	0	10	0
High herbicide	10	7	43	4	2	0	2	0
Combination	27	15	5	7	0	3	4	3
LSD _{0.05}	ns	ns	18	ns	ns	ns	ns	ns

Table 4. Weed control for four weed management systems in ‘Nelson’ blueberries.

Treatment	Canada thistle		Field horsetail		Other perennials		Annuals	
	11/19/04	8/31/05	11/19/04	8/31/05	11/19/04	8/31/05	11/19/04	8/31/05
	% cover	% cover	% cover	% cover	% cover	% cover	% cover	% cover
Organic	25	13	25	22	28	30	12	12
Low herbicide	7	3	15	12	8	8	20	8
High herbicide	5	7	20	8	15	8	20	7
Combination	2	0	8	8	30	27	10	22
LSD _{0.05}	ns	ns	ns	ns	16	ns	ns	9