

## Comparing Herbicides For Weed Control In Non-GMO soybeans (Interim Report)

### Purpose:

Poor weed control in food grade non-GMO soybean causes significant losses in grain yield and crop premium. Comparative trials were conducted at multiple locations over multiple years so as to identify weed management programs that consistently provided acceptable weed control.

### Methods:

From 2008 to 2012, common herbicide treatments were applied in a randomized complete block design at 3 different locations across Ontario (Eastern, Central and Southwestern Ontario). Weed efficacy, expressed as a percentage of the un-sprayed control at 4 and 8 weeks after application were collected. Grain yield was also collected

### Results:

**Herbicide rates used in the tables below:** Broadstrike RC (35 g/ac), Classic (14 g/ac), Cleansweep (*Pursuit* at 126 mL/ac and *Basagran Forte* at 0.7 L/ac), Conquest LQ (*Pursuit* at 126 mL/ac and *Sencor* at 250 mL/ac), Dual II Magnum (0.46 L/ac), Fierce (experimental product, rate not available), Frontier Max (390 mL/ac), Prowl H2O (1 L/ac), Pursuit (126 mL/ac), Sencor DF (0.233 kg/ac)

**Table 1: Control of pigweed eight weeks after application of various herbicide treatments at different locations in Ontario from 2008-2012.**

Herbicide Treatment	PIGWEEED CONTROL: (8 weeks)			
	Average Control (%)	Minimum Control (%)	Maximum Control (%)	# of Trials
CLASSIC + VALTERA + PROWL H2O (PRE)	100	100	100	3
CLEANSWEEP + surfactant + 28% UAN (POST)	86	65	100	9
CONQUEST LQ (PRE)	91	58	100	9
CONQUEST LQ + FRONTIER MAX (PRE)	100	98	100	7
CONQUEST LQ + VALTERA (PRE)	99	91	100	12
DUAL II MAGNUM + SENCOR + BROADSTRIKE RC (PRE)	89	50	100	6
DUAL II MAGNUM + SENCOR (PRE)	91	35	100	13
DUAL II MAGNUM + SENCOR + CLASSIC (PRE)	94	45	100	10
DUAL II MAGNUM + SENCOR + FIRSTRATE (PRE)	100	100	100	2
FIERCE (PRE)	100	95	100	10
FIERCE + CLASSIC (PRE)	100	100	100	2
FRONTIER MAX (PRE), CLEANSWEEP (POST)	97	89	100	7
PURSUIT (PRE)	79	29	100	7
PURSUIT + VALTERA (PRE)	97	84	100	7

\*Herbicide treatments highlighted indicate an average control of less than 80%, the efficacy value required for a weed to be listed on an herbicide label as controlled.

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**Table 2: Control of velvetleaf eight weeks after application of various herbicide treatments at different locations in Ontario from 2008-2012.**

Herbicide Treatment	VELVETLEAF CONTROL: (8 weeks)			
	Average Control (%)	Minimum Control (%)	Maximum Control (%)	# of Trials
CLASSIC + VALTERA + PROWL H2O (PRE)	100	99	100	2
CLEANSWEEP + surfactant + 28% UAN (POST)	97	96	98	2
CONQUEST LQ (PRE)	99	99	100	3
CONQUEST LQ + FRONTIER MAX (PRE)	100	100	100	2
CONQUEST LQ + VALTERA (PRE)	100	99	100	5
DUAL II MAGNUM + SENCOR + BROADSTRIKE RC (PRE)	100	100	100	2
DUAL II MAGNUM + SENCOR (PRE)	61	7	100	4
DUAL II MAGNUM + SENCOR + CLASSIC (PRE)	94	87	100	2
DUAL II MAGNUM + SENCOR + FIRSTRATE (PRE)	91	81	100	2
FIERCE (PRE)	84	60	98	5
FIERCE + CLASSIC (PRE)	98	98	98	2
FRONTIER MAX (PRE), CLEANSWEEP (POST)	92	89	94	2
PURSUIT (PRE)	99	99	99	1
PURSUIT + VALTERA (PRE)	100	100	100	1

\*Herbicide treatments highlighted indicate an average control of less than 80%, the efficacy value required for a weed to be listed on an herbicide label as controlled.

**Table 3: Control of lamb's-quarter eight weeks after application of various herbicide treatments at different locations in Ontario from 2008-2012.**

Herbicide Treatment	LAMB'S-QUARTER CONTROL (8 weeks)			
	Average Control (%)	Minimum Control (%)	Maximum Control (%)	# of Trials
CLASSIC + VALTERA + PROWL H2O (PRE)	95	80	100	6
CLEANSWEEP + surfactant + 28% UAN (POST)	81	40	97	12
CONQUEST LQ (PRE)	90	16	100	12
CONQUEST LQ + FRONTIER MAX (PRE)	88	35	100	10
CONQUEST LQ + VALTERA (PRE)	96	56	100	19
DUAL II MAGNUM + SENCOR + BROADSTRIKE RC (PRE)	94	70	100	9
DUAL II MAGNUM + SENCOR (PRE)	78	25	100	18
DUAL II MAGNUM + SENCOR + CLASSIC (PRE)	90	45	100	13
DUAL II MAGNUM + SENCOR + FIRSTRATE (PRE)	83	45	99	5
FIERCE (PRE)	84	0	100	18
FIERCE + CLASSIC (PRE)	93	67	100	5
FRONTIER MAX (PRE), CLEANSWEEP (POST)	95	72	100	10
PURSUIT (PRE)	92	73	100	8
PURSUIT + VALTERA (PRE)	98	92	100	8

\*Herbicide treatments highlighted indicate an average control of less than 80%, the efficacy value required for a weed to be listed on an herbicide label as controlled.

**Table 4: Control of common ragweed eight weeks after application of various herbicide treatments at different locations in Ontario from 2008-2012.**

Herbicide Treatment	COMMON RAGWEED CONTROL (8 weeks)			
	Average Control (%)	Minimum Control (%)	Maximum Control (%)	# of Trials
CLASSIC + VALTERA + PROWL H2O (PRE)	88	68	100	3
CLEANSWEEP + surfactant + 28% UAN (POST)	82	75	85	4
CONQUEST LQ (PRE)	88	49	100	6
CONQUEST LQ + FRONTIER MAX (PRE)	81	48	100	5
CONQUEST LQ + VALTERA (PRE)	93	78	100	10
DUAL II MAGNUM + SENCOR + BROADSTRIKE RC (PRE)	91	65	100	4
DUAL II MAGNUM + SENCOR (PRE)	74	18	100	9
DUAL II MAGNUM + SENCOR + CLASSIC (PRE)	89	72	100	5
DUAL II MAGNUM + SENCOR + FIRSTRATE (PRE)	62	33	100	3
FIERCE (PRE)	71	20	100	12
FIERCE + CLASSIC (PRE)	94	86	100	3
FRONTIER MAX (PRE), CLEANSWEEP (POST)	87	68	95	4
PURSUIT (PRE)	80	50	100	3
PURSUIT + VALTERA (PRE)	99	97	100	3

\*Herbicide treatments highlighted indicate an average control of less than 80%, the efficacy value required for a weed to be listed on an herbicide label as controlled.

**Table 5: Control of green foxtail eight weeks after application of various herbicide treatments at different locations in Ontario from 2008-2012.**

Herbicide Treatment	GREEN FOXTAIL CONTROL (8 weeks)			
	Average Control (%)	Minimum Control (%)	Maximum Control (%)	# of Trials
CLASSIC + VALTERA + PROWL H2O (PRE)	94	80	100	6
CLEANSWEEP + surfactant + 28% UAN (POST)	72	0	100	12
CONQUEST LQ (PRE)	84	0	100	12
CONQUEST LQ + FRONTIER MAX (PRE)	95	81	100	10
CONQUEST LQ + VALTERA (PRE)	91	48	100	17
DUAL II MAGNUM + SENCOR + BROADSTRIKE RC (PRE)	96	80	100	6
DUAL II MAGNUM + SENCOR (PRE)	93	64	100	16
DUAL II MAGNUM + SENCOR + CLASSIC (PRE)	94	72	100	13
DUAL II MAGNUM + SENCOR + FIRSTRATE (PRE)	93	76	100	5
FIERCE (PRE)	87	60	100	12
FIERCE + CLASSIC (PRE)	96	88	100	5
FRONTIER MAX (PRE), CLEANSWEEP (POST)	97	90	100	10
PURSUIT (PRE)	84	66	100	7
PURSUIT + VALTERA (PRE)	96	84	100	7

\*Herbicide treatments highlighted indicate an average control of less than 80%, the efficacy value required for a weed to be listed on an herbicide label as controlled.

**Table 6: Control of eastern black nightshade eight weeks after application of various herbicide treatments at different locations in Ontario from 2008-2012.**

Herbicide Treatment	NIGHTSHADE CONTROL (8 weeks)			
	Average Control (%)	Minimum Control (%)	Maximum Control (%)	# of Trials
CLASSIC + VALTERA + PROWL H2O (PRE)	85	78	91	2
CLEANSWEEP + surfactant + 28% UAN (POST)	50	0	100	2
CONQUEST LQ (PRE)	50	0	100	2
CONQUEST LQ + FRONTIER MAX (PRE)	84	67	100	2
CONQUEST LQ + VALTERA (PRE)	90	83	97	2
DUAL II MAGNUM + SENCOR + BROADSTRIKE RC (PRE)	59	29	89	2
DUAL II MAGNUM + SENCOR (PRE)	57	48	65	2
DUAL II MAGNUM + SENCOR + CLASSIC (PRE)	53	29	77	2
DUAL II MAGNUM + SENCOR + FIRSTRATE (PRE)	44	0	88	2
FIERCE (PRE)	97	94	99	2
FIERCE + CLASSIC (PRE)	98	95	100	2
FRONTIER MAX (PRE), CLEANSWEEP (POST)	92	83	100	2

\*Herbicide treatments highlighted indicate an average control of less than 80%, the efficacy value required for a weed to be listed on an herbicide label as controlled.

### Summary:

- One should budget between \$70-80/ac in herbicide costs to account for failures in weed control performance that require re-spraying.
- A two-pass herbicide program that begins with a pre-emergence herbicide followed by a post-emergent herbicide has provided the most consistent level of weed control.
- Due to the occurrence of herbicide resistant weeds at many of the trial locations, herbicide programs that have 3 or more modes of action have often been the most effective at providing acceptable weed control.
- Fields with high populations of Eastern Black Nightshade should be avoided for the growing of food grade, non GMO soybeans as 100% control of the species is needed to mitigate the risk of staining and these trials have yet to identify a herbicide treatment that provides 100% control of Eastern Black Nightshade.

### Next Steps:

The series of experiments will continue in 2013.

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