

Economics of Commercial Weed Control Programs in Corn, 2010 Wesley J. Everman

A field trial was conducted in corn in 2010 at the MSU Research Farm in East Lansing to compare weed control, corn injury, corn yield, and economic returns of dominant weed control programs being marketed to Michigan growers. Each major herbicide company was asked to submit up to four weed control programs for the studies based on soil type and weed infestation history. Site characteristics and herbicide application timings are described in Table 1. Table 2 describes the herbicide programs selected by each company for 2010. Herbicide programs are sorted by application timing and the need for glufosinate- or glyphosate-resistant seed. Within 3 days after planting and application of the preemergence herbicides the site received 1.45 inches of rain resulting in excellent incorporation of the herbicides and good start to corn emergence. This study was planted in early May. The high level of moisture early in the season helped reduce the effects of early season weed competition. Yield loss due to weeds was minimal and was highest where grass weeds germinated later in the season and were allowed to compete. The high levels of soil moisture resulted in excellent activity of residual herbicides early, however later in the season many treatment resulted in late-season grass escapes. There was only five treatments providing greater than 90% control of all species in August. Treatments containing herbicides with a residual component did tend to yield among the highest. The maximum corn yield was 218 bu/A, and the weedy (non-treated) yield was 41 bu/A, resulting in a yield loss of 177 bu/A (81%). Table 3 contains the actual data for corn injury, weed control, herbicide program costs, corn yield, and economic returns. Overall there were few differences in treatments, with the greatest differences observed based upon residual activity of the herbicides used.

Table 1. Site description.

Crop	Corn
Variety	Pioneer 37Y14 (RR/LL)
Soil Texture	Sandy loam
Soil pH	6.5
Soil Organic Matter	3.5
Dominant Weeds	AMBEL, SETFA, CHEAL, AMAPO, ABUTH
Number of Replications	6
Planting Date	May 4
Application Timings:	
PRE	May 4
Early POST (EP)	May 28
Mid-POST (MP)	June 4
Late-POST (LP)	June 10
Evaluation Time	7d after MP (injury) 77 d (weed control)

Abbreviations: AMBEL = c. ragweed, SETFA = giant foxtail, CHEAL = c. lambsquarters, AMAPO = pigweed (mixture of redroot & Powell), ABUTH = velvetleaf.

Table 2. Commercial corn herbicide programs selected by companies in 2010.

<i>Conventional</i>	<i>Treatments (Rate/A)</i>	<i>Abbreviated Form</i>
PRE	BreakFree ATZ (2.2 qt) + Resolve (1 oz) Lumax (3 qt) + Atrazine (1 qt)	BreakFree ATZ + Resolve Lumax + Atrazine
PRE/MPOS	Bicep Lite II Magnum (1.6 pt) fb Impact (0.75 fl oz) + Atrazine (0.5 qt) + MSO (1 %) + UAN 28% (2.5 %)	Bicep Lt fb Impact + Atrazine
MPOS	Guardman Max (4 pt) fb Status (5 oz) + Activator 90 (0.25 %) + AMS (17 lb) Capreno (3 fl oz) + Atrazine (1 qt) + Herbimax (1%) + UAN 28% (1.5 qt) Laudis (3 fl oz) + Atrazine (2 qt) + MSO (1 %) + UAN 28% (1.5 qt) Steadfast Q (1.5 oz) + Atrazine (1 qt) + Status (2.5 oz) + Herbimax (1 %) + AMS (2 lb)	GMax fb Status Capreno + Atrazine Laudis + Atrazine Steadfast Q + Atra + Status
Liberty Link		
MPOS	Ignite (22 fl oz) + Atrazine (1.5 qt) + AMS (3 lb)	Ignite + Atrazine
POST (2-pass)	Ignite (22 fl oz) + AMS (8.5 lb) MP fb Ignite (22 fl oz) + AMS (8.5 lb) LP	Ignite fb Ignite
Roundup Ready		
PRE/EPOS	SureStart (1.75 pt) fb Durango DMA (24 fl oz) + AMS (2 %)	SureStart fb Durango (EP)
PRE/MPOS	Bicep II Magnum (1.1 qt) fb Halex GT (3.6 pt) + Activator 90 (0.25 %) + AMS (8.5 lb) Bicep II Magnum (1.6 pt) fb Impact (0.5 fl oz) + Roundup PowerMAX (22 fl oz) + AMS (8.5 lb) Degree Xtra (2 qt) fb Roundup PowerMAX (22 fl oz) + AMS (17 lb) Guardman Max (2.5 pt) fb Status (2.5 oz) + Roundup PowerMAX (22 fl oz) + AMS (17 lb) Harness Xtra 5.6 (1.5 qt) fb Roundup PowerMAX (22 fl oz) + AMS (17 lb) Harness Xtra 5.6 (1 qt) fb Yukon (4 oz) + Roundup PowerMAX (22 fl oz) + Activator 90 (0.125 %) + AMS (17 lb) Integrity (16 oz) fb Roundup PowerMAX (22 fl oz) + AMS (17 lb) Resolve (1 oz) + Atrazine (0.75 qt) fb Roundup PowerMAX (22 fl oz) + AMS (17 lb)	Bicep Mag fb Halex Bicep Mag fb Impact + RPM Degree Xtra fb RupPM GMax fb Status + RupPM Harness Xtra fb RupPM Harness Xtra fb Yukon + RPM Integrity fb RupPM Resolve + Atra fb RupPM
PRE/LPOS	SureStart (1.75 pt) fb Durango DMA (24 fl oz) + AMS (2 %)	SureStart fb Durango (LP)
EPOS	Harness Xtra (1.5 qt) + Roundup PowerMAX (22 fl oz) + AMS (17 lb) Resolve Q (1 oz) + Atrazine (0.75 qt) + Roundup PowerMAX (22 fl oz) + AMS (17 lb)	Harness Xtra + RupPM Resolve Q + Atra + RupPM
MPOS	Callisto Xtra (24 oz) + Touchdown Total (24 oz) + AMS (8.5 lb) + Activator 90 (0.25%) Halex GT (3.6 pt) + AMS (8.5 lb) + Activator 90 (0.25%) Prowl H2O (2 pt) + Status (2.5 oz) + Roundup PowerMAX (22 fl oz) + AMS (17 lb)	Callisto Xtra + TDown Halex GT Prowl + Status + RupPM
POST (2-pass)	Roundup PowerMax (22 fl oz) + AMS (17 lb) – EP fb. MP	RupPM (EP) fb. RupPM (MP)

Table 3. Corn injury, weed control, program costs, corn yield, and economic returns for 26 herbicide programs in 2010.

Programs	Herbicide Treatments	Corn injury	SETFA	CHEAL	AMAPO	AMBEL	ABUTH	All Weeds	Costs ¹	Yield	Economic Returns ²
		(%)	----- % control-----					(≥90%)	(\$/A)	(bu/A)	(\$/A)
Conventional											
PRE	BreakFree ATZ + Resolve	1	98	91	100	77	85	NO	\$40.03	209*	\$1088.57*
	Lumax + Atrazine	0	97	93	100	77	100	NO	\$54.67	208*	\$1068.53*
PRE/MPOS	Bicep Lt fb Impact + Atrazine	0	84	84	100	72	73	NO	\$40.77	210*	\$1093.23*
	GMax fb Status	0	98	84	100	81	96	NO	\$57.65	205*	\$1049.35
MPOS	Capreno + Atrazine	0	88	100	100	100	100	NO	\$31.36	206*	\$1081.04*
	Laudis + Atrazine	0	83	100	100	99	100	NO	\$34.21	210*	\$1099.79*
	Steadfast Q + Atrazine + Status	0	95	100	100	99	100	YES	\$36.22	202	\$1054.58
Liberty Link											
MPOS	Ignite + Atrazine	0	82	100	100	93	100	NO	\$25.43	206*	\$1086.97*
POST (2-pass)	Ignite fb Ignite	0	96	92	100	86	100	NO	\$36.96	207*	\$1080.84*
Roundup Ready											
PRE/EPOS	SureStart fb Durango (EP)	2	84	84	98	73	98	NO	\$39.90	208*	\$1085.10*
PRE/MPOS	Bicep Mag fb Halex	0	100	100	100	97	100	YES	\$50.20	212*	\$1094.60*
	Bicep Mag fb Impact + RupPM	0	98	89	99	93	99	NO	\$40.10	205*	\$1066.90*
	Degree Xtra fb RupPM	0	100	81	100	77	99	NO	\$39.78	212*	\$1105.02*
	GMax fb Status + RupPM	0	100	83	100	82	99	NO	\$45.77	203*	\$1050.43
	Harness Xtra fb RupPM	0	98	78	100	82	100	NO	\$38.16	211*	\$1101.24*
	Harness Xtra fb Yukon + RPM	0	93	94	100	97	100	YES	\$43.27	199	\$1031.33
	Integrity fb RupPM	0	95	80	98	70	97	NO	\$46.27	200	\$1033.73
	Resolve + Atrazine fb RupPM	2	92	72	98	84	98	NO	\$33.08	204*	\$1068.52*
PRE/LPOS	SureStart fb Durango (LP)	1	99	92	99	88	100	NO	\$35.84	209*	\$1092.76*
EPOS	Harness Xtra + RupPM	8	100	95	100	86	100	NO	\$30.16	198	\$1039.04
	Resolve Q + Atrazine + RupPM	1	93	91	100	93	100	YES	\$24.87	210*	\$1109.13*
MPOS	Callisto Xtra + Tdown	0	86	100	100	100	100	NO	\$30.27	216*	\$1136.13*
	Halex GT	0	95	93	98	91	100	YES	\$31.19	208*	\$1092.01*
	Prowl + Status + RupPM	0	95	96	98	87	98	NO	\$31.24	214*	\$1124.36*
POST (2-pass)	RupPM (EP) fb. RupPM (MP)	2	77	76	90	73	90	NO	\$29.97	218*	\$1147.23*
	Non-treated	0	0	0	0	0	0	NO	--	41	\$221.40

Abbreviations: SETFA = giant foxtail, CHEAL = c. lambsquarters, AMAPO = pigweed, AMBEL = c. ragweed, ABUTH = velvetleaf, fb. = followed by.

¹Herbicide and additive costs = avg. of price lists (April 2010); Application cost = \$8.00/A; Roundup Ready seed premium = \$8.25/A; seeding rate = 30,000 seeds/A. Weed control costs = Herbicide \$ + Additive \$ + Application \$ + seed premium \$ (where applicable).

²Crop selling price = \$5.40/bu (December 2010). Economic return = (Yield x Price) – Weed Control Costs.

* Values are not significantly different from the highest value within that column.