

Economics of Commercial Weed Control Programs in Corn, 2007 Christy L. Sprague and Jim Kells

A field trial was conducted in corn in 2007 at the MSU Research Farm in E. 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 2007. Herbicide programs are sorted by application timing and the need for glyphosate-resistant seed. Within 5 days after planting and application of the preemergence herbicides the site received 0.75 inch of rain. Yield loss due to weeds was extremely high. The maximum corn yield was 203 bu/A and the weedy (untreated) yield was 75 bu/A, resulting in a yield loss of 128 bu/A (62%). Table 3 contains the actual data for corn injury, weed control, herbicide program costs, corn yield, and economic returns.

Table 1. Site description.

Crop	Corn
Variety	Pioneer 38B86
Soil Texture	Sandy loam
Soil pH	6.5
Soil Organic Matter	3.3
Dominant Weeds	SETFA, CHEAL, AMAPO, ABUTH
Number of Replications	6
Planting Date	May 8
Application Timings:	
PRE	May 8
Early POST (EP)	May 24
Mid-POST (MP)	June 1
Late-POST (LP)	June 11
Evaluation Time	7d after MP
	90 d (weed control)

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

Table 2. Commercial corn herbicide programs selected by companies in 2007.

<i>Conventional</i>	<i>Treatments (Rate/A)</i>	<i>Abbreviated Form</i>
PRE	Lexar (3.5 qt)	Lexar
	Keystone (2.4 qt) + Hornet (3 oz)	Keystone + Hornet
	BreakFree ATZ (2.6 qt) + Resolve (1 oz)	BreakFree ATZ + Resolve
	Lumax (2.5 qt) + Atrazine (1 qt)	Lumax + Atrazine
PRE/MPOS	Bicep Lite II Magnum (1.5 pt) fb. Impact (0.5 fl oz) + Atrazine (1 pt) + MSO (1%) + 28% N (0.5 gal)	Bicep Lt fb. Impact + Atrazine
	Atrazine (1.5 qt) fb. Option (1.5 oz) + Yukon (4 oz) + MSO (1.5 pt) + AMS (3.3 lb)	Atrazine fb. Option + Yukon
	GuardsmanMax (4 pt) fb. Status (5 oz/A) + Activator 90 (0.25%) + AMS (1 lb)	GMax fb. Status
	Keystone (1.8 qt) fb. Yukon (4 oz) + COC (1%)	Keystone fb. Yukon
<i>Liberty Link</i>		
PRE/MPOS	Define (12 fl oz) fb. Liberty (32 fl oz) + Atrazine (1 pt) + AMS (3 lb)	Define fb. Liberty + Atrazine
MPOS	Liberty (32 fl oz) + Atrazine (1 qt) + AMS (3 lb)	Liberty + Atrazine
<i>Roundup Ready</i>		
PRE/MPOS	GuardsmanMax (2.5 pt) fb. Roundup WeaterMax (22 fl oz) + AMS (17 lb/100 gal)	GMax fb. RupWM
	Harness Xtra (1.5 qt) fb. Roundup OriginalMax (22 fl oz) + AMS (17 lb/100 gal)	Harness Xtra fb. RupOM
	Keystone (1.3 qt) fb. Durango (24 fl oz) + Yukon (4 oz) + Activator 90 (0.25%)	Keystone fb. Dura + Yukon
	Degree Xtra (2 qt) fb. Roundup OriginalMax (22 fl oz) + AMS (17 lb/100 gal)	Degree Xtra fb. RupOM
	Bicep Lite II Magnum (1.5 pt) fb. Impact (0.5 fl oz) + Roundup WeatherMax (22 fl oz) + Atrazine (1 pt) + AMS (17 lb/100 gal)	Bicep Lt fb. Impact + RupWM + Atra
	Lumax (2.25 qt) fb. Touchdown Total (32 fl oz) + AMS (17 lb/100 gal)	Lumax fb. Tdown
	Keystone (1.3 qt) fb. Durango (24 fl oz) + AMS (2.5 lb)	Keystone fb. Dura
	Resolve (1 oz) + Atrazine (1.5 pt) fb. Roundup OriginalMax (22 fl oz) + AMS (17 lb/100 gal)	Resolve + Atrazine fb. RupOM
	SureStart (1.75 pt) fb. Durango DMA (24 fl oz) + AMS (2.5 lb)	SureStart fb. DuraD
	EPOS	Keystone (1.2 qt) + Durango (24 fl oz) + Yukon (4 oz) + Activator 90 (0.25%)
Camix (1.3 qt) + Touchdown Total (24 fl oz) + AMS (17 lb/100 gal)		Camix + Tdown
Degree Xtra (2 qt) + Roundup OriginalMax (22 fl oz) + AMS (17 lb/100 gal)		Degree Xtra + RupOM
Roundup WeatherMax (22 fl oz) + Status (2.5 oz) + AMS (17 lb/100 gal)		RupWM + Status
POST (2-pass)	Roundup OriginalMax (22 fl oz) + AMS (17 lb/100 gal) – MP fb. LP	RupOM (MP) fb. RupOM (LP)

Table 3. Corn injury, weed control, program costs, soybean yield, and economic returns for 24 herbicide programs in 2007.

Programs	Herbicide Treatments	Corn	SETFA	CHEAL	AMAPO	ABUTH	All Weeds	Costs ¹	Yield	Economic Returns ²
		injury								
<i>Conventional</i>										
PRE	Lexar	0	88	97	99	99	NO	\$40.28	188	\$724.88*
	Keystone + Hornet	0	92	98	99	98	YES	\$37.93	190*	\$733.34*
	BreakFree ATZ + Resolve	0	90	93	99	87	NO	\$34.56	194*	\$756.38*
	Lumax + Atrazine	0	90	96	99	99	YES	\$39.93	197*	\$760.50*
PRE/MPOS	Bicep Lt fb. Impact + Atrazine	0	87	90	99	99	NO	\$34.42	193*	\$749.73*
	Atrazine fb. Option + Yukon	10†	81	97	99	99	NO	\$41.68	191*	\$735.01*
	GMax fb. Status	0	90	88	99	98	NO	\$46.08	199*	\$762.49*
	Keystone fb. Yukon	0	87	99	99	99	NO	\$38.93	190*	\$733.71*
<i>Liberty Link</i>										
PRE/MPOS	Define fb. Liberty + Atrazine	0	84	94	99	96	NO	\$41.96	187	\$717.10
MPOS	Liberty + Atrazine	0	75	90	99	98	NO	\$25.51	191*	\$750.50*
<i>Roundup Ready</i>										
PRE/MPOS	GMax fb. RupWM	0	86	76	99	98	NO	\$47.26	191*	\$730.11*
	Harness Xtra fb. RupOM	0	85	83	99	94	NO	\$47.32	203*	\$776.86*
	Keystone fb. Dura + Yukon	0	85	99	99	99	NO	\$51.71	187	\$707.35
	Degree Xtra fb. RupOM	0	94	86	99	98	NO	\$49.06	190*	\$723.56*
	Bicep Lt fb. Impact + RupWM + Atra	0	90	90	99	97	YES	\$52.42	196*	\$744.62*
	Lumax fb. Tdown	0	94	97	99	99	YES	\$61.65	188	\$703.51
	Keystone fb. Dura	0	79	80	99	99	NO	\$42.91	182	\$696.20
	Resolve + Atrazine fb. RupOM	0	79	74	97	97	NO	\$40.58	193*	\$742.90*
	SureStart fb. DuraD	0	83	98	99	99	NO	\$46.38	200*	\$767.62*
EPOS	Keystone + Dura + Yukon	0	94	99	99	99	YES	\$44.80	190*	\$725.79*
	Camix + Tdown	0	90	99	99	99	YES	\$46.88	192*	\$733.88*
	Degree Xtra + RupOM	0	91	91	99	91	YES	\$43.06	197*	\$757.10*
	RupWM + Status	0	63	53	91	76	NO	\$33.06	182	\$704.97
POST (2-pass)	RupOM (MP) fb. RupOM (LP)	0	86	95	99	98	NO	\$38.98	192*	\$742.46*
	Untreated	0	0	0	0	0	NO	0	75	\$304.57

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

¹Herbicide and additive costs = avg. of price lists (April 2007); Application cost = \$6.00/A; Roundup Ready seed premium = \$13.70/A; seeding rate = 30,000 seeds/A. Weed control costs = Herbicide \$ + Additive \$ + Application \$ + seed premium \$ (where applicable).

³Crop selling price = \$4.07/bu (December 2007). Economic return = (Yield x Price) – Weed Control Costs.

* Values are not significantly different from the highest value within that column. † Indicates significant corn injury 7 days after mid-POST application.