

## Economics of Commercial Weed Control Programs in Corn, 2008

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A field trial was conducted in corn in 2008 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 2008. 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 0.25 inch of rain. Yield loss due to weeds was variable and was highest where early season competition was allowed. The maximum corn yield was 228 bu/A and the weedy (non-treated) yield was 55 bu/A, resulting in a yield loss of 173 bu/A (76%). Table 3 contains the actual data for corn injury, weed control, herbicide program costs, corn yield, and economic returns.

*Table 1.* Site description.

<b>Crop</b>	Corn
<b>Variety</b>	Pioneer 37Y14 (RR/LL)
<b>Soil Texture</b>	Sandy loam
<b>Soil pH</b>	6.5
<b>Soil Organic Matter</b>	3.3
<b>Dominant Weeds</b>	SETFA, CHEAL, AMAPO, AMBEL, ABUTH
<b>Number of Replications</b>	6
<b>Planting Date</b>	May 5
<b>Application Timings:</b>	
<b>PRE</b>	May 5
<b>Early POST (EP)</b>	May 28
<b>Mid-POST (MP)</b>	June 11
<b>Late-POST (LP)</b>	June 18
<b>Evaluation Time</b>	7d after MP 90 d (weed control)

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

**Table 2.** Commercial corn herbicide programs selected by companies in 2008.

<i>Conventional</i>	<i>Treatments (Rate/A)</i>	<i>Abbreviated Form</i>
<b>PRE</b>	BreakFree ATZ (2.6 qt) + Resolve (1 oz)	BreakFree ATZ + Resolve
	Lumax (2.5 qt) + Atrazine (1 qt)	Lumax + Atrazine
<b>PRE/MPOS</b>	Bicep Lite II Magnum (1.5 pt) fb Impact (0.5 fl oz) + Atrazine (0.5 qt) + MSO (1 %) + UAN 28% (2.5 %)	Bicep Lt fb Impact + Atrazine
	Guardsman Max (4 pt) fb Status (5 oz) + Activator 90 (0.25 %) + AMS (17 lb)	GMax fb Status
	Harness Xtra 5.6 (2 qt) fb Yukon (4 oz) + Herbimax (1 %)	Harness Xtra fb Yukon
<b>EPOS</b>	Laudis (3 fl oz) + MSO (1 %) + UAN 28% (1.5 qt)	Laudis
	Laudis (3 fl oz) + Atrazine (1 qt) + MSO (1 %) + UAN 28% (1.5 qt)	Laudis + Atrazine
	Laudis (3 fl oz) + Prowl (1 qt) + MSO (1 %) + UAN 28% (1.5 qt)	Laudis + Prowl
<b>MPOS</b>	Steadfast (0.75 oz) + Atrazine (1 qt) + Status (2.5 oz) + Herbimax (1 %) + AMS (2 lb)	Steadfast + Atrazine + Status
<b>Liberty Link</b>		
<b>MPOS</b>	Liberty (32 fl oz) + Atrazine (1 qt) + AMS (3 lb)	Liberty + Atrazine
<b>Roundup Ready</b>		
<b>PRE/MPOS</b>	Parallel (2 pt) fb Buccaneer Plus (1 qt) + AMS (17 lb)	Parallel fb Buccaneer Plus
	Parallel Plus (1.5 qt) fb Buccaneer Plus (1 qt) + AMS (17 lb)	Parallel Plus fb Buccaneer Plus
	Bicep II Magnum (1.6 qt) fb Touchdown Total (24 fl oz) + AMS (17 lb)	Bicep fb Tdown
	Parallel (1.5 pt) fb Buccaneer Plus (1 qt) + AMS (17 lb)	Parallel fb Buccaneer Plus
	Harness Xtra 5.6 (1.5 qt) fb Roundup PowerMAX (22 fl oz) + AMS (17 lb)	Harness Xtra fb RupPM
	Bicep Lite II Magnum (1.5 pt) fb Impact (0.5 fl oz) + Roundup PowerMAX (22 fl oz) + Atrazine (0.5 qt) + AMS (8.5 lb)	Bicep Lt fb Impact + RupPM
	Harness Xtra 5.6 (1 qt) fb Yukon (4 oz) + Roundup PowerMAX + (22 fl oz) + Activator 90 (0.125 %) + AMS (17 lb)	Harness Xtra fb Yukon + RupPM
	Parallel Plus (2.3 qt) fb Buccaneer Plus (1 qt) + AMS (17 lb)	Parallel Plus fb Buccaneer Plus
	Lumax (2 qt) fb Touchdown Total (24 fl oz) + AMS (17 lb)	Lumax fb Tdown
	SureStart (1.75 pt) fb Durango DMA (24 fl oz) + AMS (2 %)	SureStart fb Durango
	Outlook (10 fl oz) fb Status (2.5 oz) + Roundup PowerMAX (22 fl oz) + AMS (17 lb)	Outlook fb Status + RupPM
	Degree Xtra (2 qt) fb Roundup PowerMAX (22 fl oz) + AMS (17 lb)	Degree Xtra fb RupPM
	Resolve (1 oz) + Atrazine (0.75 qt) fb Roundup PowerMAX (22 fl oz) + AMS (17 lb)	Resolve fb RupPM
	Guardsman Max (2.5 pt) fb Status (2.5 oz) + Roundup PowerMAX (22 fl oz) + AMS (17 lb)	GMax fb Status + RupPM
	Harness Xtra 5.6 (1 qt) fb Yukon (4 oz) + Roundup PowerMAX (22 fl oz) + Activator 90 (0.125 %) + AMS (17 lb)	Harness Xtra fb Yukon + RupPM
<b>EPOS</b>	Resolve (0.229 oz) + Harmony GT 50 SG (0.05 oz) + Isoxadifen-Ethyl (0.115 oz) + Atrazine (0.75 qt) + Roundup PowerMAX (22 fl oz) + AMS (17 lb)	Res + Harmony + Atrazine + RupPM
	SureStart (1.75 pt) + Durango DMA (24 fl oz) + AMS (2 %)	SureStart + Durango
	Degree Xtra (2 qt) + Roundup PowerMAX (22 fl oz) + AMS (17 lb)	Degree Xtra + RupPM
<b>MPOS</b>	Halex GT (3.6 pt) + Atrazine (1 pt) + Activator 90 (0.25 %) + AMS (17 lb)	Halex + Atrazine
	Prowl H2O (2.6 pt) + Status (2.5 oz) + Roundup PowerMAX (22 fl oz) + AMS (17 lb)	Prowl + Status + RupPM
<b>POST (2-pass)</b>	Roundup OriginalMax (22 fl oz) + AMS (17 lb/100 gal) – MP fb. LP	RupPM (MP) fb. RupPM (LP)

Table 3. Corn injury, weed control, program costs, corn yield, and economic returns for 31 herbicide programs in 2008.

Programs	Herbicide Treatments	Corn injury	SETFA	CHEAL	AMAPO	AMBEL	ABUTH	All Weeds	Costs <sup>1</sup>	Yield	Economic Returns <sup>2</sup>
		(%)	----- % control -----				(≥90%)	(\$/A)	(bu/A)	(\$/A)	
<i>Conventional</i>											
<b>PRE</b>	BreakFree ATZ + Resolve	0	<b>93</b>	<b>91</b>	<b>100</b>	83	71	NO	\$35.71	194	\$603.39
	Lumax + Atrazine	0	74	<b>95</b>	<b>100</b>	<b>99</b>	<b>100</b>	NO	\$45.06	204	\$627.59
<b>PRE/MPOS</b>	Bicep Lt fb Impact + Atrazine	0	<b>97</b>	<b>100</b>	<b>100</b>	<b>96</b>	<b>100</b>	<b>YES</b>	\$36.73	196	\$610.07
	GMax fb Status	0	89	<b>99</b>	<b>100</b>	<b>100</b>	<b>98</b>	NO	\$49.40	<b>213*</b>	<b>\$654.60*</b>
	Harness Xtra fb Yukon	0	79	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	NO	\$44.91	<b>215*</b>	<b>\$662.94*</b>
<b>EPOS</b>	Laudis	0	74	87	<b>98</b>	<b>92</b>	<b>97</b>	NO	\$22.67	<b>212*</b>	<b>\$676.93*</b>
	Laudis + Atrazine	0	79	<b>95</b>	<b>100</b>	<b>98</b>	<b>99</b>	NO	\$26.24	<b>213*</b>	<b>\$675.01*</b>
	Laudis + Prowl	0	88	<b>94</b>	<b>100</b>	86	<b>97</b>	NO	\$29.30	202	<b>\$635.65*</b>
<b>MPOS</b>	Steadfast + Atrazine + Status	0	<b>94</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>YES</b>	\$35.24	205	<b>\$641.26*</b>
<i>Liberty Link</i>											
<b>MPOS</b>	Liberty + Atrazine	0	<b>94</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>YES</b>	\$24.92	208	\$659.83
<i>Roundup Ready</i>											
<b>PRE/MPOS</b>	Parallel fb Buccaneer Plus	0	<b>98</b>	<b>97</b>	<b>100</b>	<b>91</b>	<b>100</b>	<b>YES</b>	\$50.93	<b>215*</b>	<b>\$659.67*</b>
	Parallel Plus fb Buccaneer Plus	0	<b>97</b>	<b>96</b>	<b>100</b>	<b>90</b>	<b>97</b>	<b>YES</b>	\$50.05	<b>218*</b>	<b>\$668.80*</b>
	Bicep fb Tdown	0	<b>97</b>	<b>98</b>	<b>100</b>	<b>91</b>	<b>100</b>	<b>YES</b>	\$56.99	<b>213*</b>	<b>\$645.36*</b>
	Parallel fb Buccaneer Plus	0	<b>98</b>	<b>98</b>	<b>100</b>	<b>90</b>	<b>100</b>	<b>YES</b>	\$48.01	205	\$629.59
	Harness Xtra fb RupPM	0	<b>94</b>	<b>95</b>	<b>100</b>	89	<b>95</b>	NO	\$56.61	<b>215*</b>	<b>\$651.24*</b>
	Bicep Lt fb Impact + RupPM	0	<b>97</b>	<b>100</b>	<b>100</b>	<b>98</b>	<b>100</b>	<b>YES</b>	\$60.20	<b>214*</b>	<b>\$644.90*</b>
	Harness Xtra fb Yukon + RupPM	0	<b>97</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>YES</b>	\$61.13	<b>222*</b>	<b>\$669.82*</b>
	Parallel Plus fb Buccaneer Plus	0	<b>97</b>	<b>94</b>	<b>100</b>	88	<b>94</b>	NO	\$55.80	<b>225*</b>	<b>\$685.05*</b>
	Lumax fb Tdown	0	<b>98</b>	<b>100</b>	<b>100</b>	<b>96</b>	<b>100</b>	<b>YES</b>	\$40.74	<b>218*</b>	<b>\$679.76*</b>
	SureStart fb Durango	0	<b>91</b>	83	<b>100</b>	74	<b>92</b>	NO	\$50.78	<b>220*</b>	<b>\$673.57*</b>
	Outlook fb Status + RupPM	0	<b>97</b>	<b>99</b>	<b>100</b>	<b>98</b>	<b>100</b>	<b>YES</b>	\$57.94	<b>219*</b>	<b>\$663.66*</b>
	Degree Xtra fb RupPM	0	<b>97</b>	<b>99</b>	<b>99</b>	<b>95</b>	<b>98</b>	<b>YES</b>	\$58.50	<b>220*</b>	<b>\$667.50*</b>
	Resolve fb RupPM	0	<b>92</b>	<b>99</b>	<b>98</b>	<b>91</b>	<b>97</b>	<b>YES</b>	\$49.89	<b>212*</b>	<b>\$650.26*</b>
	GMax fb Status + RupPM	0	<b>96</b>	<b>96</b>	<b>100</b>	<b>98</b>	<b>100</b>	<b>YES</b>	\$60.55	<b>217*</b>	<b>\$653.90*</b>
	Harness Xtra fb Yukon + RupPM	0	<b>93</b>	<b>99</b>	<b>100</b>	<b>98</b>	<b>99</b>	<b>YES</b>	\$61.13	<b>217*</b>	<b>\$653.87*</b>
<b>EPOS</b>	Res + Harmny + Atrazine + RupPM	0	<b>90</b>	<b>94</b>	<b>100</b>	<b>91</b>	<b>97</b>	<b>YES</b>	\$38.53	<b>210*</b>	<b>\$655.13*</b>
	SureStart + Durango	0	90	<b>90</b>	<b>100</b>	88	<b>96</b>	NO	\$44.78	<b>217*</b>	<b>\$670.77*</b>
	Degree Xtra + RupPM	0	<b>95</b>	<b>93</b>	<b>100</b>	83	87	NO	\$52.50	<b>210*</b>	<b>\$641.05*</b>
<b>MPOS</b>	Halex + Atrazine	0	<b>97</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>YES</b>	\$45.76	195	\$596.09
	Prowl + Status + RupPM	0	<b>98</b>	<b>100</b>	<b>100</b>	<b>99</b>	<b>100</b>	<b>YES</b>	\$48.30	<b>210*</b>	<b>\$645.36*</b>
<b>POST</b>	RupPM (MP) fb. RupPM (LP)	0	<b>98</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>YES</b>	\$53.08	<b>228*</b>	<b>\$699.32*</b>
	<b>Non-treated</b>	0	0	0	0	0	0	NO	0	55	\$179.85

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

<sup>1</sup>Herbicide and additive costs = avg. of price lists (April 2008); Application cost = \$6.00/A; Roundup Ready seed premium = \$15.56/A; seeding rate = 30,000 seeds/A. Weed control costs = Herbicide \$ + Additive \$ + Application \$ + seed premium \$ (where applicable).

<sup>2</sup>Crop 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.