

**Economics of Commercial Weed Control Programs in Corn  
2-Year Summary  
Jim Kells and Kathrin Schirmacher  
Department of Crop and Soil Sciences  
Michigan State University**

A field trial was conducted in corn in 2004 and 2005 on the MSU Research Farm to compare weed control, corn injury, corn yield, and economic return of the dominant herbicide programs marketed in Michigan. Major herbicide companies were asked to submit weed control programs for the study based on soil type and weed infestation history. Site characteristics and herbicide application timings are described in Table 1. Table 2 and 3 list the treatment details, sorted by application method and need for Roundup Ready hybrids in 2004 and 2005, respectively. Weed competition was very high at the research site in both years. In 2004, the maximum corn yield was 229 bu/A and the weedy (untreated) was 87 bu/A, resulting in a yield loss of 131 bu/A (60%). In 2005, the maximum corn yield was 223 bu/A and the weedy (untreated) was 85 bu/A, resulting in a yield loss of 138 bu/A (62%).

In 2004, the site received excessive rainfall shortly after planting. A total of 6.1 inches of rainfall occurred within 2 weeks of preemergence herbicide application in 2004.

**e Table 1. Site description.**

	<b>2004</b>	<b>2005</b>
<b>Crop</b>	Corn	Corn
<b>Hybrid</b>	P37R70	DKC42-95
<b>Soil Texture</b>	Clay Loam	Loam
<b>Soil pH</b>	6.8	6.7
<b>Soil OM</b>	3.8	2.6
<b>Dominant Weeds</b>	ANGR, CHEAL, AMARE, AMBEL, ABUTH	ANGR, CHEAL, AMARE, ABUTH
<b>Planting</b>	May 17	May 5
<b>Application Timings</b>		
<i>PRE</i>	May 17	May 5
<i>Mid-POST (MP)</i>	June 16	June 2
<i>Late-POST (LP)</i>	June 28	June 17
<b>Evaluation Time</b>	27 days after MP	26 days after MP

Abbreviations: ANGR= annual grass (primarily giant foxtail), CHEAL= common lambsquarters, AMARE= redroot pigweed, AMBEL= common ragweed, ABUTH= velvetleaf, OM= organic matter.

**Table 2. Commercial corn herbicide programs selected by companies in 2004.**

<i>Conventional</i>	<i>Treatments (Rate/A)</i>	<i>Abbreviated Form</i>	<i>Years<sup>a</sup></i>
<b>PRE</b>	Guardsman Max (3.5 pt) + Prowl H2O (2.5 pt)	GuardsMax + Prowl	2004
	Guardsman Max (3.5 pt) + Python (1 oz)	GuardsMax + Python	2004
	Axiom (15 oz) + Atrazine (1 qt) + Prowl H2O (2 pt)	Axiom + Atz + Prowl	2004
	Keystone (2.2 qt) + Python (0.8 oz)	Key + Python	2004
	Keystone (2.2 qt) + Hornet WDG (3 oz)	Key + Hornet	2004
	Keystone LA (1.9 qt) + Hornet WDG (3 oz)	KeyLA + Hornet	2004, 2005
	Cinch ATZ (2.1 qt) + Basis (0.5 oz)	CinchATZ + Basis	2004, 2005
	Lumax (2.5 qt)	Lumax	2004
<b>PRE/POST</b>	Guardsman Max (3.5 pt) fb. Clarity (6 fl oz) + Aim (0.33 fl oz) + Activator 90 (0.25%) + 28% N (3 qt)	GuardsMax fb. Clarity + Aim	2004
	Outlook (3 pt) fb. Distinct (4 oz) + Activator 90 (0.25%) + AMS (2.5 lb)	Outlk fb. Distinct	2004
	Define SC (15 fl oz) fb. Buctril/Atrazine (2 pt)	Define fb. Buct/Atz	2004
	Atrazine (1 qt) fb. Option (1.5 oz) + Distinct (2 oz) + MSO (1.5 pt) + 28% N (1.5 qt)	Atz fb. Option + Distinct	2004
	Cinch (0.66 pt) fb. Steadfast ATZ (14 oz) + Distinct (2 oz) + COC (1%) + AMS (2 lb)	Cinch fb. SteadATZ + Distinct	2004
	Bicep II Magnum (2.1 qt) fb. Callisto (3 fl oz) + Atrazine (0.25 qt) + COC (1%) + 28% N (2.5 %)	BicepIIMag fb. Callisto + Atz	2004, 2005
<b>Total POST</b>	Atrazine (1 qt) + Callisto (1.5 fl oz) + Option (1.5 oz) + MSO (1.5 pt) + 28% N (1.5 qt)	Atz + Callisto + Option	2004, 2005
	Steadfast ATZ (14 oz) + Distinct (2 oz) + COC (1%) + AMS (2 lb)	SteadATZ + Distinct	2004, 2005
<b>Roundup Ready</b>			
<b>PRE/POST</b>	Keystone (1.1 qt) fb. GlyphomaxPlus (32 fl oz) + AMS (2 lb)	Key + GlyphoPlus	2004
	Cinch ATZ (2 pt) fb. Roundup WeatherMax (22 fl oz) + AMS (17lb/100 gal)	CinchATZ fb. RoundWM	2004
	Harness Xtra 5.6L (1.2 qt) fb. Roundup WeatherMax (22 fl oz) + AMS (2%)	HarnessXtra fb. RoundWM	2004, 2005
	Bicep II Magnum (2.1 qt) fb. Touchdown Total (24 fl oz) + AMS (17 lb/100 gal)	BicepIIMag fb. Touchdown	2004
<b>POST (1-Pass)</b>	Roundup OriginalMax (22 fl oz) + Atrazine (1 qt) + AMS (2 %)	RoundOM + Atz	2004
	Degree Xtra (1.5 qt) + RoundupWeatherMax (22 fl oz) + AMS (2 %)	DegreeXtra + RoundWM	2004, 2005
<b>POST (2-Pass)</b>	RoundupWeatherMax (22 fl oz) + AMS ( 2 %) fb. Roundup WeatherMax (22 fl oz) + AMS (2 %)	RoundWM fb. RoundWM	2004, 2005
	Touchdown Total (24 fl oz) + AMS (17 lb/100 gal) fb. Touchdown Total (24 fl oz) + AMS (17 lb/100 gal)	Touchdown fb. Touchdown	2004

Abbreviations: fb.= followed by, PRE= preemergence, POST=postemergence, PRE/POST= preemergence followed by postemergence.

<sup>a</sup> Herbicide programs that were common in 2004 and 2005.

**Table 3. Commercial corn herbicide programs selected by companies in 2005.**

<i>Conventional</i>	<i>Treatments (Rate/A)</i>	<i>Abbreviated Form</i>
<b>PRE</b>	Guardsman Max (3.5 pt) + Hornet WDG (3 oz)	GuardsMax + Hornet
	Define (19 fl oz) + Hornet WDG (3 oz) + Atrazine (1.5 qt)	Define + Hornet + Atz
	Keystone LA (1.9 qt) + Hornet WDG (3 oz)	KeyLA + Hornet
	Keystone LA (1.9 qt) + Python (0.8 oz)	KeyLA + Python
	Cinch ATZ (2.1 qt) + Basis (0.5 oz)	CinchATZ + Basis
	Lexar (3.5 qt)	Lexar
	Lumax (2.5 qt) + Atrazine (1 qt)	Lumax + Atz
	Stalwart C (1.67 pt) + Atrazine (1 qt) + Callisto (5.33 fl oz)	StalC + Atz + Callisto
	Micro-Tech (2 qt) + Hornet WDG (3 oz)	MicroTech + Hornet
<b>PRE/POST</b>	Guardsman Max (3.5 pt) fb. Distinct (4 oz) + NIS (0.25%) + AMS (2.5 lbs)	GuardsMax fb. Distinct
	Define (14 fl oz) fb. Equip (1.5 oz) + MSO (1.5 pt) + 28% N (1.5 qt)	Define fb. Equip
	Bicep II Magnum (2.1 qt) fb. Callisto (3 fl oz) + Atrazine (0.25qt) + COC (1%) + 28% N (2.5%)	BicepIIMag fb. Callisto + Atz
	Micro-Tech (2 qt) + Atrazine (1.3 lbs) fb. Distinct (6 oz) + NIS (0.25%) + 28% N (2 qt)	MicroTech + Atz fb. Distinct
<b>Total POST</b>	Atrazine (1 qt) + Option (1.5 oz) + Define (12 fl oz) + MSO (1.5 pt) + 28% N (1.5 qt)	Atz + Option + Define
	Atrazine (0.75 qt) + Option (1.5 oz) + Callisto (1.5 fl oz) + MSO (1.5 pt) + 28% N (1.5 qt)	Atz + Option + Callisto
	Steadfast ATZ (14 oz) + Distinct (2 oz) + COC (1 %) + AMS (2 lbs)	SteadATZ + Distinct
	Steadfast (0.75 oz) + Distinct (4 oz) + COC (0.25%) + 28% N (2 qt)	Steadfast + Distinct
<b>Roundup Ready</b>		
<b>PRE/POST</b>	Outlook (12 fl oz) fb. Roundup OriginalMax (22 fl oz) + Distinct (3 oz) + NIS (1 qt) + AMS (17 lb/100 gal)	Outlk fb. RoundOM + Distinct
	Guardsman Max (12 fl oz) fb. Roundup OriginalMax (24 fl oz) + AMS (17 lb/100 gal)	GuardsMax fb. RoundOM
	Keystone (1.3 qt) fb. Durango (1.5 pt) + AMS (1.5 %)	Key fb. Durango
	Basis (0.5 oz) + Atrazine (0.75 qt) fb. Roundup WeatherMax (22 fl oz) + AMS (17 lb/100 gal)	Basis + Atz fb. RoundWM
	Basis (0.33 oz) fb. Roundup WeatherMax (22 fl oz) + AMS (17 lb/100 gal)	Basis fb. RoundWM
	Harness Xtra (1.5 qt) fb. Roundup WeatherMax (22 fl oz) + AMS (17 lb/100 gal)	HarnessXtra fb. RoundWM
	Atrazine (1.5 qt) fb. Roundup OriginalMax (22 fl oz) + AMS (17 lb/100 gal)	Atz fb. RoundOM
	Lumax (2 qt) fb. Touchdown Total (24 fl oz) + AMS (17.5 lb/100 gal)	Lumax fb. Touchdown
Stalwart Xtra (3 oz) fb. Roundup WeatherMax (22 fl oz) + AMS (17 lb/100 gal)	StalXtra fb. RoundWM	
<b>POST (1-Pass)</b>	Degree Xtra (2 qt) + Roundup WeatherMax (22 fl oz) + AMS (17 lb/100 gal)	DegreeXtra + RoundWM
<b>POST (2-Pass)</b>	Roundup WeatherMax (22 fl oz) + AMS (17 lb/100 gal) fb. Roundup WeatherMax (22 fl oz) + AMS (17lb/100gal)	RoundWM fb. RoundWM

Abbreviations: fb.= followed by, PRE= preemergence, POST=postemergence, PRE/POST= preemergence followed by postemergence.

**Table 4. Weed control effectiveness, weed control costs, corn yields, and gross margins for herbicide programs in 2004.**

<i>Conventional</i>	<i>Treatments</i>	<i>ANGR</i>	<i>CHEAL</i>	<i>AMARE</i>	<i>AMBEL</i>	<i>ABUTH</i>	<i>All Weeds (≥ 90%)</i>	<i>Cost<sup>1</sup> (\$/A)</i>	<i>Yield (bu/A)</i>	<i>Gross Margin<sup>2</sup> (\$/A)</i>
<b>PRE</b>	GuardsMax + Prowl	81	85	<b>96</b>	55	65	No	31.89	208	332.11
	GuardsMax + Python	78	<b>91</b>	<b>94</b>	67	<b>96</b>	No	32.03	212	<b>338.97*</b>
	Axiom + Atz + Prowl <sup>3</sup>	87	<b>90</b>	<b>94</b>	60	67	No	31.33	170	266.17
	Key + Python	79	<b>98</b>	<b>99</b>	64	<b>99</b>	No	30.53	212	<b>340.47*</b>
	Key + Hornet	72	<b>93</b>	<b>94</b>	60	<b>97</b>	No	32.62	<b>214*</b>	<b>341.88*</b>
	KeyLA + Hornet	74	<b>98</b>	<b>98</b>	65	<b>98</b>	No	33.48	212	<b>337.52*</b>
	CinchATZ + Basis	<b>90</b>	88	<b>99</b>	74	85	No	33.61	<b>215*</b>	<b>342.64*</b>
	Lumax	85	78	<b>93</b>	61	88	No	32.05	<b>219*</b>	<b>351.20*</b>
<b>PRE/POST</b>	GuardsMax fb. Clarity + Aim <sup>3</sup>	<b>90</b>	<b>93</b>	<b>99</b>	<b>98</b>	<b>98</b>	<b>Yes</b>	36.37	202	317.13
	Outlk fb. Distinct	<b>96</b>	67	<b>93</b>	65	83	No	39.70	206	320.80
	Define fb. Buct/Atz	84	<b>100</b>	<b>100</b>	<b>90</b>	<b>100</b>	No	34.95	204	322.05
	Atz fb. Option + Distinct	<b>91</b>	89	<b>99</b>	86	<b>93</b>	No	36.59	<b>221*</b>	<b>350.16*</b>
	Cinch fb. SteadATZ + Distinct	<b>99</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>Yes</b>	43.53	<b>221*</b>	<b>343.22*</b>
	BicepIIMag fb. Callisto + Atz	<b>96</b>	<b>100</b>	<b>100</b>	<b>99</b>	<b>100</b>	<b>Yes</b>	45.24	<b>216*</b>	332.76
<b>Total POST</b>	Atz + Callisto + Option	<b>96</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>99</b>	<b>Yes</b>	31.48	<b>220*</b>	<b>353.52*</b>
	SteadATZ + Distinct	<b>95</b>	<b>100</b>	<b>100</b>	<b>97</b>	<b>100</b>	<b>Yes</b>	29.35	<b>221*</b>	<b>357.40*</b>
<b>Roundup Ready</b>										
<b>PRE/POST</b>	Key fb. GlyphoPlus	86	79	<b>94</b>	76	<b>94</b>	No	37.28	<b>215*</b>	<b>338.97*</b>
	CinchATZ fb. RoundWM	<b>93</b>	82	<b>91</b>	74	<b>99</b>	No	39.21	<b>222*</b>	<b>349.29*</b>
	HarnessXtra fb. RoundWM	86	75	<b>93</b>	75	<b>98</b>	No	41.50	<b>221*</b>	<b>345.25*</b>
	BicepIIMag fb. Touchdown	<b>95</b>	78	<b>96</b>	77	<b>99</b>	No	49.40	<b>224*</b>	<b>342.60*</b>
<b>POST (1-Pass)</b>	RoundOM + Atr	<b>91</b>	<b>100</b>	<b>100</b>	<b>98</b>	<b>98</b>	<b>Yes</b>	24.14	<b>217*</b>	<b>355.61*</b>
	DegreeXtra + RoundWM	<b>99</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>99</b>	<b>Yes</b>	33.91	<b>222*</b>	<b>354.59*</b>
<b>POST (2-Pass)</b>	RoundWM fb. RoundWM	<b>99</b>	<b>100</b>	<b>99</b>	<b>100</b>	<b>100</b>	<b>Yes</b>	39.83	<b>229*</b>	<b>360.92*</b>
	Touchdown fb. Touchdown	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>Yes</b>	39.77	<b>218*</b>	<b>341.73*</b>
<b>Untreated</b>	Weedy	0	0	0	0	0	na	0	87	152.25

Abbreviations: ANGR= annual grass, CHEAL= common lambsquarters, AMARE= redroot pigweed, AMBEL= common ragweed, ABUTH= velvetleaf, fb.= followed by.

<sup>1</sup>Herbicide and additive costs = avg. of price lists (April 2004); Application cost = \$6.00/A; Roundup Ready seed premium = \$20.50/bag; seeding rate = 30,000 seeds/A. Weed control costs = Herbicide \$ + Additive \$ + Application \$ + seed premium \$ (where applicable).

<sup>2</sup>Crop selling price = \$1.75/bu (December 2004). Gross Margin = (Yield x Price) – Weed Control Costs.

<sup>3</sup>Corn injury was 15% and 10% for Axiom + Atrazine + Prowl and Guardsman Max fb. Clarity + Aim, respectively. All other treatments showed no corn injury.

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

**Table 5. Weed control effectiveness, weed control costs, corn yields, and gross margins for herbicide programs in 2005.**

<i>Conventional</i>	<i>Treatments</i>	<i>ANGR</i>	<i>CHEAL</i>	<i>AMARE</i>	<i>ABUTH</i>	<i>All Weeds (≥ 90%)</i>	<i>Cost<sup>1</sup> (\$/A)</i>	<i>Yield (bu/A)</i>	<i>Gross Margin<sup>2</sup> (\$/A)</i>
<b>PRE</b>	GuardsMax + Hornet	83	<b>90</b>	<b>100</b>	73	No	32.96	<b>215*</b>	<b>289.54</b>
	Define + Hornet + Atz	84	<b>98</b>	<b>100</b>	78	No	37.01	<b>210*</b>	<b>277.99</b>
	KeyLA + Hornet	<b>92</b>	<b>99</b>	<b>100</b>	75	No	34.38	<b>215*</b>	<b>288.12</b>
	KeyLA + Python	87	<b>96</b>	<b>100</b>	77	No	32.34	<b>211*</b>	<b>284.16</b>
	CinchATZ + Basis	77	77	<b>100</b>	57	No	33.61	<b>205*</b>	<b>273.89</b>
	Lexar	79	<b>98</b>	<b>100</b>	<b>94</b>	No	34.88	<b>212*</b>	<b>283.12</b>
	Lumax + Atz	82	<b>99</b>	<b>100</b>	<b>98</b>	No	35.03	<b>208*</b>	<b>276.97</b>
	StalC + Atz + Callisto	75	<b>97</b>	<b>100</b>	<b>97</b>	No	45.79	<b>207*</b>	264.71
	MicroTech + Hornet	68	66	<b>100</b>	67	No	26.51	202	<b>276.49</b>
<b>PRE/POST</b>	GuardsMax fb. Distinct	<b>90</b>	<b>93</b>	<b>100</b>	72	No	40.54	<b>204*</b>	265.46
	Define fb. Equip	<b>97</b>	<b>99</b>	<b>100</b>	86	No	43.55	<b>216*</b>	<b>280.45</b>
	BicepII Mag fb. Callisto + Atz	<b>90</b>	<b>100</b>	<b>100</b>	<b>93</b>	<b>Yes</b>	46.49	<b>216*</b>	<b>277.51</b>
	MicroTech + Atz fb. Distinct	88	<b>98</b>	<b>100</b>	86	No	42.36	<b>212*</b>	<b>275.64</b>
<b>Total POST</b>	Atz + Option + Define	88	85	<b>100</b>	64	No	37.63	<b>208*</b>	<b>274.37</b>
	Atz + Option + Callisto	89	<b>100</b>	<b>100</b>	<b>96</b>	No	31.77	<b>212*</b>	<b>286.23</b>
	SteadATZ + Distinct	<b>91</b>	<b>98</b>	<b>100</b>	<b>93</b>	<b>Yes</b>	30.04	<b>214*</b>	<b>290.96</b>
	Steadfast + Distinct	84	76	<b>100</b>	80	No	32.05	<b>209*</b>	<b>281.45</b>
<b>Roundup Ready</b>									
<b>PRE/POST</b>	Outlk fb. RoundOM + Distinct	<b>96</b>	<b>91</b>	<b>100</b>	80	No	45.12	<b>218*</b>	<b>281.88</b>
	GuardsMax fb. RoundOM	<b>96</b>	<b>91</b>	<b>100</b>	78	No	33.99	<b>215*</b>	<b>288.51</b>
	Key fb. Durango	<b>97</b>	87	<b>100</b>	76	No	33.71	<b>222*</b>	<b>299.29</b>
	Basis + Atz fb. RoundWM	86	<b>95</b>	<b>100</b>	82	No	37.95	<b>212*</b>	<b>280.05</b>
	Basis fb. RoundWM	83	71	<b>99</b>	79	No	33.42	<b>219*</b>	<b>295.08</b>
	HarnessXtra fb. RoundWM	<b>97</b>	<b>99</b>	<b>100</b>	81	No	41.14	<b>223*</b>	<b>293.36</b>
	Atz fb. RoundOM	82	89	<b>100</b>	83	No	27.58	<b>216*</b>	<b>296.42</b>
	Lumax fb. Touchdown	<b>99</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>Yes</b>	46.16	<b>219*</b>	<b>282.34</b>
	StalXtra fb. RoundWM	<b>95</b>	<b>93</b>	<b>100</b>	80	No	38.16	<b>214*</b>	<b>282.84</b>
<b>POST (1-Pass)</b>	DegreeXtra + RoundWM	<b>99</b>	<b>96</b>	<b>100</b>	87	No	36.51	<b>219*</b>	<b>291.99</b>
<b>POST (2-Pass)</b>	RoundWM fb. RoundWM	<b>98</b>	<b>97</b>	<b>100</b>	<b>97</b>	<b>Yes</b>	38.53	<b>214*</b>	<b>282.47</b>
<b>Untreated</b>	Weedy	0	0	0	0	na	0	85	127.50

Abbreviations: ANGR= annual grass, CHEAL= common lambsquarters, AMARE= redroot pigweed, ABUTH= velvetleaf, fb.= followed by.

<sup>1</sup>Herbicide and additive costs = avg. of price lists (April 2005); Application cost = \$6.00/A; Roundup Ready seed premium = \$6.19/A; seeding rate = 30,000 seeds/A.

Weed control costs = Herbicide \$ + Additive \$ + Application \$ + seed premium \$ (where applicable).

<sup>2</sup>Crop selling price = \$1.50/bu (December 2005). Gross Margin = (Yield x Price) – Weed Control Costs.

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



**Table 6. Summary of the 2004 commercial weed control program comparisons.**

	Treatments providing ≥ 90% control of ALL weeds	5 Most Expensive	5 Least Expensive	Yields not differing significantly from the highest	Gross margins not differing significantly from the highest
<i>Conventional</i>					
PRE	0/8	0/8	2/8	3/8	6/8
PRE/POST	3/6	2/6	0/6	3/6	2/6
Total POST	2/2	0/2	2/2	2/2	2/2
<i>Roundup Ready</i>					
PRE/POST	0/4	2/4	0/4	4/4	4/4
POST (1-Pass)	2/2	0/2	1/2	2/2	2/2
POST (2-Pass)	2/2	1/2	0/2	2/2	2/2

Abbreviations: PRE= preemergence, POST=postemergence, PRE/POST= preemergence followed by postemergence.  
Information in Table 6 is based on results presented in Table 4.

**Table 7. Summary of the 2005 commercial weed control program comparisons.**

	Treatments providing ≥ 90% control of ALL weeds	5 Most Expensive	5 Least Expensive	Yields not differing significantly from the highest	Gross margins not differing significantly from the highest
<i>Conventional</i>					
PRE	0/9	1/9	1/9	8/9	8/9
PRE/POST	1/4	2/4	0/4	4/4	3/4
Total POST	1/4	0/4	3/4	4/4	4/4
<i>Roundup Ready</i>					
PRE/POST	1/9	2/9	1/9	9/9	9/9
POST (1-Pass)	0/1	0/1	0/1	1/1	1/1
POST (2-Pass)	1/1	0/1	0/1	1/1	1/1

Abbreviations: PRE= preemergence, POST=postemergence, PRE/POST= preemergence followed by postemergence.  
Information in Table 7 is based on results presented in Table 5.

**Table 8. A two-year summary of all weed control programs for corn yield (% of maximum yield) and gross margin (% of maximum gross margin).**

<i>Conventional</i>	<i>Treatments</i>	2004	2005	2004	2005
		-----% of max. yield-----		---% of max. gross margin---	
<b>PRE</b>	GuardsMax + Prowl	91	--	92	--
	GuardsMax + Python	92	--	94*	--
	GuardsMax + Hornet	--	96*	--	97*
	Axiom + Atz + Prowl	74	--	74	--
	Key + Python	92	--	94*	--
	Key + Hornet	93*	--	95*	--
	KeyLA + Hornet	92	96*	94*	96*
	KeyLA + Python	--	95*	--	95*
	CinchATZ + Basis	94*	92*	95*	92*
	Define + Hornet + Atz	--	94*	--	93*
	Lexar	--	95*	--	95
	Lumax	96*	--	97*	--
	Lumax + Atz	--	93*	--	93*
	StalC + Atz + Callisto	--	93*	--	88
	MicroTech + Hornet	--	91	--	92*
<b>PRE/POST</b>	GuardsMax fb. Clarity + Aim	88	--	88	--
	GuardsMax fb. Distinct	--	92*	--	89
	Define fb. Buct/Atz	89	--	89	--
	Define fb. Equip	--	97*	--	94*
	Outlk fb. Distinct	90	--	89	--
	Atz fb. Option + Distinct	97*	--	97*	--
	Cinch fb. SteadATZ + Distinct	97*	--	95*	--
	MicroTech + Atz fb. Distinct	--	95*	--	92*
	BicepIIMag fb. Callisto + Atz	94*	97*	92	93*
<b>Total POST</b>	Atz + Option + Callisto	96*	95*	98*	96*
	Atz + Option + Define	--	93*	--	92*
	SteadATZ + Distinct	97*	96*	99*	97*
	Steadfast + Distinct	--	94*	--	94*
<b>Roundup Ready</b>					
<b>PRE/POST</b>	Key fb. GlyphoPlus	94*	--	94*	--
	Key fb. Durango	--	100*	--	100*
	CinchATZ fb. RoundWM	97*	--	97*	--
	HarnessXtra fb. RoundWM	97*	100*	96*	98*
	BicepIIMag fb. Touchdown	98*	--	95*	--
	Outlk fb. RoundOM + Distinct	--	98*	--	94*
	GuardsMax fb. RoundOM	--	96*	--	96*
	Basis + Atz fb. RoundWM	--	95*	--	94*
	Basis fb. RoundWM	--	98*	--	99*
	Atz fb. RoundOM	--	97*	--	99*
	Lumax fb. Touchdown	--	98*	--	94*
	StalXtra fb. RoundWM	--	96*	--	95*
<b>POST (1-Pass)</b>	RoundOM + Atz	95*	--	99*	--
	DegreeXtra + RoundWM	97*	98*	98*	98*
<b>POST (2-Pass)</b>	RoundWM fb. RoundWM	100*	96*	100*	94*
	Touchdown fb. Touchdown	95*	--	95*	--

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

## **Observations**

### **2004:**

Excessive rainfall after herbicide application reduced weed control with preemergence programs, which often resulted in lower yields. The most expensive programs involved two applications. The least expensive programs involved one application. Three of the five most expensive programs were Roundup Ready programs. One of the five least expensive programs was a Roundup Ready program. The programs with the highest occurrence of yield loss were conventional treatments involving a preemergence application. Those treatments that caused significant corn injury had the lowest corn yields and gross margins. Four of the five most costly programs had high gross margins. Similarly, four of the five least costly programs had high gross margins. The major factor affecting gross margins was corn yield.

### **2005:**

Four of the five most expensive programs involved two applications. Four of the five least expensive programs involved one application and were conventional. None of the treatments caused significant corn injury in 2005. Only 4 of the 28 treatments provided  $\geq 90\%$  control of all weed species. Annual grasses and velvetleaf were the most difficult to control. Four of the five programs with the highest yields and gross margins involved two applications. All of the Roundup Ready treatments, regardless of application timing, had yields not differing significantly from the highest. Only one of the conventional treatments differed significantly from the highest. Overall, the programs submitted for comparison in corn were very good with 93% of those providing high gross margins.

## **Interpretation**

In 2004, the excessive rainfall following planting and preemergence herbicide application disfavored the preemergence programs and favored the postemergence programs. It is important to remember that these results came from an atypical season and that these results must be interpreted in that context. We know from experience that the opposite can occur under different growing conditions and this is what happened in 2005. In 2005, the PRE only and the PRE fb. POST weed control programs were more consistent in obtaining high yields and high gross margins relative to 2004. The unusually wet, early season growing conditions in 2004 created notable differences between weed control treatments, whereas in a more typical growing season (2005) differences between treatments were minimal.