Economics of Commercial Weed Control Programs in Soybean, 2008
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A field trial in soybean was conducted in 2008 at the MSU Research Farm in E. Lansing to compare weed control, soybean injury, soybean 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 Roundup Ready seed. Yield loss due to weeds was extremely high. The maximum soybean yield was 47.2 bu/A and the weedy (untreated) yield was 10.7 bu/A, resulting in a yield loss of 36.5 bu/A (77 %).

Within 14 days after planting and application of the preemergence herbicides the site received less than 0.75 inches of rain. These rainfall events were less than what was needed to incorporate the soil-applied herbicides; as a result common ragweed was a significant escape of most soil-applied herbicides prior to the postemergence herbicide applications. Table 3 contains the data for soybean injury, weed control, herbicide program costs, soybean yield, and economic returns.

Table1. Site description.

Crop	Soybean
Variety	Pioneer 92M33
Soil Texture	Sandy loam
Soil pH	7.1
Soil Organic Matter	2.7
Dominant Weeds	SETFA, CHEAL, AMBEL, ABUTH, AMASS
Planting Date	May 8
Application Timings:	
PRE	May 8
Mid-POST (MPOS)	June 12
POST	June 18
Late-POST (LPOS)	July 14
Evaluation Times	Soybean injury – 7 d after MPOS
	Weed control at harvest

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

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Table 2. Commercial soybean herbicide programs selected by companies in 2008.

Conventional	Treatments (Rate/A)	Abbreviated Form
PRE	Canopy (2.25 oz) + Linex (1 pt) + Cinch (1 pt)	Canopy + Linex + Cinch
PRE/POST	Gangster (3 oz) fb. Cobra (8 fl oz) + SelectMax (9 fl oz) + NIS (0.25%) + AMS (2.5 lb)	Gangster fb. Cobra + SelectMax (MP)
	Valor XLT (4 oz) fb. Cobra (8 fl oz) + SelectMax (9 fl oz) + NIS (0.25%) + AMS (2.5 lb)	Valor XLT fb. Cobra + SelectMax (MP)
	Envive (3.5 oz) fb. Flexstar (1 pt) + Assure II (8 fl oz) + COC (1%)	Envive fb. Flexstar + Assure II (MP)

Roundup Ready		
PRE/POST	Prowl H_2O (2 pt) fb. Extreme (3 pt) + NIS (0.25%) + AMS (17 lb/100 gal)	Prowl fb. Extreme (MP)
	Prowl H_2O (2 pt) fb. Roundup PowerMax (22 fl oz) + AMS (17 lb/100 gal)	Prowl fb. RupPM (MP)
	Sonic (3 oz) fb. Durango DMA (24 fl oz) + AMS (17 lb/100 gal)	Sonic fb. Durango (P)
	IntRRo (1.5 qt) fb. Roundup PowerMax (22 fl oz) + AMS (17 lb/100 gal)	IntRRo fb. RupPM (P)
	Prefix (2 pt) fb. Touchdown Total (24 fl oz) + AMS (17 lb/100 gal)	Prefix fb. Tdown (P)
	Boundary (1.5 pt) fb. Touchdown Total (24 fl oz) + AMS (17 lb/100 gal)	Boundary fb. Tdown (P)
POST (2-pass)	Sequence (2.5 pt) + AMS (17 lb/100 gal) fb. Touchdown Total (24 fl oz) + AMS (17 lb/100 gal)	Sequence (MP) fb. Tdown (LP)
	Durango DMA (24 fl oz) + FirstRate (0.3 oz) + AMS (17 lb/100gal) fb. Durango DMA (24 fl oz) + AMS (17 lb/100 gal)	Durango + FRate (MP) fb. Durango (LP)
	Touchdown Total (24 fl oz) + AMS (17 lb/100 gal) - MPOS fb. LPOS	Tdown (MP) fb. Tdown (LP)
	Roundup PowerMax (22 fl oz) + AMS (17 lb/100 gal) - MPOS fb. LPOS	RupPM (MP) fb. RupPM (LP)
	Roundup WeatherMax (22 fl oz) + AMS (17 lb/100 gal) - MPOS fb. LPOS	RupWM (MP) fb. RupWM (LP)
	Roundup PowerMax (32 fl oz) + AMS (17 lb/100 gal) POST fb. Roundup PowerMax (22 fl oz) + AMS (17 lb/100 gal) LPOS	RupPM (P) fb. RupPM (LP)

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Table 3. Soybean injury, weed control, program costs, soybean yield, and economic returns for 16 herbicide programs in 2008.

Herbicide Programs	Soybean Injury	SETFA	CHEAL	AMBEL[1]	SOLPT	ABUTH, AMASS	All Weeds	Costs[2]	Yield	Economic Returns[3]
	(%)	←——————— % control ———————→					(≥90%)	($/A)	(bu/A)	($/A)
PRE *(Conventional)*										
Canopy + Linex + Cinch	1	69	**99**	65	88	**99**	NO	$33.49	32.1	$223.31
PRE fb. POST *(Conventional)*										
Gangster fb. Cobra + SelectMax (MP)	**23†**	74	**99**	**99**	97	**99**	NO	$49.55	37.7	$252.05
Valor XLT fb. Cobra + SelectMax (MP)	**20†**	89	**99**	**99**	88	**99**	NO	$44.15	**40.7***	**$281.45***
Envive fb. Flexstar + Assure II (MP)	**16†**	**97**	**99**	**99**	96	**99**	**YES**	$41.46	**40.0***	**$278.54***
PRE fb. POST *(Roundup Ready)*										
Prowl fb. Extreme (MP)	0	**94**	**96**	**96**	**99**	**99**	**YES**	$47.00	**44.4***	**$308.20***
Prowl fb. RupPM (MP)	**9†**	76	87	87	64	**99**	NO	$43.36	**47.2***	**$334.24***
Sonic fb. Durango (P)	**4†**	90	**99**	**99**	98	**99**	**YES**	$42.40	**40.4***	**$280.80***
IntRRo fb. RupPM (P)	0	77	**99**	**99**	76	**99**	NO	$44.35	**45.6***	**$320.45***
Prefix fb. Tdown (P)	0	**99**	**99**	**99**	**99**	**99**	**YES**	$46.49	**43.4***	**$300.71***
Boundary fb. Tdown (P)	0	**98**	**99**	**99**	91	**99**	**YES**	$49.03	37.3	$249.37
POST 2-pass *(Roundup Ready)*										
Sequence (MP) fb. Tdown (LP)	**4†**	**99**	**99**	**99**	**99**	**99**	**YES**	$52.23	**46.7***	**$321.37***
Durango + FRate (MP) fb. Durango (LP)	**6†**	**99**	**99**	**99**	**99**	**99**	**YES**	$50.19	**44.7***	**$307.41***
Tdown (MP) fb. Tdown (LP)	0	**99**	**99**	**99**	**99**	**99**	**YES**	$49.19	**40.4***	**$274.01***
RupPM (MP) fb. RupPM (LP)	0	**99**	**99**	**99**	**99**	**99**	**YES**	$48.48	**45.3***	**$313.92***
RupWM (MP) fb. RupWM (LP)	1	**99**	**99**	**99**	**99**	**99**	**YES**	$51.29	**44.8***	**$307.11***
RupPM (P) fb. RupPM (LP)	0	**99**	**99**	**99**	**99**	**99**	**YES**	$53.47	**41.3***	**$276.93***
Untreated		0	0	0	0	0	NO	—	10.7	$85.60

Abbreviations: SETFA = giant foxtail, CHEAL = common lambsquarters, AMBEL = common ragweed, ABUTH = velvetleaf, AMAPO = pigweed, fb. = followed by, MP = mid-POST, P = POST, LP = late POST.

[1] A portion of the common ragweed population may have been resistant to ALS-herbicides.

[2] Herbicide and additive costs = avg. of price lists (April 2008); Application cost = $6.00/A; Roundup Ready seed premium = $11.00/A; seeding rate = 156,000 seeds/A. Weed control costs = Herbicide $ + Additive $ + Application $ + seed premium $ (where applicable).

[3] Crop selling price = $8.00/bu (December 2008). Economic return = (Yield x Price) – Weed Control Costs.

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

† Indicates significant soybean injury 7 days after MPOS application, soybean injury was negligible 35 day after this application.