

Economics of Commercial Weed Control Programs in Soybean, 2010 Christy L. Sprague

A field trial in soybean was conducted in 2010 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 2010. 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 52.1 bu/A and the weedy (untreated) yield was 16 bu/A, resulting in a yield loss of 36.1 bu/A (70 %).

Within 14 days after planting and application of the preemergence herbicides the site received 2.6-inches of rain. Additionally, this study was conducted on higher pH soils, as a result all of the soil-applied herbicide programs caused significant soybean injury, 20 days after planting (20 DAP). However, soybean outgrew most of this injury and it appeared that early soybean injury did not result in significant yield losses. Table 3 contains the data for soybean injury, weed control, herbicide program costs, soybean yield, and economic returns. Please note overall yields were lower than previous years due to minimal rainfall at this location during July and August (pod-fill).

Table 1. Site description.

Crop	Soybean
Variety	Pioneer 92M61
Soil Texture	Loam
Soil pH	7.2
Soil Organic Matter	2.7
Dominant Weeds	SETFA, CHEAL, AMASS, AMBEL, BRAKA
Planting Date	May 28
Application Timings:	
PRE	May 28
Mid-POST (MPOS)	June 21
POST	June 25
Late-POST (LPOS)	July 12
Evaluation Times	Soybean injury – at POST Weed control late-July

Abbreviations: SETFA = giant foxtail, CHEAL = c. lambsquarters, AMASS = pigweed species (mostly Powell amaranth and redroot pigweed), AMBEL = c. ragweed, BRAKA = wild mustard.

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

Conventional	Treatments (Rate/A)	Abbreviated Form
PRE	Canopy (2.25 oz) + Linex (1 pt) + Cinch (1 pt)	Canopy + Linex + Cinch
PRE/POST	Optill (2 fl oz) + Prowl H ₂ O (2 pt) fb. Flexstar (10 fl oz) + COC (1%) + AMS (17 lb/100gal) Prowl H ₂ O (2 pt) fb. Raptor (4 fl oz) + Flexstar (10 fl oz) + COC (1%) + AMS (17 lb/100gal) Authority MTZ (10 oz) + Command (2 pt) fb. Cadet (0.5 fl oz) + COC (1%) Authority XL (3.2 oz) + Command (1.33 pt) fb. Cadet (0.5 fl oz) + Fusilade (4 fl oz) + COC (1%)	Optill + Prowl fb. + Flexstar (P) Prowl fb. Raptor + Flexstar (MP) Auth MTZ + Command fb. Cadet (LP) Auth XL + Com fb. Cadet + Fusilade (LP)
Roundup Ready		
PRE/POST	Valor (2 oz) fb. Roundup PowerMax (22 fl oz) + AMS (17 lb/100 gal) Valor XLT (3 oz) fb. Roundup PowerMax (22 fl oz) + AMS (17 lb/100 gal) Envive (2.5 oz) fb. Roundup PowerMax (22 fl oz) + AMS (17 lb/100 gal) Synchrony (1.5 oz) fb. Roundup PowerMax (22 fl oz) + AMS (17 lb/100 gal) Boundary (1.5 pt) fb. Flexstar GT (3 pt) + NIS (0.25%) + AMS (8.5 lb/100 gal) Prefix (2 pt) fb. Touchdown Total (24 fl oz) + AMS (8.5 lb/100 gal) Sonic (3 oz) fb. Durango DMA (24 fl oz) + AMS (17 lb/100 gal) Sonic (4.5 oz) fb. Durango DMA (24 fl oz) + AMS (17 lb/100 gal) Authority XL (3.2 oz) fb. Roundup PMax (22 fl oz) + Cadet (0.5 fl oz) + AMS (17 lb/100 gal)	Valor fb. RupPM (P) Valor XLT fb. RupPM (P) Envive fb. RupPM (P) Synchrony fb. RupPM (P) Boundary fb. Flexstar GT (P) Prefix fb. Tdown (P) Sonic (L) fb. Durango (P) Sonic (H) fb. Durango (P) Auth XL fb. Rup PM (22 fl oz) + Cadet (P)
POST (2-pass)	Roundup PowerMax (22 fl oz) + Warrant (3 pt) + AMS (17 lb/100 gal) fb. Roundup PowerMax (22 fl oz) + AMS (17 lb/100 gal) Roundup PowerMax (22 fl oz) + AMS (17 lb/100 gal) fb. Roundup PowerMax (22 fl oz) + Warrant (3 pt) + AMS (17 lb/100 gal) Durango DMA (24 fl oz) + FirstRate (0.3 oz) + AMS (17 lb/100gal) fb. Durango DMA (24 fl oz) + AMS (17 lb/100 gal) Flexstar GT (3 pt) + NIS (0.25%) + AMS (8.5 lb/100 gal) fb. Touchdown Total (24 fl oz) + AMS (8.5 lb/100 gal) Roundup PowerMax (22 fl oz) + AMS (17 lb/100 gal) - MPOS fb. LPOS	Rup PM (MP) + Warrant fb. Rup PM (LP) Rup PM (MP) fb. Rup PM + Warrant (LP) Durango + FRate (MP) fb. Durango (LP) Flexstar GT (MP) fb. Tdown (LP) RupPM (MP) fb. RupPM (LP)

Table 3. Soybean injury, weed control, program costs, soybean yield, and economic returns for 19 herbicide programs in 2010.

Herbicide Programs	Soybean						All Weeds (≥90%)	Costs ¹ (\$/A)	Yield (bu/A)	Economic Returns ² (\$/A)
	Injury (%)	SETFA	CHEAL	AMASS	AMBEL	BRAKA				
PRE (Conventional)										
Canopy + Linex + Cinch	18†	95	99	99	95	99	YES	\$36.40	45.6	\$522.20*
PRE fb. POST (Conventional)										
Optill + Prowl fb. + Flexstar (P)	15†	90	99	99	98	99	YES	\$46.25	49.9*	\$565.03*
Prowl fb. Raptor + Flexstar (MP)	14†	80	99	99	94	99	NO	\$54.20	44.5	\$490.93
Auth MTZ + Command fb. Cadet (LP)	1	99	99	99	91	99	YES	\$62.60	51.0*	\$562.15*
Auth XL + Com fb. Cadet + Fusilade (LP)	2	99	99	99	92	99	YES	\$57.10	45.3	\$497.83
PRE fb. POST (Roundup Ready)										
Valor fb. RupPM (P)	11†	87	99	98	99	99	NO	\$47.60	52.1**	\$589.40**
Valor XLT fb. RupPM (P)	15†	81	99	99	99	99	NO	\$48.65	50.1*	\$565.08*
Envive fb. RupPM (P)	9†	85	99	98	99	99	NO	\$47.50	47.0*	\$528.25*
Synchrony fb. RupPM (P)	3	86	99	99	99	99	NO	\$52.20	48.8*	\$545.60*
Boundary fb. Flexstar GT (P)	18†	99	99	99	99	99	YES	\$61.15	48.0*	\$526.85*
Prefix fb. Tdown (P)	18†	99	99	99	99	99	YES	\$49.45	52.1**	\$588.78*
Sonic (L) fb. Durango (P)	0	74	99	99	99	99	NO	\$49.40	44.5	\$495.73
Sonic (H) fb. Durango (P)	0	79	99	99	99	99	NO	\$55.90	49.2*	\$546.80*
Auth XL fb. Rup PM (22 fl oz) + Cadet (P)	2	76	99	99	90	99	NO	\$52.70	46.1*	\$512.03
POST 2-pass (Roundup Ready)										
Rup PM (MP) + Warrant fb. Rup PM (LP)	0	99	99	99	99	99	YES	\$54.40	47.9*	\$532.28*
Rup PM (MP) fb. Rup PM + Warrant (LP)	0	99	99	99	99	99	YES	\$54.40	47.4*	\$526.25*
Durango + FRate (MP) fb. Durango (LP)	0	99	99	99	99	99	YES	\$52.10	45.4	\$504.05
Flexstar GT (MP) fb. Tdown (LP)	0	99	99	99	99	99	YES	\$53.90	47.3*	\$525.53*
RupPM (MP) fb. RupPM (LP)	0	98	99	99	99	99	YES	\$45.00	42.8	\$479.30
Untreated	0	0	0	0	0	0	NO	-	16.0	\$196.00

Abbreviations: SETFA = giant foxtail, CHEAL = c. lambsquarters, AMASS = pigweed species, AMBEL = c. ragweed, BRAKA= wild mustard, fb. = followed by, MP = mid-POST, P = POST, LP = late POST.

¹Herbicide and additive costs = avg. of price lists (May 2010); Application cost = \$7.00/A; Roundup Ready seed premium = \$17.14/A; seeding rate = 157,000 seeds/A. Weed control costs = Herbicide \$ + Additive \$ + Application \$ + seed premium \$ (where applicable).

²Crop selling price = \$12.25/bu (December 2010). Economic return = (Yield x Price) – Weed Control Costs.

* Values are not significantly different from the highest value within that column. ** Highest yielding and highest economic returns.

† Indicates significant soybean injury 20 days after planting, soybean injury was negligible 60 day after planting.