

# Alabama Soybean Producers Project Report, Funded 2008

**TITLE:** Soybean Production Tools for Alabama

**INVESTIGATORS:**

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**OBJECTIVES AND RESULTS:**

1. To evaluate soybean cultivars suitable for Alabama growing conditions under producer practices and growing conditions. While Auburn University/ AAES conducts soybean cultivar trials at several Experiment Stations and Fields, evaluation of selected cultivars in large blocks provides needed information under local soil and environmental conditions.

Several on-farm variety trials were planned for locations across the state. However, due to adverse weather conditions, only the trials in Dallas, Barbour, and Escambia Counties were harvested.

**MG VI and Early VII RR Varieties, High pH Soils, Dallas County, Rudy Yates – REA**

This trial was planted on 19 June 2008 following a wheat grain crop on the Sam Givhan Farm near Safford, AL. Each cultivar was planted in a single field length strip of 15 to 25 ft wide, approximately 1500 ft long. Soil type was a Leeper Silty Clay with a pH of 7.8 to 8.0. Rows were 20-inch spacing using a no-till planter with row cleaners, except for an adjacent comparison of AgVenture 73D3, planted the same day using a grain drill in 10-inch rows. A wind storm had severely lodged the wheat straw, causing difficult planting conditions and poor stands in strips across the field. Plots were maintained according to Extension recommendations. Plots were harvested on 29 October 2008 using the producer's combine and a weighing grain buggy. No significant lodging was noted for any variety. Yields were adjusted to 13% moisture and 60 lb/bu.

While early summer rainfall was generally good, dry weather during pod fill impacted yields. Some yellowing from iron chlorosis was observed and was rated on 20 August (below).

Table 1. Dallas County MG VI and VII RR Soybean Varieties on High pH Soils, 2008

<b>Brand</b>	<b>Variety</b>	<b>Bu/A @ 13.0%</b>	<b>Chlorosis*</b>
Asgrow – DeltaPine	6880 RR	26.5	1
Asgrow – DeltaPine	6568 RR	24.2	2
Asgrow	6702 RR	22.3	1
DeKalb- DKB	64-51 RR	21.7	3
Pioneer	96M60 (RR)	18.9	1
Asgrow	6301 RR	18.1	1
AgVenture	73D3**	15.2	2

\*Rated 20 Aug: 1 = green, 5 = very yellow

\*\* drilled in 10-inch rows

**Irrigated Late MG V to VII RR Soybean Varieties, Barbour County, Brandon Dillard-REA**

This trial was planted on 5 May 2008 on the Tom and Walt Corcoran Farm near Eufaula, AL. Four replications of each variety\* were planted in a Randomized Complete Block pattern. Each plot was 19 ft wide and 900 to 1100 ft long with a twin-row pattern (38-in. main centers) used at planting. Soil type was a Dothan fine sandy loam, with a previous crop of corn. Plots were irrigated, and maintained according to Extension recommendations. Samples of roots and soil for root-knot nematodes were taken from each plot on 3 October. There were no significant differences in root galling between plots and nematodes were below detectable levels at the time of sampling. Plots were harvested on 28 October 2008 using the producers' combine and a weighing grain buggy. No significant lodging was noted for any variety. Yields were adjusted to 13% moisture and 60 lb/bu.

Table 2. Irrigated MG V to VII RR Soybean Varieties, Barbour Co. 2008

<b>Variety</b>	<b>Bu/A @ 13.0%</b>	
Asgrow 7501	70.2	a
Asgrow 6702	70.2	a
DeltaPine 7330 *	67.6	ab
Dyna-Gro 35K73	65.7	ab
Croplan RC 7355	63.9	bc
Pioneer 97M50	63.3	bc
DeltaPine 5914 *	59.5	cd
Dyna-Gro 32R74	57.5	d
<b>LSD (P = 0.10)</b>	<b>4.2</b>	
<b>CV</b>	<b>5.3</b>	

Means followed by same letter do not significantly differ (P=.10, Duncan's New MRT)  
\* Due to limited seed at planting, only 2 replications were planted for these two varieties.

### **MG V to VII RR Soybean Varieties, Escambia County, Richard Petcher- REA**

This trial was planted on 18 June 2008 following a wheat grain crop on the Bennie and Matt Watson Farm near Atmore, AL. Each cultivar was planted in a single block of 36 ft wide and 725 ft long in 7.5 inch rows using a grain drill. Plots were maintained according to Extension recommendations. Rainfall was timely such that no irrigation was needed. Plots were harvested on 6 November 2008 using the producers' combine and a weighing grain buggy. No significant lodging was noted for any variety. Yields were adjusted to 13% moisture and 60 lb/bu.

Table 3. Escambia County MG V to VII RR Soybean Varieties, 2008

<b>Brand</b>	<b>Variety</b>	<b>Bu/A @ 13.0%</b>
NK	S 74-W6	58.8
NK	S 78-G6	58.5
Asgrow	7601	57.4
Asgrow	6702 RR	56.8
Asgrow - DeKalb	6301 RR	56.0
DeKalb- DKB	64-51 RR	55.8
Pioneer	96M60	55.7
NK	S 65-M3	55.2
Terral	59R16	55.1
Dyna-Gro	35K73	54.1
Terral	55R15	53.7
NK	S 61-Q2	53.1
NK	S 68-D4	52.8
NK	S 80-P2	51.9
Asgrow – DeltaPine	6568 RR	51.9

2. To evaluate the use of various desiccants and combinations and rates, particularly with early maturing and strobiluron fungicide-treated soybeans. The increasing use of these practices in Alabama has led to many fields with harvest ready pods, but green leaves, stems and sometimes weeds which slow harvest and can affect grain quality. Application of desiccants may speed harvest and lower harvest costs and discounts, but little information is available to recommend the most effective and economical products and mixtures.

Three locations were selected for these trials – Gulf Coast REC (GCREC), EVS Field Crops (EVS), and Sand Mountain REC (SMREC). All trials were planted with a mid to late MG IV soybean variety and were sprayed two to three times during the growing season with a strobiluron or strobiluron/triazole tank-mix to encourage the greening effect noted in previous experiences.

Trials at Gulf Coast, EVS and Sand Mountain were sprayed with 10 combinations of labeled desiccants at pod maturity, then rated for soybean and weed desiccation. All plots were harvested at the same time per location approximately two weeks after application with a plot combine. Soybeans were weighed before and after drying, and samples were analyzed for moisture, trash and 100-seed weights.

Extremely wet soil conditions at GCREC in mid-summer limited yields (~ 35 bu/A), while early summer dry weather at Sand Mountain limited plant size and yields (~ 32 bu/A). Supplemental irrigation at EVS allowed yields of ~ 50 bu/A.

There were no significant differences in yield, harvest moisture, trash content or 100-seed weights between treatments at any location. Good harvest conditions in the early fall likely contributed to the lack of differences for yield and quality.

Plots were rated for leaf and stem desiccation at 6 to 11 Days After Treatment (DAT), with all treatments increasing leaf desiccation at 6 to 9 DAT at all locations. At EVS (Table 4), treatments including paraquat @ 0.5 lb/A (= 1 pt of Gramoxone Inteon) generally gave the best leaf desiccation compared to the check or Aim + Roundup WeatherMax, however, by the 11 DAT rating, all applications were not significantly different. At SMREC (Table 5), all treatments except those including Aim increased leaf desiccation. At GCREC (Table 5), all treatments increased leaf desiccation, with those treatments including higher rates of paraquat and sodium chlorate generally more effective.

Table 4. Leaf and Stem Desiccation after Application of Harvest Aids to Soybeans, EVS 2008

Trt No.	Treatment	Rate	Unit	Leaf*		Stem		Leaf		Stem	
				6 DAT**		6 DAT		11 DAT		11 DAT	
1	Untreated Check			3.8	d	3.5	c	5	b	4.5	c
2	Gramoxone Inteon	0.125	lb ai/a	7.5	c	6.5	ab	8.3	a	7	b
	NIS	0.5	% v/v								
3	Gramoxone Inteon	0.25	lb ai/a	8.8	abc	8	ab	9	a	8.8	a
	NIS	0.5	% v/v								
4	Gramoxone Inteon	0.5	lb ai/a	9	ab	8	ab	9	a	9	a
	NIS	0.5	% v/v								
5	Gramoxone Inteon	0.25	lb ai/a	9.3	a	8.5	a	9	a	8.8	a
	Sodium Chlorate	3	lb ai/a								
	NIS	0.5	% v/v								
6	Sodium Chlorate	6	lb ai/a	8.8	abc	7.5	ab	9	a	8.5	a
	NIS	0.5	% v/v								
7	Firestorm	0.25	lb ai/a	9	ab	7.8	ab	9	a	9	a
	NIS	0.5	% v/v								
8	Aim	1.4	fl oz/a	8.3	abc	6.5	ab	8.8	a	7.8	ab
	Crop Oil Concentrate	1	% v/v								
9	Aim	1.4	fl oz/a	8.8	abc	7	ab	8.8	a	8.3	ab
	Gramoxone Inteon	0.125	lb ai/a								
	Crop Oil Concentrate	1	% v/v								
10	Aim	1.4	fl oz/a	7.8	bc	6.3	b	8.8	a	8.3	ab
	Roundup WeatherMax	22	fl oz/a								
LSD (P=.10)				0.82		1.23		0.59		0.94	
CV				8.38		14.65		5.81		9.79	
Treatment Prob(F)				0.0001		0.0001		0.0001		0.0001	
Means followed by same letter do not significantly differ (P=.10, Student-Newman-Keuls)											
*1= green, 10=dry											
** DAT = Days After Treatment											

Stem desiccation at EVS was increased by all treatments at 6 DAT, with the only difference between treatments Gramoxone + Sodium chlorate > Aim + Roundup WeatherMax. However, by 11 DAT, all treatments with paraquat @ 0.5 lb a.i/A greater, or sodium chlorate @ 3 lb a.i/A or greater, increased stem desiccation compared to paraquat @ 0.125 lb/A. At SMREC, stem desiccation was increased by higher rates of paraquat, while there was no significant difference in stem desiccation between any treatment and the check at GCREC.

Table 5. Leaf and Stem Desiccation after Application of Harvest Aids to Soybeans, SMS and GCREC 2008

Trt No.	Treatment	Rate	Unit	SMS				GCREC			
				Leaf		Stem		Leaf		STEM	
				9 DAT	9 DAT	9 DAT	9 DAT	10 DAT	10 DAT	10 DAT	10 DAT
1	Untreated Check			4.5	d	4.8	d	2.3	d	1.0	b
2	Gramoxone Inteon	0.125	lb ai/a	7.3	c	6.3	c	5.3	c	1.3	b
	NIS	0.5	% v/v								
3	Gramoxone Inteon	0.25	lb ai/a	9.5	a	8.0	ab	6.5	c	1.3	b
	NIS	0.5	% v/v								
4	Gramoxone Inteon	0.5	lb ai/a	9.8	a	8.5	a	8.8	ab	2.8	a
	NIS	0.5	% v/v								
5	Gramoxone Inteon	0.25	lb ai/a	8.8	ab	8.0	ab	9.3	a	3.0	a
	Sodium Chlorate	3	lb ai/a								
	NIS	0.5	% v/v								
6	Sodium Chlorate	6	lb ai/a	8.8	ab	6.8	bc	7.0	bc	1.3	b
	NIS	0.5	% v/v								
7	Firestorm	0.25	lb ai/a	9.3	a	8.0	ab	5.8	c	1.5	b
	NIS	0.5	% v/v								
8	Aim	1.4	fl oz/a	5.3	d	4.5	d	7.0	bc	1.5	b
	Crop Oil Concentrate	1	% v/v								
9	Aim	1.4	fl oz/a	8.0	bc	6.3	c	6.8	c	1.3	b
	Gramoxone Inteon	0.125	lb ai/a								
	Crop Oil Concentrate	1	% v/v								
10	Aim	1.4	fl oz/a	5.3	d	5.5	cd	7.0	bc	1.8	b
	Roundup WeatherMax	22	fl oz/a								
LSD (P=.10)				1.06		1.17		1.76		0.78	
CV				1.834		2.907		4.625		1.045	
Treatment Prob(F)				0.0001		0.0001		0.0001		0.0012	
Means followed by same letter do not significantly differ (P=.10, Student-Newman-Keuls)											
*1= green, 10=dry											
** DAT = Days After Treatment											

### Conclusions:

Although yields were not increased by harvest aid treatments when all plots were harvested at the same time, several treatments increased leaf and stem desiccation, which could lead to increased harvest efficiency and timeliness. Generally, higher rates (0.5 lb ai/A or the equivalent of 1 pt/A of Gramoxone Inteon) or the addition of sodium chlorate were needed for maximum effect. Treatments containing Aim generally increased desiccation over the check, but were less effective or consistent than those containing higher rates of paraquat.

3. Experiments were conducted at Tennessee Valley (TVS) and Sand Mountain (SMS) RECs to determine the effects of late applications of glyphosate on soybean yields. Current guidelines call for ceasing glyphosate applications at the R3 or beginning pod stage, until maturity, but producers often ask about applications to control late maturing weeds.

The trial at the Tennessee Valley RREC investigated the use of two rates (1X and 2X normal rates) at two post-bloom growth stages. DeltaKing 5068 RR was planted on 07 May in a Decatur silt loam, and managed according to Extension recommendations. Plots were 4 \* 30-inch rows, 30 feet long, in a Randomized Complete Blocks with four replications. Roundup WeatherMax (5.5 lb/gal glyphosate) applications were applied in a factorial design at either the R4 or R5 growth stages at 22 or 44 fl. oz/A. R4 growth stage (full-size pod stage) applications were made on 25 July, while R5 (beginning seed fill) growth stage applications were made on 31 July.

Herbicides were applied in 20 gal/A of water using a backpack CO2 sprayer equipped with TeeJet 8002VS flat fan nozzles on 19-in. centers at 55 psi. The center two rows were harvested with a plot combine on 22 October, weighed and samples taken for seed weights.

Plant growth and yields were limited by dry weather, with no significant differences between any treatments or factors for yield or 100-seed weight. (Table 6.)

Table 6. Soybean Yields and 100-seed Weights After Glyphosate Application at the R3 and R5 Growth Stage, Tennessee Valley REC (TVRREC) in 2008

				<b>YIELD</b>	<b>100 seed</b>
<b>Treatment</b>	<b>Rate</b>		<b>Stage</b>	<b>BU/A</b>	<b>g</b>
Untreated Check				49.9	14.24
Roundup Weather Max	22	oz/a	R4	49.8	14.85
Roundup Weather Max	22	oz/a	R5	48.1	14.62
Roundup Weather Max	44	oz/a	R4	50.4	15.10
Roundup Weather Max	44	oz/a	R5	49.5	14.81
<i>LSD (P=.10)</i>				<b>NS</b>	<b>NS</b>

The trial at the Sand Mountain RREC also investigated the use of two rates (1X and 2X normal rates) at two post-bloom growth stages. Dyna-Gro 3443nRR was planted on 02 May using strip tillage in a Wynnville sandy loam, and managed according to Extension recommendations. Plots were 4 \* 36-inch rows, 25 feet long, in a Randomized Complete Blocks with four replications. Roundup WeatherMax (5.5 lb/gal glyphosate) applications were applied in a factorial design at either the R3 or R5 growth stages at 22 or 44 fl. oz/A. R3 growth stage (3/16" pod stage) applications were made on 17 July, while R5 (beginning seed fill) growth stage applications were made on 29 July.

Herbicides were applied in 20 gal/A of water using a backpack CO2 sprayer equipped with TeeJet 8002VS flat fan nozzles on 19-in. centers at 55 psi. The center two rows were harvested on 30 September with a plot combine, weighed and samples taken for seed weights.

Plant growth and yields were limited by extremely dry weather, with no significant differences between treatments or factors for yield or 100-seed weight. (Table 7.)

Table 7. Soybean Yields and 100-seed Weights After Glyphosate Application at the R3 and R5 Growth Stage Sand Mountain REC (SMS) in 2008

<u>Treatment</u>	<u>Rate</u>		<u>Stage</u>	<u>YIELD</u> <u>BU/A</u>	<u>100 seed</u> <u>g</u>
Untreated Check				18.7	13.11
Roundup Weather Max	22	oz/a	R3	18.6	12.78
Roundup Weather Max	22	oz/a	R5	16.9	12.90
Roundup Weather Max	44	oz/a	R3	17.8	12.97
Roundup Weather Max	44	oz/a	R5	17.5	13.02
<i>LSD (P=.10)</i>				<b>NS</b>	<b>NS</b>

**Conclusions:**

Dry weather limited early plant growth and yields, particularly at SMS. However, late application of glyphosate at either the R3-R4 or R5 growth stage did not significantly affect yield or 100-seed weights at either location in 2008.