

RESEARCH AND DEVELOPMENT
PROJECT REPORT

Evaluation of the Crop Safety and Response of Albion B5 after Glyphosate
Application Compared to Brandt Smart Trio

Trial ID: ALB1602M

Albion, MI – Michigan Ag Research Station

Prepared for:

Jeremy O'Brien / Albion Minerals

Prepared by:



June – October, 2016
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ABSTRACT

Objective: Evaluate the effect of Albion B5 on crop response after application with glyphosate compared to Brandt Smart Trio.

Product(s) tested: Buccaneer Plus, Brandt Smart Trio, and Albion B5

Location: Albion, MI – Michigan Ag Research Station

Project Duration: June 2 (Planting) to October 10 (Harvest), 2016

Key Findings:

- No phytotoxic effects observed on soybeans for any product tested
- Weed control was not significantly different among the treatments
- Yields were not significantly impacted by Albion B5 at either rate but highest with the 1 qt/acre rate

Narrative:

Here we evaluate the efficacy of 0.5 and 1 qt/a rates of Albion B5 compared to Brandt Smart Trio on

species was high, greater than 83% for velvetleaf and >87% for foxtail with little deviation from the average. At 10 DA-A, lambsquarter control was numerically lowest on the untreated plots and highest on the plots treated with the low rate of Albion B5 (86%, $P=0.35$). By 24 DA-A, lambsquarter control was above 95% for all treatments.

Total soybean yields were calculated in bushels/acre, with an average of 59/acre for each treatment. Soybean yields were higher, numerically, on the plots treated with the high rate of Albion B5, though not significantly so ($p=0.46$). Estimated gross returns were as much as \$80 more per acre for the higher of the two rates, but means separations were not significant compared to the untreated.

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MATERIALS AND METHODS

Treatments:

This study consisted of four treatments with one application on June 21 (A), 2016.

1. Buccaneer Plus – 1 qt/a (A)
2. Brandt Smart Trio – 1 qt/a (AB) + Buccaneer Plus – 1 qt/a (A)
3. Albion B5 – 16 fl oz/a (AB) + Buccaneer Plus – 1 qt/a (A)
4. Albion B5 – 1 qt/a (AB) + Buccaneer Plus – 1 qt/a (A)

Experimental Unit:

This trial was conducted on AG 2535 variety soybeans in a field. Plants were spaced 30 inches apart with a planting density of 126,000 plants per acre. Plots were 10 feet by 40 feet, and four treatments were replicated four times in a randomized complete block design for a total experiment size of 6,400 square feet. The soil had a pH of 5.9, a cation exchange capacity of 3.7 meq/100g soil, and 1.7% organic matter. The soil texture consisted of 54% sand, 28% silt, and 18% clay particles.

Pest Description:

Green foxtail (*Setaria viridis major*), common lambsquarters (*Chenopodium album*), velvetleaf (*Abutilon theophrasti*), and common ragweed (*Ambrosia artemisiifolia*) were naturally occurring in the field alongside the soybeans.

had a spray volume of 20 gallons per acre and a mix size of 3 liters.

Evaluations:

The number of weeds per two square feet was counted to determine the weed density on July 1 (9 DA A), 2016.

The control of each weed species was evaluated on a scale of 0 to 100 percent where 0% indicates no weed control and 100% indicates no evidence of that species of weed on July 1 (10DA-A) and July 15 (24 DA-A), 2016.

Corn was harvested, weighed in pounds, tested for percent moisture, and busheled and weighed for a test weight on October 10 (111 DA-B), 2016.

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Table 1. Green Foxtail Control (%). The control of green foxtail was evaluated on a scale of 0 to 100 percent where 0% indicates no weed control and 100% indicates no evidence of that species of weed on July 1 (10DA-A) and July 15 (24 DA-A), 2016.

Green Foxtail Control (%)		07/01/16	07/15/16	10 DA-A	24 DA-A
Trt	Treatment Rate	Appl No.	Name		
Rate	Unit	Code			
			1 Buccaneer Plus 1 qt/a	A	87.5% a 100.0% a
			2 Brandt Smart Trio 1 qt/a	AB	95.0% a 100.0% a
			3 Albion B5 16 fl oz/a	AB	100.0% a 100.0% a
			4 Albion B5 1 qt/a	AB	92.5% a 100.0% a

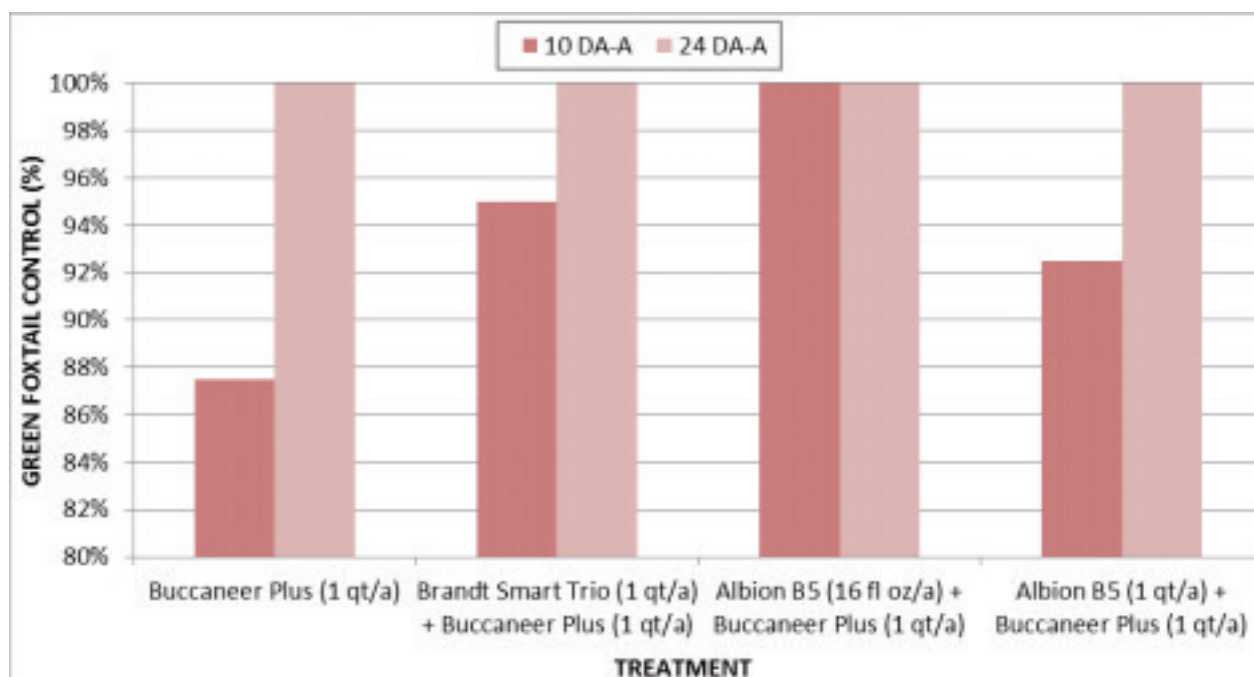


Chart 1. Green Foxtail Control (%). The control of green foxtail was evaluated on a scale of 0 to 100 percent where 0% indicates no weed control and 100% indicates no evidence of that species of weed on July 1 (10DA-A) and July 15 (24 DA-A), 2016.

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Table 2. Common Lambsquarter Control (%). The control of common lambsquarter was evaluated on a scale of 0 to 100 percent where 0% indicates no weed control and 100% indicates no evidence of that species of weed on July 1 (10DA-A) and July 15 (24 DA-A), 2016.

Common Lambsquarter Control (%)		07/01/16	07/15/16	10 DA-A	24 DA-A
Trt	Treatment Rate Appl No. Name				
	Rate Unit Code				
1	Buccaneer Plus 1 qt/a A	68.8% a	100.0% a		
2	Brandt Smart Trio 1 qt/a AB	78.8% a	95.0% a		
3	Albion B5 16 fl oz/a AB	86.3% a	100.0% a		
4	Albion B5 1 qt/a AB	83.8% a	95.0% a		

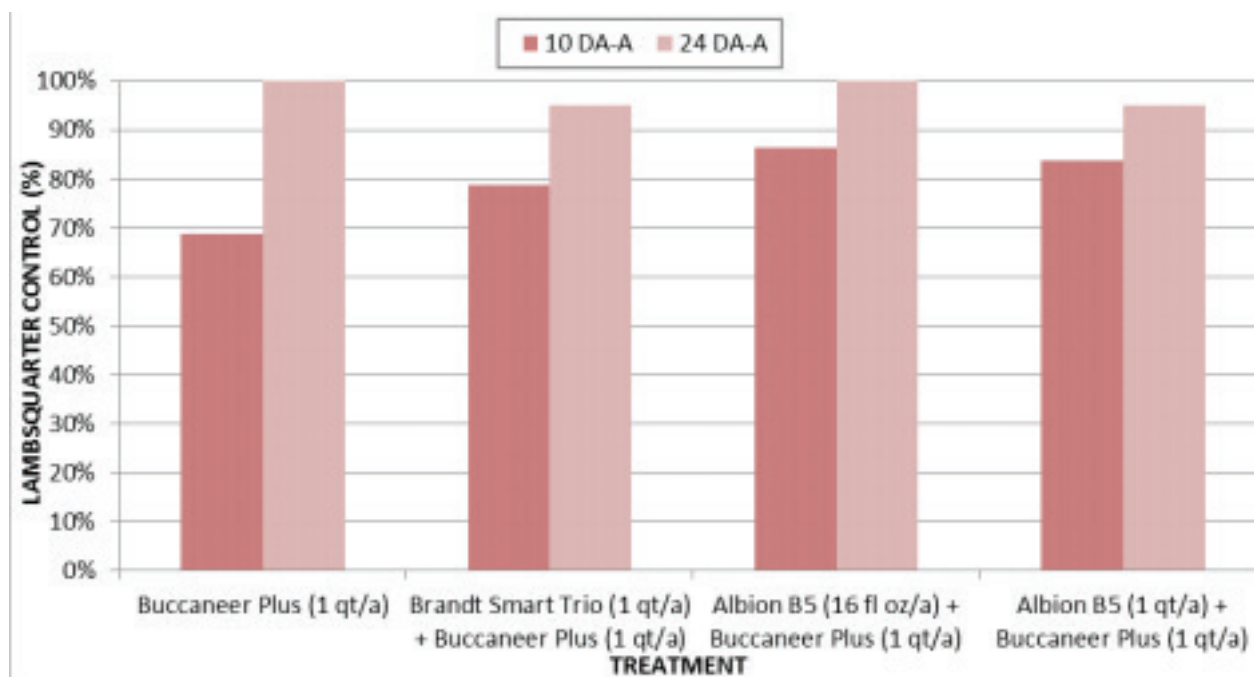


Chart 2. Common Lambsquarter Control (%). The control of common lambsquarter was evaluated on a scale of 0 to 100 percent where 0% indicates no weed control and 100% indicates no evidence of that species of weed on July 1 (10DA-A) and July 15 (24 DA-A), 2016.

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Table 3. Velvetleaf Control (%). The control of velvetleaf was evaluated on a scale of 0 to 100 percent where 0% indicates no weed control and 100% indicates no evidence of that species of weed on July 1 (10DA-A) and July 15 (24 DA-A), 2016.

Velvetleaf Control (%)		07/01/16	07/15/16	10 DA-A	24 DA-A
Trt	Treatment Rate Appl No. Name				
	Rate Unit Code				
1	Buccaneer Plus 1 qt/a A	83.8% a	100.0% a		
2	Brandt Smart Trio 1 qt/a AB	83.8% a	100.0% a		
3	Albion B5 16 fl oz/a AB	87.5% a	100.0% a		
4	Albion B5 1 qt/a AB	86.3% a	100.0% a		

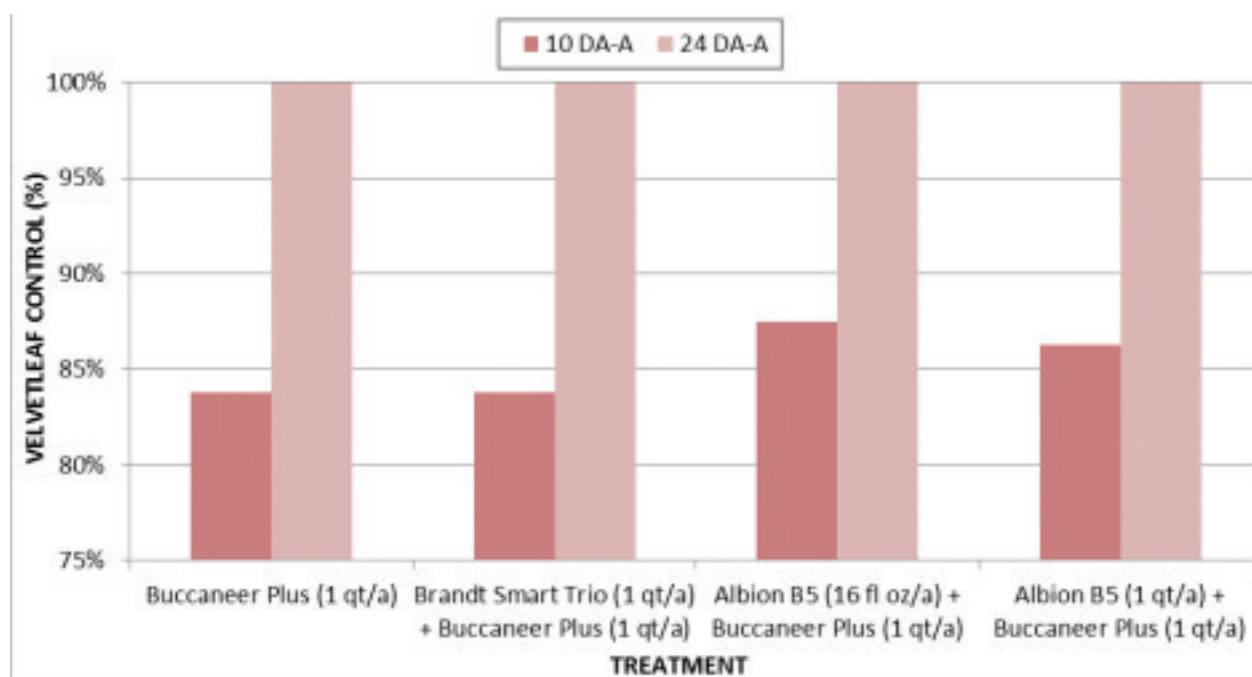


Chart 3. Velvetleaf Control (%). The control of velvetleaf was evaluated on a scale of 0 to 100 percent where 0% indicates no weed control and 100% indicates no evidence of that species of weed on July 1 (10DA-A) and July 15 (24 DA-A), 2016.

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Table 4. Weed Density. The number of weeds per two square feet was counted to determine the weed density on July 1 (9 DA-A), 2016. No replication.

Weed Density, July 1, 2016 (9 DA-A) (plant/ft ²)			
Trt	Treatment	Rate	Appl
			Giant Green Common
			Velvetleaf 3
No.	Name	Rate	Unit
Code	1 Buccaneer Plus	B5 1 qt/a	AB
	1 qt/a	A 2 Brandt	Buccaneer Plus 1 qt/a
	Smart Trio	1 qt/a	AB
	Buccaneer Plus	1 qt/a	A
	A 3 Albion B5	16 fl	oz/a
	AB Buccaneer	6	
			Foxtail
			Lambsquarter 45

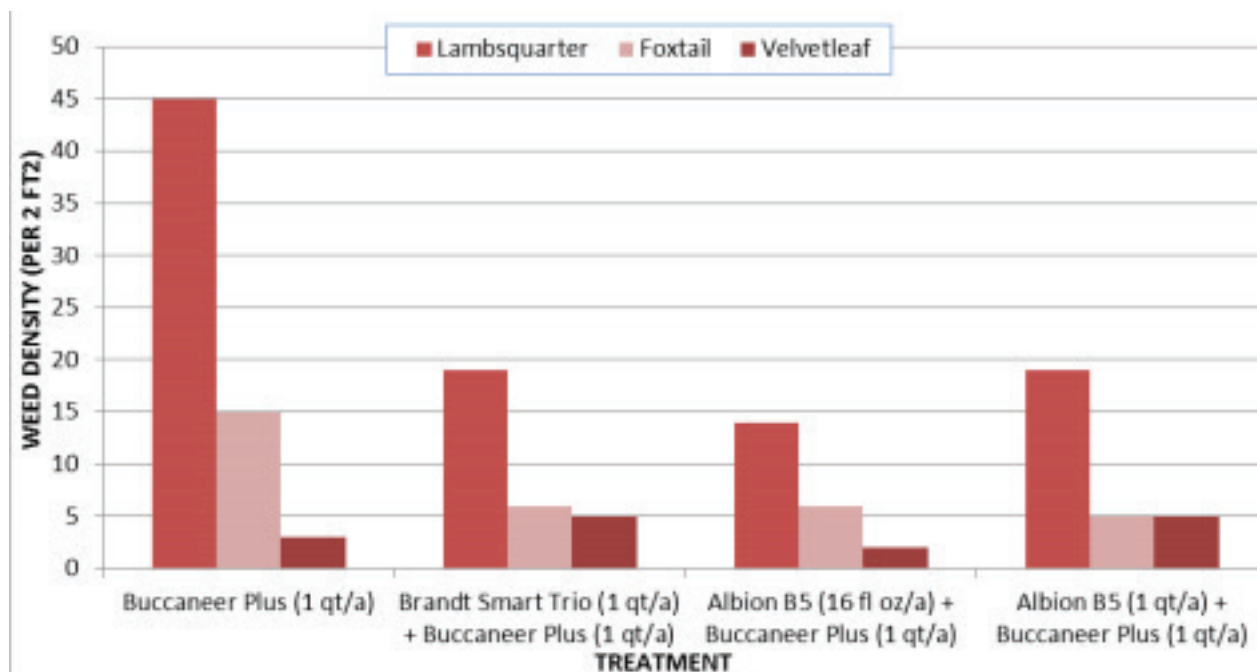


Chart 4. Weed Density. The number of weeds per two square feet was counted to determine the weed density on July 1 (9 DA-A), 2016.

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Table 5. Yield Weight. Soybean weights per plot, in pound, from plots harvested October 10 (111 DA A), 2016.

10/10/16 111 DA-A			
Trt	Treatment	Rate	Appl No.
Name	Rate	Unit	Code
1	Buccaneer Plus	1 qt/a	A
16.05			a
2	Brandt Smart Trio	1 qt/a	AB
15.98			a
3	Albion B5	16 fl oz/a	AB
14.93			a
4	Albion B5	1 qt/a	AB
17.28			a

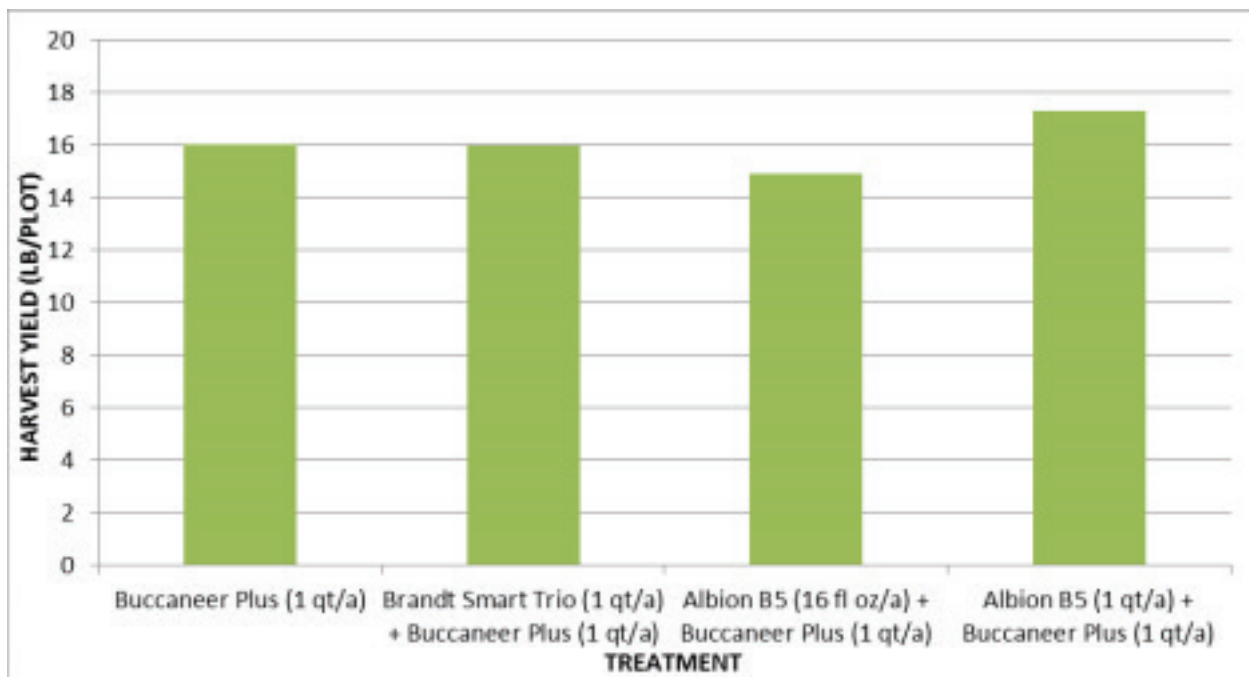


Chart 5. Yield Weight. Soybean weights per plot, in pound, from plots harvested October 10 (111 DA-A), 2016.

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Table 6. Moisture Content (%). The moisture content of soybeans at harvest was recorded from samples from each plot.

10/10/16 111 DA-A	
Trt	Treatment Rate Appl No.
Name	Rate Unit Code
1	Buccaneer Plus 1 qt/a A 12.0% a
2	Brandt Smart Trio 1 qt/a AB 12.2% a
	Buccaneer Plus 1 qt/a A
3	Albion B5 16 fl oz/a AB 12.6% a
	Buccaneer Plus 1 qt/a A
4	Albion B5 1 qt/a AB 12.3% a
	Buccaneer Plus 1 qt/a A

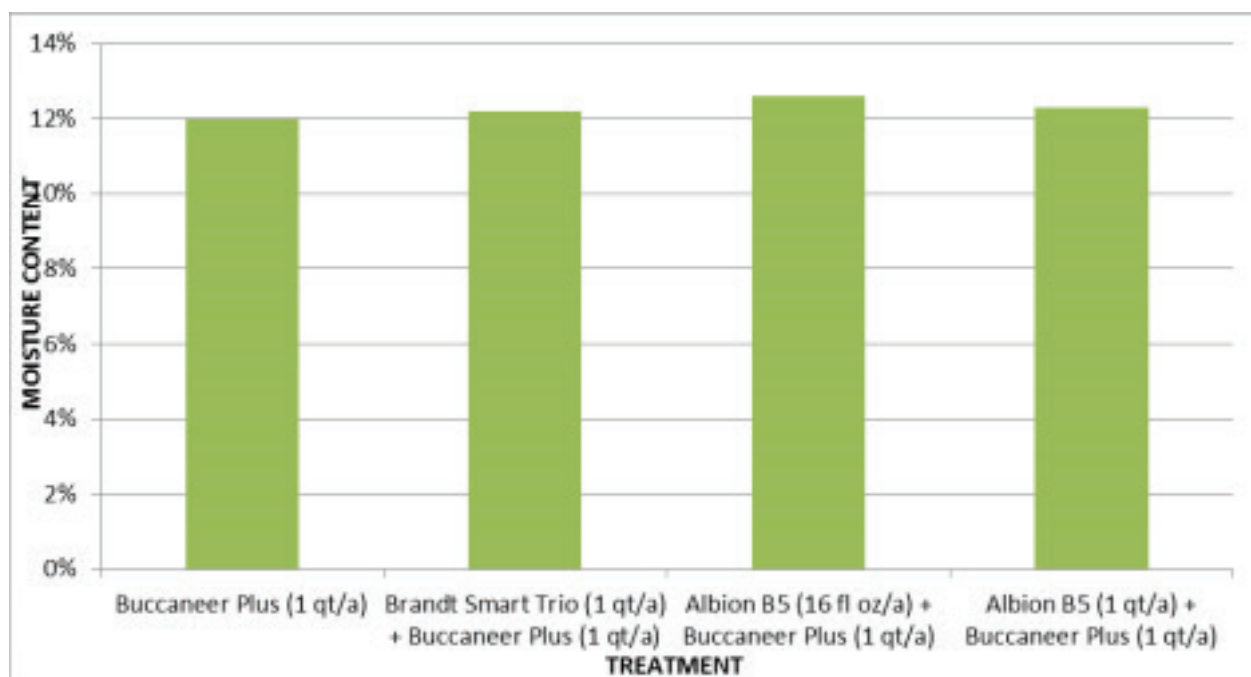


Chart 6. Moisture Content (%). The moisture content of soybeans at harvest was recorded from samples from each plot.

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Table 7. Test Weight (Lbs/Bushel). The test weight (in pounds/bushel) of soybeans at harvest was recorded for each plot on October 10 (111 DA-A), 2016.

10/10/16111 DA-A	
Trt	Treatment Rate Appl No.
Name	Rate Unit Code
1	Buccaneer Plus 1 qt/a A 56.70 a
2	Brandt Smart Trio 1 qt/a AB 58.70 a
	Buccaneer Plus 1 qt/a A
3	Albion B5 16 fl oz/a AB 59.60 a
	Buccaneer Plus 1 qt/a A
4	Albion B5 1 qt/a AB 54.70 a
	Buccaneer Plus 1 qt/a A

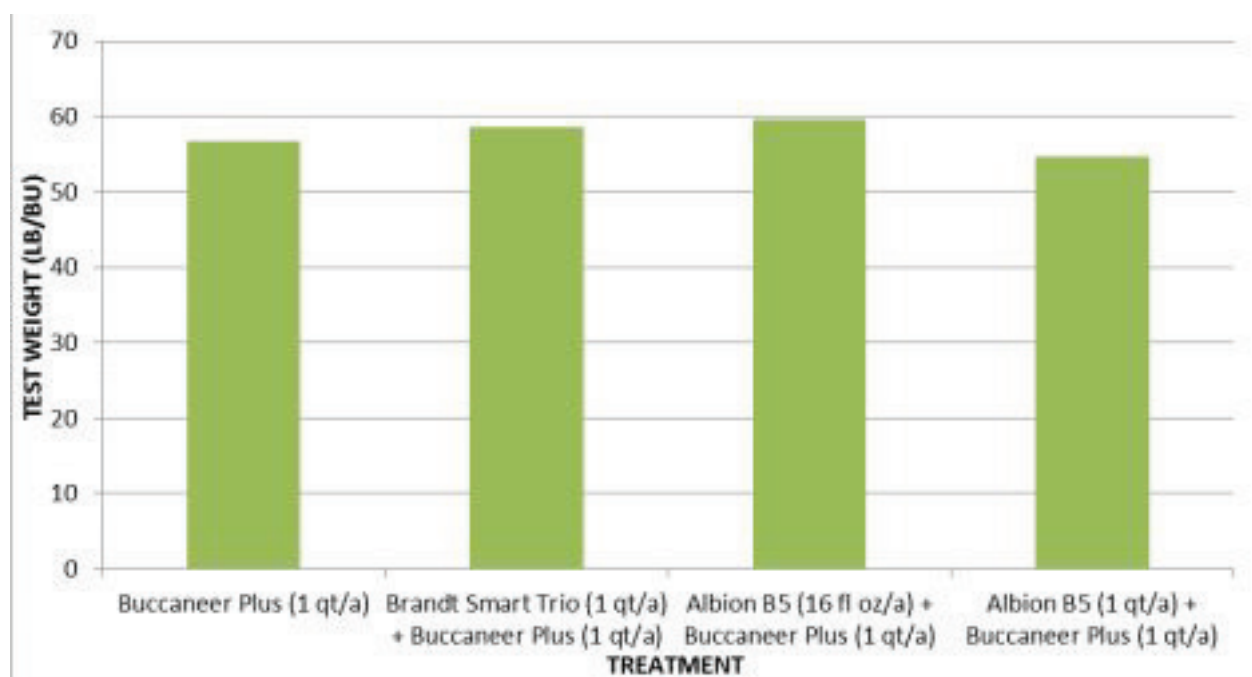


Chart 7. Test Weight (Lbs/Bushel). The test weight (in pounds/bushel) of soybeans at harvest was recorded for each plot on October 10 (111 DA-A), 2016.

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Table 8. Moisture-Adjusted Bushels per Acre. An estimate of the number of bushels per acre, adjusted to 13% moisture content for soybeans harvested on October 10 (111 DA-B), 2016.

Harvest Yield (Bu/Ac)	Trt	Treatment	Rate	Appl No.	10/10/16	111 DA-A
Name	Rate	Unit	Code			
	1	Buccaneer Plus	1 qt/a	A	58.92	a
	2	Brandt Smart Trio	1 qt/a	AB	58.48	a
	3	Albion B5	16 fl oz/a	AB	54.50	a
	4	Albion B5	1 qt/a	AB	63.23	a

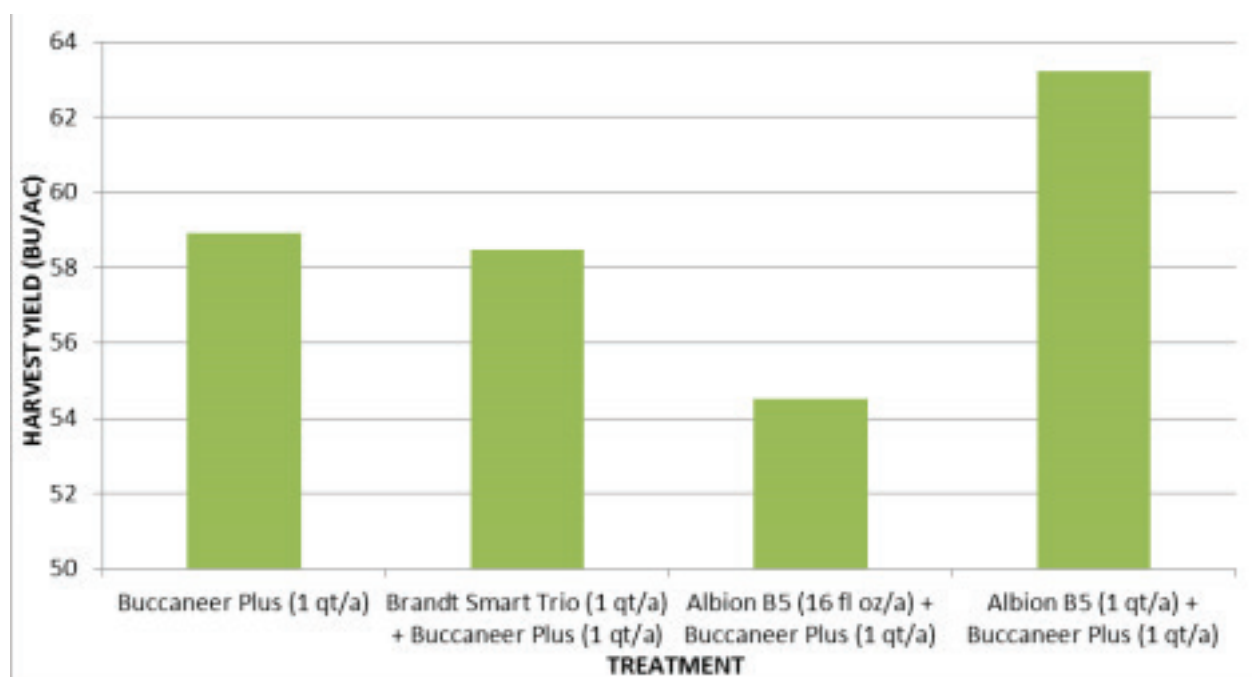


Chart 8. Moisture-Adjusted Bushels per Acre. An estimate of the number of bushels per acre, adjusted to 13% moisture content for soybeans harvested on October 10 (111 DA-B), 2016.

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Table 9. Estimated Gross Returns (\$/Ac). The estimated gross return per acre was based on a market value of \$10.30 per bushel of soybeans for November 22, 2016.

10/10/16 111 DA-A

Trt Treatment Rate Appl No.

Name Rate Unit Code

1 Buccaneer Plus 1 qt/a A \$607 a

2 Brandt Smart Trio 1 qt/a AB \$602 a

Buccaneer Plus 1 qt/a A

3 Albion B5 16 fl oz/a AB \$561 a

Buccaneer Plus 1 qt/a A

4 Albion B5 1 qt/a AB \$651 a

Buccaneer Plus 1 qt/a A

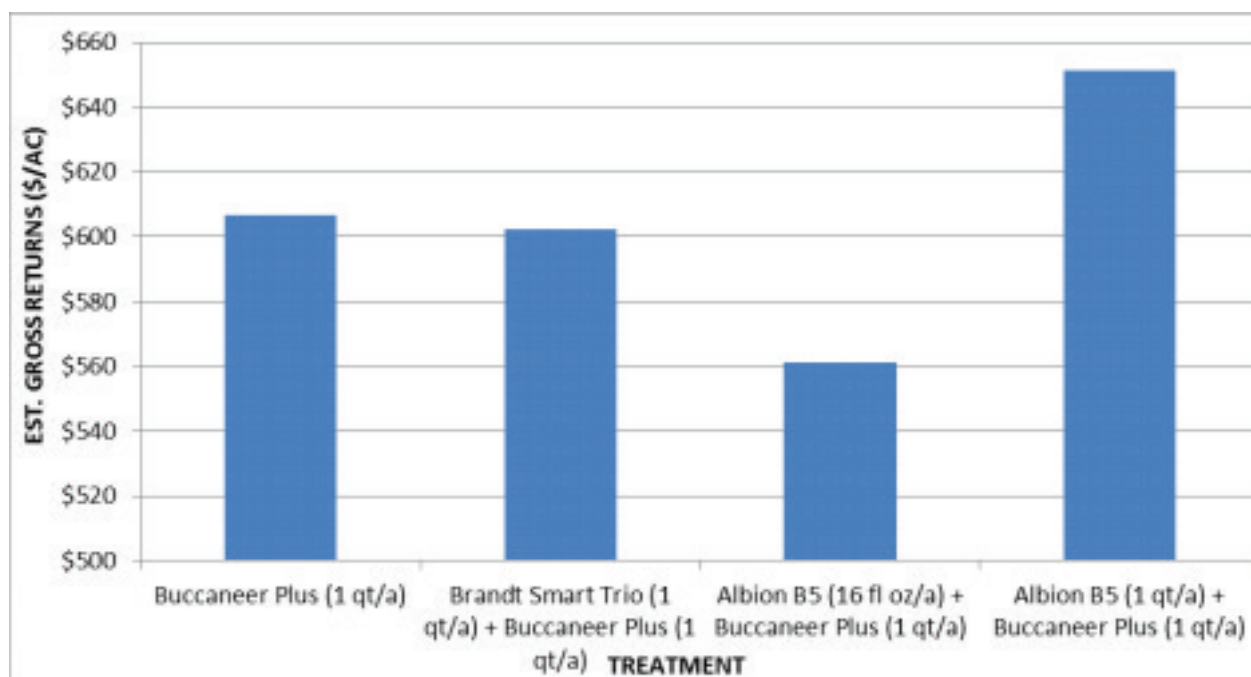


Chart 9. Estimated Gross Returns (\$/Ac). The estimated gross return per acre was based on a market value of \$10.30 per bushel of soybeans for November 22, 2016.

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TRIAL INFORMATION SHEET

Trial Setup Info:

Trial ID: ALB1602M **Statistical Design:** RCBD

Discipline: Fertilizer **Location:** Albion Block 31 **Principal Investigator:** Brian Cortright

Plot Width: 10 Feet **Client Contact:** Jeremy O'Brien **Plot Length:** 40 Feet **Grower:**

Michigan Ag Research **Irrigation Method:** Dry Land

Treatments: 4 **Soil pH:** 6.2

Replicates: 4 **Soil CEC:** 6.40

Trial Initiation Date: 06/02/16 **Soil % OM:** 2.1% **Trial End Date:** 10/15/16 **Soil %**

Sand, Silt, Clay: 54%, 26%, 18% **Objective:**

Evaluate the effect of Albion B5 on crop response after application with glyphosate compared to Brandt Smart Trio.

Crop and Pest Info:

JD7000 Vset **Harvest Equipment:** HP5 *Evaluations:*

Weed Ratings: 10/10

Harvest:

Applications: A - 06/21/16: Foliar; Broadcast; 20 GPA; 3 Liters; 4
7/1, 7/15 nozzles; XR8002; 25 PSI

Two broadcast foliar sprays was made with a boom with four flatfan XR8002 nozzles.
Each treatment had a spray volume of 20 gallons per acre and a mix size of 3 liters.

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TREATMENT LIST

Reps: 4 Plots: 6 by 40 feet Spray vol: 20 GAL/AC Mix Size: 3 liters (2.0856 liters calculated mix size)

Trt Treatment Form Form Rate Appl Spray Volume Mix Mix Amt Product Rep

2 Brandt Smart Trio 10.5 LB/GAL EC 1 qt/a A B 20 GAL/AC 3 liters 37.5 ml/mx 102 201 302 403
No.Name Conc Unit Type Rate Unit Code Volume Unit Size Unit to Measure 1 2 3 4 1 Buccaneer Plus 41 % EC 1 qt/a
 A 20 GAL/AC 3 liters 37.5 ml/mx 104 203 304 401 3 Albion B5 10.5 LB/GAL EC 16 fl oz/aA B 20 GAL/AC 3 liters 18.75
 ml/mx 101 204 301 402
 Buccaneer Plus 41 % EC 1 qt/a A 20 GAL/AC 3 liters 37.5 ml/mx 4 Albion B5 10.5 LB/GAL EC 1 qt/a A B 20 GAL/AC
 3 liters 37.5 ml/mx 103 202 303 404
 Buccaneer Plus 41 % EC 1 qt/a A 20 GAL/AC 3 liters 37.5 ml/mx Buccaneer Plus 41 % EC 1 qt/a

A 20 GAL/AC 3 liters 37.5 ml/mx **PLOT MAP**



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APPENDIX A: DAILY METEROLOGICAL SUMMARY

**ALBION, CA
MAWN ALBION STATION: 8 MI AWAY**

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Max Air	Min Air	Avg Air	Cumul	Max	Min
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Date	Temp (F)	Temp (F)	Temp (F)	Precip (in)	Precip (in)	RH (%)	RH (%)	RH (%)	Avg	Max Wind Speed (MPH)							
05/28/16	86.6	65.0	75.8	0.00	0.00	85.1	35.1	60.1	15.2	05/29/16	85.3	61.3	73.3	0.00	0.00	91.7	
28.8	60.3	15.9	05/30/16	84.5	56.9	70.7	0.00	0.00	92.8	27.8	60.3	12.9	05/31/16	84.5	52.0	68.3	
0.00	0.00	94.2	20.6	57.4	11.9	06/01/16	80.3	59.4	69.9	0.00	0.00	91.4	42.1	66.8	10.2	06/02/16	
81.0	57.1	69.1	0.00	0.00	94.6	25.9	60.3	13.2	06/03/16	83.0	49.0	66.0	0.00	0.00	94.7	22.6	58.7
11.9																	
06/04/16	82.2	57.8	70.0	0.40	0.40	94.2	33.3	63.8	12.2	06/05/16	71.0	59.3	65.2	0.15	0.55	94.4	
46.9	70.7	20.2	06/06/16	80.4	54.2	67.3	0.01	0.56	93.7	25.1	59.4	17.6	06/07/16	63.9	50.3	57.1	
0.00	0.56	92.4	56.3	74.4	13.9	06/08/16	69.7	45.1	57.4	0.00	0.56	93.9	28.1	61.0	13.9	06/09/16	
74.3	40.6	57.5	0.00	0.56	92.6	29.3	61.0	8.8	06/10/16	87.2	59.5	73.4	0.00	0.56	79.2	42.7	61.0
9.8																	
06/11/16	90.7	69.3	80.0	0.00	0.56	81.5	32.8	57.2	15.9	06/12/16	80.3	58.2	69.3	0.00	0.56	82.9	
20.4	51.7	14.5	06/13/16	79.5	48.7	64.1	0.00	0.56	82.8	26.3	54.6	8.8	06/14/16	79.2	60.3	69.8	
0.00	0.56	64.5	34.5	49.5	12.2	06/15/16	87.9	61.4	74.7	0.31	0.87	92.4	46.3	69.4	9.5	06/16/16	
70.8	62.2	66.5	0.09	0.96	93.9	72.9	83.4	13.5	06/17/16	87.3	58.7	73.0	0.00	0.96	80.2	22.4	51.3
17.2																	
06/18/16	89.8	54.2	72.0	0.00	0.96	93.6	19.7	56.7	8.5	06/19/16	89.8	59.7	74.8	0.00	0.96	79.4	
25.4	52.4	9.8	06/20/16	89.5	67.3	78.4	0.00	0.96	80.8	41.0	60.9	17.9	06/21/16	81.2	55.6	68.4	
0.00	0.96	87.5	23.8	55.7	19.6	06/22/16	83.9	55.8	69.9	0.07	1.03	92.2	30.0	61.1	9.2	06/23/16	
78.2	64.1	71.2	0.04	1.07	94.8	50.0	72.4	12.2	06/24/16	86.2	57.0	71.6	0.00	1.07	80.6	19.8	50.2

06/25/16 88.0 53.7 70.9 0.00 1.07 91.2 26.2 58.7 9.8 06/26/16 87.6 65.0 76.3 0.01 1.08 92.3
 48.1 70.2 12.5 06/27/16 90.0 62.9 76.5 0.00 1.08 94.9 20.0 57.5 21.6 06/28/16 66.9 53.2 60.1
 0.00 1.08 91.4 55.0 73.2 13.5 06/29/16 81.0 46.2 63.6 0.00 1.08 94.9 20.5 57.7 18.6 06/30/16
 81.4 47.9 64.7 0.00 1.08 93.8 24.7 59.3 11.5 07/01/16 75.6 54.9 65.3 0.47 1.55 94.3 34.7 64.5
 17.9

07/02/16 77.5 49.2 63.4 0.00 1.55 94.4 28.4 61.4 9.5 07/03/16 78.5 50.0 64.3 0.00 1.55 94.5
 24.5 59.5 9.5 07/04/16 79.7 53.2 66.5 0.00 1.55 90.9 51.3 71.1 11.2 07/05/16 84.7 63.3 74.0
 0.00 1.55 94.5 42.2 68.4 13.9 07/06/16 87.5 63.5 75.5 0.00 1.55 93.9 37.0 65.5 12.5

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07/07/16 88.8 64.6 76.7 0.10 1.65 93.7 45.2 69.5 11.5 07/08/16 86.7 65.7 76.2 1.45 3.10 95.3
 35.5 65.4 17.2

07/09/16 78.4 61.4 69.9 0.00 3.10 89.6 47.8 68.7 15.9 07/10/16 83.1 55.9 69.5 0.00 3.10 95.0
 32.4 63.7 8.2 07/11/16 87.6 63.5 75.6 0.06 3.16 87.7 44.2 66.0 8.8 07/12/16 90.6 65.4 78.0
 0.01 3.17 91.7 39.5 65.6 14.5 07/13/16 88.0 68.2 78.1 0.05 3.22 94.2 51.1 72.7 12.2 07/14/16
 86.1 67.0 76.6 0.00 3.22 90.9 32.6 61.8 16.9 07/15/16 77.2 60.7 69.0 0.00 3.22 92.6 52.5 72.6
 13.9

07/16/16 78.7 57.6 68.2 0.00 3.22 90.2 34.5 62.4 9.5 07/17/16 84.9 52.2 68.6 0.00 3.22 95.1
 48.3 71.7 15.5 07/18/16 85.9 64.5 75.2 0.22 3.44 94.7 32.9 63.8 18.9 07/19/16 88.5 58.6 73.6
 0.00 3.44 95.1 32.2 63.7 10.2 07/20/16 90.1 60.1 75.1 0.00 3.44 93.3 32.4 62.9 9.5 07/21/16
 89.1 65.0 77.1 0.47 3.91 94.7 52.5 73.6 21.6 07/22/16 90.6 71.7 81.2 0.00 3.91 93.4 48.4 70.9
 11.2

07/23/16 92.9 63.9 78.4 0.00 3.91 95.6 28.9 62.3 7.5 07/24/16 85.4 67.6 76.5 0.78 4.69 95.2
 69.1 82.2 15.9 07/25/16 88.4 68.3 78.4 0.01 4.70 91.3 38.0 64.7 11.5 07/26/16 87.4 60.1 73.8
 0.00 4.70 95.7 31.4 63.6 8.2 07/27/16 88.5 62.1 75.3 0.00 4.70 95.8 34.1 65.0 13.9 07/28/16
 86.8 61.8 74.3 0.00 4.70 94.7 45.2 70.0 11.5 07/29/16 79.8 64.7 72.3 0.14 4.84 91.9 62.1 77.0
 11.9

07/30/16 76.6 61.9 69.3 0.53 5.37 94.9 64.8 79.9 11.2 07/31/16 81.2 63.8 72.5 0.00 5.37 93.7
 53.8 73.8 8.8 08/01/16 85.6 58.7 72.2 0.00 5.37 95.7 33.7 64.7 8.5 08/02/16 88.6 60.1 74.4
 0.00 5.37 95.5 36.6 66.1 9.5 08/03/16 91.3 62.3 76.8 0.00 5.37 95.6 34.9 65.3 6.5 08/04/16
 91.2 63.1 77.2 0.00 5.37 94.4 30.7 62.6 7.8 08/05/16 86.1 64.8 75.5 0.00 5.37 93.9 53.5 73.7
 13.5

08/06/16 83.9 58.1 71.0 0.00 5.37 95.7 33.0 64.4 11.2 08/07/16 83.7 55.5 69.6 0.00 5.37 95.5
 32.1 63.8 11.5 08/08/16 85.7 54.6 70.2 0.00 5.37 94.0 23.6 58.8 13.9 08/09/16 87.8 56.1 72.0
 0.00 5.37 91.6 44.5 68.1 7.2
 08/10/16 92.5 62.7 77.6 0.00 5.37 95.5 31.7 63.6 7.5 08/11/16 93.3 71.3 82.3 0.00 5.37 91.5
 42.0 66.8 12.9 08/12/16 93.2 72.8 83.0 0.35 5.72 95.0 47.0 71.0 14.2

08/13/16 85.1 69.4 77.3 0.80 6.52 95.6 62.2 78.9 13.2 08/14/16 81.7 65.0 73.4 0.00 6.52 95.5
 55.8 75.7 7.2 08/15/16 79.6 63.1 71.4 1.75 8.27 95.6 63.3 79.5 9.5 08/16/16 84.1 66.6 75.4 2.21
 10.48 95.6 48.1 71.9 17.6 08/17/16 83.7 63.1 73.4 0.11 10.59 95.7 54.5 75.1 16.2 08/18/16 82.8
 59.3 71.1 0.00 10.59 95.7 54.3 75.0 7.2

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08/19/16 81.0 65.2 73.1 0.00 10.59 95.4 59.6 77.5 9.8

08/20/16 80.2 64.8 72.5 0.13 10.72 95.6 64.0 79.8 15.9 08/21/16 73.6 58.2 65.9 0.00 10.72
 94.2 50.2 72.2 13.5 08/22/16 76.8 52.1 64.5 0.00 10.72 95.9 36.1 66.0 8.5 08/23/16 80.5 53.9
 67.2 0.00 10.72 95.8 45.0 70.4 9.5 08/24/16 81.1 58.9 70.0 0.01 10.73 95.0 66.2 80.6 14.5
 08/25/16 82.4 63.2 72.8 0.00 10.73 95.7 61.4 78.6 12.5 08/26/16 85.6 57.8 71.7 0.00 10.73
 95.9 41.1 68.5 7.8

08/27/16 77.8 64.6 71.2 0.84 11.57 95.3 66.7 81.0 10.8 08/28/16 87.4 67.6 77.5 0.00 11.57
 95.6 50.3 73.0 8.8 08/29/16 84.9 63.1 74.0 0.00 11.57 95.7 46.8 71.3 8.5 08/30/16 82.8 64.6
 73.7 0.00 11.57 94.3 57.0 75.7 9.5 08/31/16 78.6 59.4 69.0 0.00 11.57 94.9 50.8 72.9 13.2
 09/01/16 74.8 55.3 65.1 0.00 11.57 91.9 41.0 66.5 14.9 09/02/16 75.9 51.5 63.7 0.00 11.57
 93.0 41.4 67.2 14.2

09/03/16 78.6 48.6 63.6 0.00 11.57 96.0 37.8 66.9 9.8 09/04/16 80.1 49.5 64.8 0.00 11.57 96.2
 38.1 67.2 7.8 09/05/16 85.4 54.6 70.0 0.00 11.57 95.5 47.0 71.3 10.2 09/06/16 89.9 68.7 79.3
 0.00 11.57 93.1 52.1 72.6 9.5 09/07/16 90.6 72.3 81.5 0.00 11.57 92.8 52.5 72.7 11.2 09/08/16
 80.2 67.4 73.8 0.11 11.68 93.9 63.8 78.9 13.2 09/09/16 81.0 62.9 72.0 0.08 11.76 95.9 58.2
 77.1 6.5

09/10/16 70.0 59.3 64.7 1.01 12.77 95.9 70.2 83.1 16.9 09/11/16 74.3 50.2 62.3 0.00 12.77
 96.1 33.4 64.8 8.8 09/12/16 76.1 49.7 62.9 0.00 12.77 96.0 41.4 68.7 10.8 09/13/16 82.2 52.4
 67.3 0.00 12.77 96.1 50.1 73.1 10.8 09/14/16 74.9 57.0 66.0 0.02 12.79 93.5 42.7 68.1 12.2
 09/15/16 74.7 52.8 63.8 0.00 12.79 94.3 34.5 64.4 9.5
 09/16/16 79.0 51.9 65.5 0.00 12.79 95.7 43.9 69.8 11.2

09/17/16 76.0 61.6 68.8 0.80 13.59 95.9 67.0 81.5 8.5 09/18/16 80.0 55.5 67.8 0.00 13.59 96.5
 43.1 69.8 9.5 09/19/16 83.6 51.0 67.3 0.00 13.59 96.7 32.2 64.5 8.5 09/20/16 84.3 56.3 70.3
 0.00 13.59 91.6 26.6 59.1 12.5
 09/21/16 84.4 55.6 70.0 0.03 13.62 94.2 46.2 70.2 15.5 09/22/16 83.0 58.9 71.0 0.00 13.62
 96.3 43.5 69.9 6.5 09/23/16 74.2 59.7 67.0 0.00 13.62 94.5 71.5 83.0 12.9

09/24/16 74.0 53.4 63.7 0.00 13.62 90.8 47.9 69.4 11.5 09/25/16 76.6 49.7 63.2 0.00 13.62 93.0
 32.2 62.6 10.2 09/26/16 68.0 49.8 58.9 0.12 13.74 94.1 32.6 63.4 23.9 09/27/16 68.0 47.4 57.7
 0.00 13.74 83.2 27.5 55.4 16.9 09/28/16 65.6 49.5 57.6 0.19 13.93 94.4 50.4 72.4 15.9 09/29/16
 63.4 55.0 59.2 0.73 14.66 95.9 79.7 87.8 17.2

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09/30/16 60.0 56.9 58.5 0.12 14.78 96.1 91.7 93.9 17.9

10/01/16 66.6 51.2 58.9 0.38 15.16 96.5 59.5 78.0 10.8 10/02/16 66.6 48.1 57.4 0.00 15.16
 96.7 66.8 81.8 6.5 10/03/16 65.7 52.0 58.9 0.01 15.17 96.6 68.0 82.3 8.5 10/04/16 73.3 50.0
 61.7 0.00 15.17 96.5 46.5 71.5 13.2 10/05/16 80.0 55.8 67.9 0.03 15.20 95.7 50.9 73.3 13.9
 10/06/16 79.0 55.2 67.1 0.01 15.21 97.2 56.7 77.0 10.2 10/07/16 82.5 53.1 67.8 0.00 15.21
 93.8 44.6 69.2 21.3

10/08/16 60.0 39.2 49.6 0.00 15.21 94.9 32.3 63.6 23.6 10/09/16 63.5 36.1 49.8 0.00 15.21
 96.0 34.7 65.4 9.8 10/10/16 65.5 37.5 51.5 0.00 15.21 95.3 40.4 67.9 11.2 10/11/16 71.0 47.0
 59.0 0.00 15.21 91.8 42.6 67.2 8.8 10/12/16 75.1 48.0 61.6 0.32 15.53 95.1 54.2 74.7 14.5
 10/13/16 59.0 37.6 48.3 0.00 15.53 95.3 39.0 67.2 11.5

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APPENDIX B: DATA SUMMARIES

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Nov-22-2016 (ALB1602M) ARM 2016.4 AOV Means Table Page 1 of 4

Pacific Ag Research

Evaluation of the efficacy of foliar fertilizers on soybean growth and weed control enhancement when used with post emergence herbicides.

Trial ID:ALB1602M Location:Albion, MI Trial Year:2016
 Protocol ID:ALB1602M Investigator:Eric Flora
 Project ID:ALB1602M Study Director:Brian Cortright
 Sponsor Contact:Jeremy O'Brien

Pest Type	W Weed	W Weed	W Weed	W Weed	W Weed	W Weed
Pest Code	SETVI	SETVI	CHEAL	CHEAL	ABUTH	ABUTH
Pest Scientific Name	Setaria	Setaria	Chenopodium	Chenopodium	Abutilon theophrasti	Abutilon theophrasti
Pest Name	viridis	viridis	al> common	common	theop>velvetleaf	velvetleaf
Crop Code	Green	Green	lambsqu>	lam	GLXMA	GLXMA
BBCH Scale	foxtail	foxtail	GLXMA	bsq	BSOY	BSOY
Crop Scientific Name	GLXMA	GLXMA	BSOY	u>	Glycine max	Glycine max
Crop Name	BSOY	BSOY	Glycine max	GLX	Soybean	Soybean
Description	Glycine	Glycine	Soybean	MA	% Control	% Control
Part Rated	max	max	% Control	BSOY	PLANT P	PLANT P
Rating Date	Soyb	Soyb	PLANT P	Glycine max	Jul-1-2016	Jul-15-2016
Rating Type	ean	ean	Jul-1-2016	Soybean	PESCON	PESCON
Rating Unit	% Control	% Control	PESCON	% Control	%	%
Sample Size, Unit	PLANT P	PLANT P	%	PLANT P	1 PLOT	1 PLOT
Collection Basis, Unit	Jul-1-2016	Jul-15-2	1 PLOT	Jul-15-2016	1 PLOT	1 PLOT
Number of Subsamples	PESCON	016	1 PLOT	PESCON	1	1
SE Group No.	%	PESC	1	%	4	4
Days After First/Last Applic.	1 PLOT	ON	3	1 PLOT	10 10	24 24
Trt-Eval Interval	1 PLOT	%	10 10	1 PLOT	10 DA-A	24 DA-A
Plant-Eval Interval	1	1 PLOT	10 DA-A	1	29 DP-1	43 DP-1
ARM Action Codes	1	1 PLOT	29 DP-1	3		
Number of Decimals	10 10	1		24 24		
	10 DA-A	1		24 DA-A		
	29 DP-1	24 24		43 DP-1		
		24 DA-A				

		43 DP-1				
Trt Treatment Rate Appl No. Name Rate Unit Code	1	2	3	4	5	6
1Buccaner Plus 1qt/a A	87.5a	100.0a	68.8a	100.0a	83.8a	100.0a
2Brandt Smart Trio 1qt/a A Buccaner Plus 1qt/a A Brandt Smart Trio 1qt/a B	95.0a	100.0a	78.8a	95.0a	83.8a	100.0a
3Albion B5 16fl oz/a A Buccaner Plus 1qt/a A Albion B5 16fl oz/a B	100.0a	100.0a	86.3a	100.0a	87.5a	100.0a
4Albion B5 1qt/a A Buccaner Plus 1qt/a A Albion B5 1qt/a B	92.5a	100.0a	83.8a	95.0a	86.3a	100.0a
LSD P=.05	19.41	0.00	. 22.27 13.92	8.43	16.45	0.00
Standard Deviation	12.13	0.0	17.54	5.27	10.28	0.0
CV	12.94	0.0	0.668	5.41	12.05	0.0
Bartlett's X2	0.549		. 0.881 . -0.05 .	0.829	0.507	
P(Bartlett's X2)	0.76		-1.6936	0.363	0.917	
Skewness	-1.4656*			-2.3754*	-0.6116	
Kurtosis	0.4644		1.086	5.3143*	-1.0078	
Replicate F	0.736	0.000	0.4034	1.800	4.980	0.000
Replicate Prob(F)	0.5565	1.0000	1.237	0.2172	0.0263	1.0000
Treatment F	0.736	0.000	0.3524	1.200	0.133	1.0000
Treatment Prob(F)	0.5565	1.0000		0.3641	0.9379	

Means followed by same letter or symbol do not significantly differ (P=.05, LSD)
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.
Could not calculate LSD (% mean diff) for columns 2,6,7,8,9,10 because error mean square = 0.

Compiled by Pacific Ag Research, San Luis Obispo, CA for Albion Minerals 22

Nov-22-2016 (ALB1602M) ARM 2016.4 AOV Means Table Page 2 of 4 **Pacific Ag Research**

Evaluation of the efficacy of foliar fertilizers on soybean growth and weed control enhancement when used with post emergence herbicides.

Trial ID:ALB1602M Location:Albion, MI Trial Year:2016
Protocol ID:ALB1602M Investigator:Eric Flora
Project ID:ALB1602M Study Director:Brian Cortright
Sponsor Contact:Jeremy O'Brien

Number of Decimals	43 DP-1	1 PLOT 1 5 10 10 10 DA-A 29 DP-1
Trt Treatment Rate Appl No. Name Rate Unit Code	7	8
1Buccaner Plus 1qt/a A	100.0a	15.0
2Brandt Smart Trio 1qt/a A Buccaner Plus 1qt/a A Brandt Smart Trio 1qt/a B	100.0a	6.0
3Albion B5 16fl oz/a A Buccaner Plus 1qt/a A Albion B5 16fl oz/a B	100.0a	6.0
4Albion B5 1qt/a A Buccaner Plus 1qt/a A Albion B5 1qt/a B	100.0a	5.0
LSD P=.05 Standard Deviation CV Bartlett's X2 P(Bartlett's X2) Skewness Kurtosis	0.00 0.0 0.0 . . . 0.000 1.9382 3.814

Pest Type	W Weed	W Weed	Replicate F	W Weed		1.0000
Pest Code	AMBEL	SETVI	Replicate F (F)	W Weed		0.0000
Pest Scientific Name	Ambrosia	Setaria	Treatment CHEAL	ABUTH		1.0000
Pest Name	artem>	viridis	Chenopodium	velvetleaf		Glycine max
Crop Code	Common	Green	theop-commc	GLXMA	GLXMA	Soybean
BBCH Scale	ragweed	foxtail		BSOY	BSOY	Moisture
Crop Scientific Name	GLXMA	GLXMA		Glycine max	Glycine max	Conte>
Crop Name	BSOY	BSOY		Soybean	Soybean	EARHA
Description	Glycine max	Glycine	Compiled by Pacific Ag Research, San Luis Obispo, CA for Albion Minerals 23	Weed Density	Weed Density	Oct-10-2016
Part Rated	Soybean	max		PLANT P	Yield	MOICON
Rating Date	% Control	Soyb		Jul-1-2016	Weight	%
Rating Type	PLANT P	ean		DENSITY	t	1 PLOT
Rating Unit	Jul-15-2016	Weed		NUMBER	YIELD	1 PLOT
Sample Size, Unit	PESCON	Densit		2 FT2	C	1
Collection Basis, Unit	%	y		1 PLOT	NUMBER	10
Number of Subsamples	1 PLOT	PLAN		1	2 FT2	111 111
SE Group No.	1 PLOT	T P		6	1 PLOT	111 DA-A
Days After First/Last Applic.	1	Jul-1-2016		10 10	1	130 DP-1
Trt-Eval Interval	2	DENSITY		10 DA-A	7	
Plant-Eval Interval	24 24	NUMBER		29 DP-1	10 10	
ARM Action Codes	24 DA-A	2 FT2			10 DA-A	1

Nov-22-2016 (ALB1602M) ARM 2016.4 AOV Means Table Page 3 of 4

Pacific Ag Research

Evaluation of the efficacy of foliar fertilizers on soybean growth and weed control enhancement when used with post emergence herbicides.

Pest Type	GLXMA	GLXMA	GLXMA
Pest Code	BSOY	BSOY	BSOY
Pest Scientific Name	Glycine	Glycine max	Glycine max
Pest Name	max	Soybean	Soybean
Crop Code	Soyb	Bushels per	Est. Gross
BBCH Scale	ean	Ac>	Ret>Y
Crop Scientific Name	Test	YIEL	IELD
Crop Name	Weight	D C	C
Description	EARHAR	Oct-10-2016	Oct-10-2016
Part Rated	C	YIELD	INCGRO
Rating Date	Oct-10-2	BU	DOLLAR
Rating Type	016	1 A	1 A
Rating Unit	WEITES	1 PLOT	1 PLOT
Sample Size, Unit	LB	1	1
Collection Basis, Unit	1 BU	12	13
Number of Subsamples	1 PLOT	111 111	111 111
SE Group No.	1	111 DA-A	111 DA-A
Days After First/Last Applic.	11	130 DP-1	130 DP-1
Trt-Eval Interval	111 111	TY2	T1
Plant-Eval Interval	111 DA-A	2	2
ARM Action Codes	130 DP-1		
Number of Decimals	1		
Trt Treatment Rate Appl No. Name Rate Unit Code	13	14	15
1Buccaner Plus 1qt/a A	56.7a	58.92a	606.86a
2Brandt Smart Trio 1qt/a A Buccaner Plus 1qt/a A Brandt Smart Trio 1qt/a B	58.7a	58.48a	602.39a
3Albion B5 16fl oz/a A Buccaner Plus 1qt/a A Albion B5 16fl oz/a B	59.6a	54.50a	561.31a
4Albion B5 1qt/a A Buccaner Plus 1qt/a A Albion B5 1qt/a B	54.7a	63.23a	651.28a
LSD P=.05	4.61	11.832	121.869
Standard Deviation	2.88	7.397	76.188
CV	5.01	12.58	12.58
Bartlett's X2	2.216	1.098	1.098
P(Bartlett's X2)	0.529	0.778	0.778
Skewness	0.2503	-0.1219	-0.1219
Kurtosis	-1.0673	-1.4653	-1.4653
Replicate F	0.483	4.258	4.258
Replicate Prob(F)	0.7022	0.0394	0.0394
Treatment F	2.321	0.933	0.933
Treatment Prob(F)	0.1436	0.4641	0.4641

Compiled by Pacific Ag Research, San Luis Obispo, CA for Albion Minerals 24

Nov-22-2016 (ALB1602M) ARM 2016.4 AOV Means Table Page 4 of 4 **Pacific Ag Research**

Evaluation of the efficacy of foliar fertilizers on soybean growth and weed control enhancement when used with post emergence herbicides.

Trial ID:ALB1602M Location:Albion, MI Trial Year:2016
Protocol ID:ALB1602M Investigator:Eric Flora
Project ID:ALB1602M Study Director:Brian Cortright
Sponsor Contact:Jeremy O'Brien

Pest Type

W, Weed, G-BYRW7, G-WedStg = Weed or volunteer crop

Pest Code

SETVI, Setaria viridis, = US

CHEAL, Chenopodium album, = US

ABUTH, Abutilon theophrasti, = US

AMBEL, Ambrosia artemisiifolia, = US

Crop Code

GLXMA, BSOY, Glycine max, = US

Part Rated

PLANT = plant

YIELD = yield

EARHAR = ear - harvestable

P = Pest is Part Rated

C = Crop is Part Rated

Rating Type

PESCON = pest control

WEIGHT = weight

MOICON = moisture content

WEITES = weight - test

YIELD = yield

INCGRO = income - gross / value

Rating Unit

% = percent

NUMBER = number

LB = pound

BU = bushel

DOLLAR = dollar

PLOT = total plot

FT2 = square foot

ROW = row

BU = bushel

A = acre

PLOT = total plot

Plant-Eval Interval

29 DP-1 = 1 GLXMA Jun-2-2016

43 DP-1 = 1 GLXMA Jun-2-2016

130 DP-1 = 1 GLXMA Jun-2-2016

ARM Action Codes

TY2 = $3.63 * [11] * (100 - [12]) / 87$

T1 = $10.3 * [14]$

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