

RESEARCH AND DEVELOPMENT
PROJECT REPORT

Evaluate the Efficacy of Albion B5 Compared to Brandt Smart Trio when Applied with Glyphosate for Weed Control and Yield Enhancement on Corn under Field Conditions

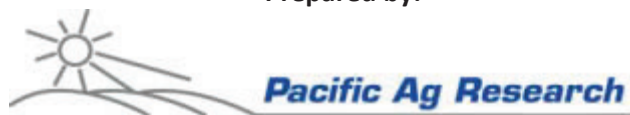
Trial ID: ALB1502M

Albion, MI – Michigan Ag Research Station

Prepared for:

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Prepared by:



May – October, 2015

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ABSTRACT

Objective: Evaluate the efficacy of Albion B5 compared to Brandt Smart Trio when applied with glyphosate for weed control and yield enhancement on corn under field conditions.

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

Location: Albion, MI – Michigan Ag Research Station

Project Duration: May 20 (Planting) to October 15 (Harvest), 2015

Key Findings:

- No significant improvement in weed control was observed among plots treated with glyphosate and either Albion B5 or Brandt Smart Trio.
- Yields were no different statistically but estimated gross returns for moisture-adjusted corn were highest numerically for the plots treated with Buccaneer and Albion B5 at 16 fl oz/a.

Narrative:

Weed control and yield enhancement for glyphosate treated DK-43-30 variety corn grown under field conditions in Michigan is tested here for Brandt Smart Trio and Albion B5 fertilizers. Total and specific weed control was measured on a 0-100% basis (100% rating for weed-free plots) 9 DAA and yield data was collected 118 DAA in mid-October.

In the soybean trial, we observed significant improvement in weed control in the glyphosate-only plots. Here, there were not statistical differences in control observed among treatments and the untreated was numerically in the middle for total weed control, but lower than control observed in plots treated with glyphosate and Brandt Smart Trio. Ragweed and Canada Horseweed were the only pests to come in with less than 80% control, but all other weeds did not have significant differences among treatments.

Yield weights were slightly higher on the Albion-treated plots and when adjusted for moisture, estimated gross returns would be approximately \$35 more per acre for those treated with 16 fl oz/a Albion B5 relative to the untreated.

MATERIALS AND METHODS

Treatments:

This study consisted of four treatments with applications on June 19 (A), 2015.

1. Buccaneer Plus – 32 fl oz/a (A)
2. Buccaneer Plus – 32 fl oz/a (A) + Brandt Smart Trio – 32 fl oz/a (A)
3. Buccaneer Plus – 32 fl oz/a (A) + Albion B5 – 16 fl oz/a (A)
4. Buccaneer Plus – 32 fl oz/a (A) + Albion B5 – 32 fl oz/a (A)

Experimental Unit:

This trial was conducted on DK-43-30 variety corn that was seeded on May 20, 2015. Plants were spaced 6 inches apart in rows, and rows were spaced 30 inches apart for a planting density of 34,848 plants per acre. Plots were 10 feet (4 rows) by 40 feet, and treatments were replicated four times in a randomized complete block design for a total experiment size of 6,400 square-feet. The soil at the Michigan Ag Research station had a pH of 5.9, a cation exchange capacity of 5.5 meq/100g soil, and 2.3% organic matter. The soil texture consisted of 59% sand, 28% silt, and 13% clay particles.

Pest Description:

Weeds were naturally occurring in the plots. Weed species observed during the trial were: common lambsquarters (*Chenopodium album*), crab grass (*Digitaria sp.*), wood sorrel (*Oxalis sp.*), foxtail millet (*Setaria sp.*), common ragweed (*Ambrosia artemisiifolia*), and Canada horseweed (*Conyza canadaensis*).

Application Equipment:

Treatments were applied using a CO₂ backpack sprayer operating at 25 PSI with a spray volume of 15 gallons per acre and a mix size of 3 liters. The spray boom incorporated three nozzles for a total boom width of 38 inches (see diagram below).



Evaluations:

Weed percent control was evaluated on a 0% to 100% scale where 0% represents a plot full of weeds (no control) and 100% represents a weed-free plot (complete control). Percent control ratings were done on July 5 (26 DA-A), and ratings were done for each of six weed species as well as a total percent control rating per plot.

Plots were harvested on October 15 (76 DA-B), 2015. The yield weight in pounds, percent moisture content, and test weight were recorded for the center two rows of each plot (80 row-ft). The estimated

number of bushels per acre was adjusted to 15.5% moisture content, and estimated gross returns were calculated using a value of \$3.6775 per bushel.

Trial data was managed using ARM9 software (Gylling Data Management). Statistics were analyzed using ANOVA mean comparison with LSD test and $\alpha=0.05$.

RESULTS

Table 1. Total Weed Percent Control. Percent control was evaluated on a 0% to 100% scale (0% = no control/plot full of weeds, 100% = no weed presence in plots) on July 5 (26 DA-A), 2015.

#	Treatment		06/28/15
	Name	Rate	9 DA-A
1	Buccaneer Plus	32 fl oz/a (A)	88.75 a
2	Brandt Smart Trio	32 fl oz/a (A)	90.00 a
	Buccaneer Plus	32 fl oz/a (A)	
3	Albion B5	16 fl oz/a (A)	88.75 a
	Buccaneer Plus	32 fl oz/a (A)	
4	Albion B5	32 fl oz/a (A)	86.25 a
	Buccaneer Plus	32 fl oz/a (A)	

RESULTS

Table 2. Common Lambsquarters Percent Control. Percent control of common lambsquarters (*Chenopodium album*) was evaluated on a 0% to 100% scale (0% = no control/plot full of weeds, 100% = no weed presence in plots) on July 5 (26 DA-A), 2015.

#	Treatment		06/28/15
	Name	Rate	9 DA-A
1	Buccaneer Plus	32 fl oz/a (A)	92.50 a
2	Brandt Smart Trio Buccaneer Plus	32 fl oz/a (A) 32 fl oz/a (A)	90.00 a
3	Albion B5 Buccaneer Plus	16 fl oz/a (A) 32 fl oz/a (A)	90.00 a
4	Albion B5 Buccaneer Plus	32 fl oz/a (A) 32 fl oz/a (A)	90.00 a

Table 3. Crab Grass Percent Control. Percent control of crab grass (*Digitaria sp.*) was evaluated on a 0% to 100% scale (0% = no control/plot full of weeds, 100% = no weed presence in plots) on July 5 (26 DA-A), 2015.

#	Treatment		06/28/15
	Name	Rate	9 DA-A
1	Buccaneer Plus	32 fl oz/a (A)	90.00 a
2	Brandt Smart Trio Buccaneer Plus	32 fl oz/a (A) 32 fl oz/a (A)	82.50 a
3	Albion B5 Buccaneer Plus	16 fl oz/a (A) 32 fl oz/a (A)	90.00 a
4	Albion B5 Buccaneer Plus	32 fl oz/a (A) 32 fl oz/a (A)	90.00 a

Table 4. Wood Sorrel Percent Control. Percent control of wood sorrel (*Oxalis sp.*) was evaluated on a 0% to 100% scale (0% = no control/plot full of weeds, 100% = no weed presence in plots) on July 5 (26 DA-A), 2015.

#	Treatment		06/28/15
	Name	Rate	9 DA-A
1	Buccaneer Plus	32 fl oz/a (A)	100.00 a
2	Brandt Smart Trio Buccaneer Plus	32 fl oz/a (A) 32 fl oz/a (A)	100.00 a
3	Albion B5 Buccaneer Plus	16 fl oz/a (A) 32 fl oz/a (A)	100.00 a
4	Albion B5 Buccaneer Plus	32 fl oz/a (A) 32 fl oz/a (A)	95.00 a

RESULTS

Table 5. Foxtail Millet Percent Control. Percent control of foxtail millet (*Setaria sp.*) was evaluated on a 0% to 100% scale (0% = no control/plot full of weeds, 100% = no weed presence in plots) on July 5 (26 DA-A), 2015.

#	Treatment		06/28/15
	Name	Rate	9 DA-A
1	Buccaneer Plus	32 fl oz/a (A)	100.00 a
2	Brandt Smart Trio Buccaneer Plus	32 fl oz/a (A) 32 fl oz/a (A)	100.00 a
3	Albion B5 Buccaneer Plus	16 fl oz/a (A) 32 fl oz/a (A)	100.00 a
4	Albion B5 Buccaneer Plus	32 fl oz/a (A) 32 fl oz/a (A)	100.00 a

Table 6. Common Ragweed Percent Control. Percent control of common ragweed (*Ambrosia artemisiifolia*) was evaluated on a 0% to 100% scale (0% = no control/plot full of weeds, 100% = no weed presence in plots) on July 5 (26 DA-A), 2015.

#	Treatment		06/28/15
	Name	Rate	9 DA-A
1	Buccaneer Plus	32 fl oz/a (A)	72.50 a
2	Brandt Smart Trio Buccaneer Plus	32 fl oz/a (A) 32 fl oz/a (A)	71.25 a
3	Albion B5 Buccaneer Plus	16 fl oz/a (A) 32 fl oz/a (A)	71.25 a
4	Albion B5 Buccaneer Plus	32 fl oz/a (A) 32 fl oz/a (A)	70.00 a

Table 7. Canada Horseweed Percent Control. Percent control of Canada horseweed (*Conyza Canadensis*) was evaluated on a 0% to 100% scale (0% = no control/plot full of weeds, 100% = no weed presence in plots) on July 5 (26 DA-A), 2015.

#	Treatment		06/28/15
	Name	Rate	9 DA-A
1	Buccaneer Plus	32 fl oz/a (A)	67.50 a
2	Brandt Smart Trio Buccaneer Plus	32 fl oz/a (A) 32 fl oz/a (A)	70.00 a
3	Albion B5 Buccaneer Plus	16 fl oz/a (A) 32 fl oz/a (A)	67.50 a
4	Albion B5 Buccaneer Plus	32 fl oz/a (A) 32 fl oz/a (A)	67.50 a

RESULTS

Table 8. Yield Weight (Lbs). Yield weights (in pounds) were recorded for 80 row-ft per plot on October 15 (76 DA-B), 2015.

#	Treatment Name	Rate	10/15/15 118 DA-A
1	Buccaneer Plus	32 fl oz/a (A)	53.28 a
2	Brandt Smart Trio Buccaneer Plus	32 fl oz/a (A) 32 fl oz/a (A)	52.53 a
3	Albion B5 Buccaneer Plus	16 fl oz/a (A) 32 fl oz/a (A)	55.84 a
4	Albion B5 Buccaneer Plus	32 fl oz/a (A) 32 fl oz/a (A)	53.26 a

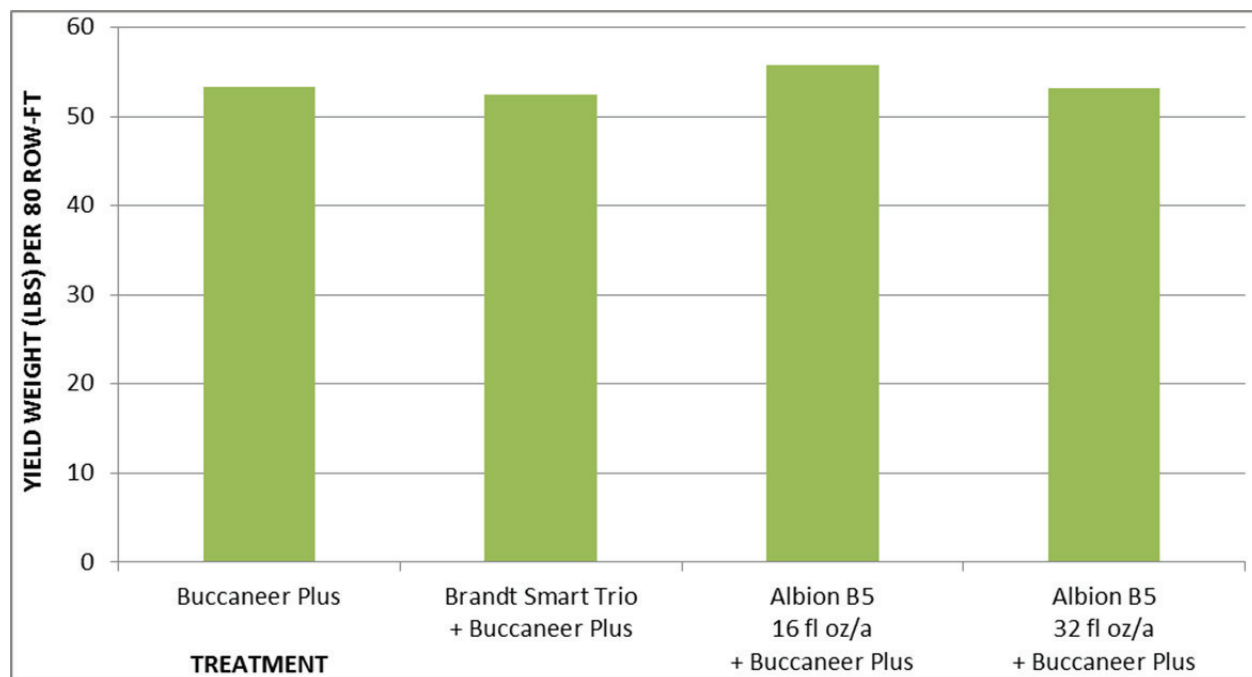


Chart 8. Yield Weight (Lbs). Yield weights (in pounds) were recorded for 80 row-ft per plot on October 15 (76 DA-B), 2015.

RESULTS

Table 9. Moisture Content (%). The moisture content of corn at harvest was recorded for each plot on October 15 (76 DA-B), 2015.

#	Treatment Name	Rate	10/15/15 118 DA-A
1	Buccaneer Plus	32 fl oz/a (A)	15.83% a
2	Brandt Smart Trio Buccaneer Plus	32 fl oz/a (A) 32 fl oz/a (A)	16.60% a
3	Albion B5 Buccaneer Plus	16 fl oz/a (A) 32 fl oz/a (A)	15.95% a
4	Albion B5 Buccaneer Plus	32 fl oz/a (A) 32 fl oz/a (A)	16.48% a

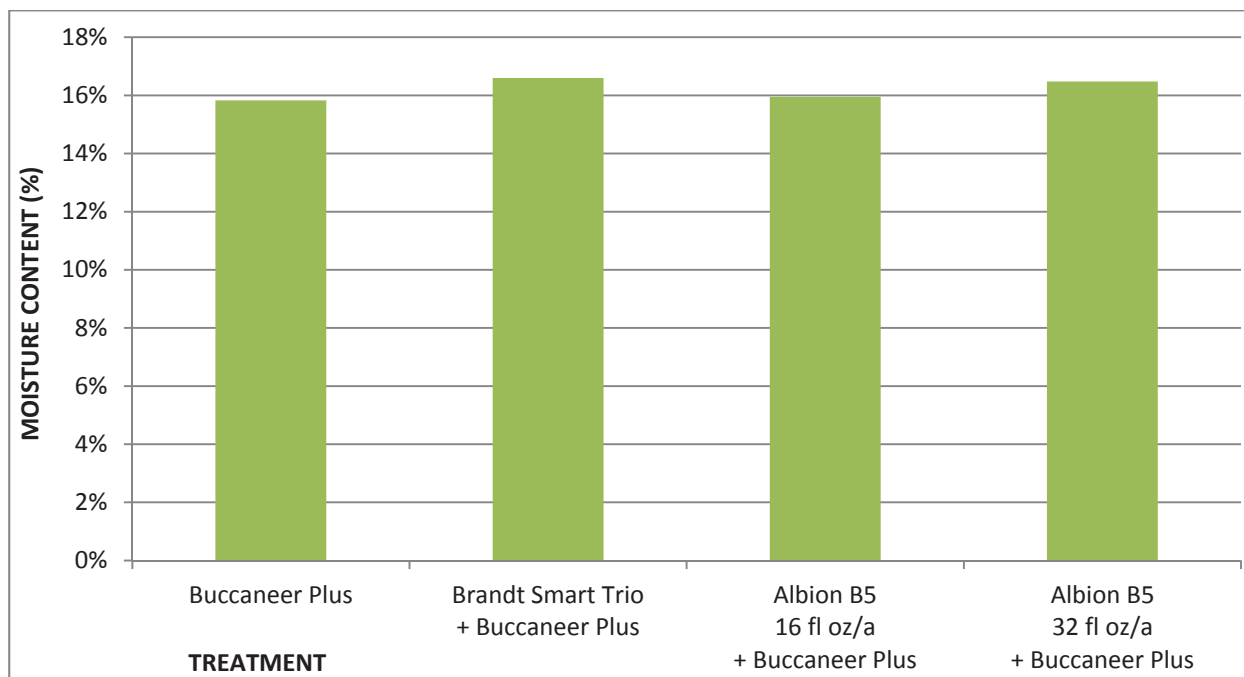


Chart 9. Moisture Content (%). The moisture content of corn at harvest was recorded for each plot on October 15 (76 DA-B), 2015.

RESULTS

Chart 10. Test Weight (Lbs/Bushel). The test weight (in pounds/bushel) of corn at harvest was recorded for each plot on October 15 (76 DA-B), 2015.

#	Treatment Name	Rate	10/15/15 118 DA-A
1	Buccaneer Plus	32 fl oz/a (A)	66.10 a
2	Brandt Smart Trio Buccaneer Plus	32 fl oz/a (A) 32 fl oz/a (A)	60.93 a
3	Albion B5 Buccaneer Plus	16 fl oz/a (A) 32 fl oz/a (A)	64.23 a
4	Albion B5 Buccaneer Plus	32 fl oz/a (A) 32 fl oz/a (A)	60.70 a

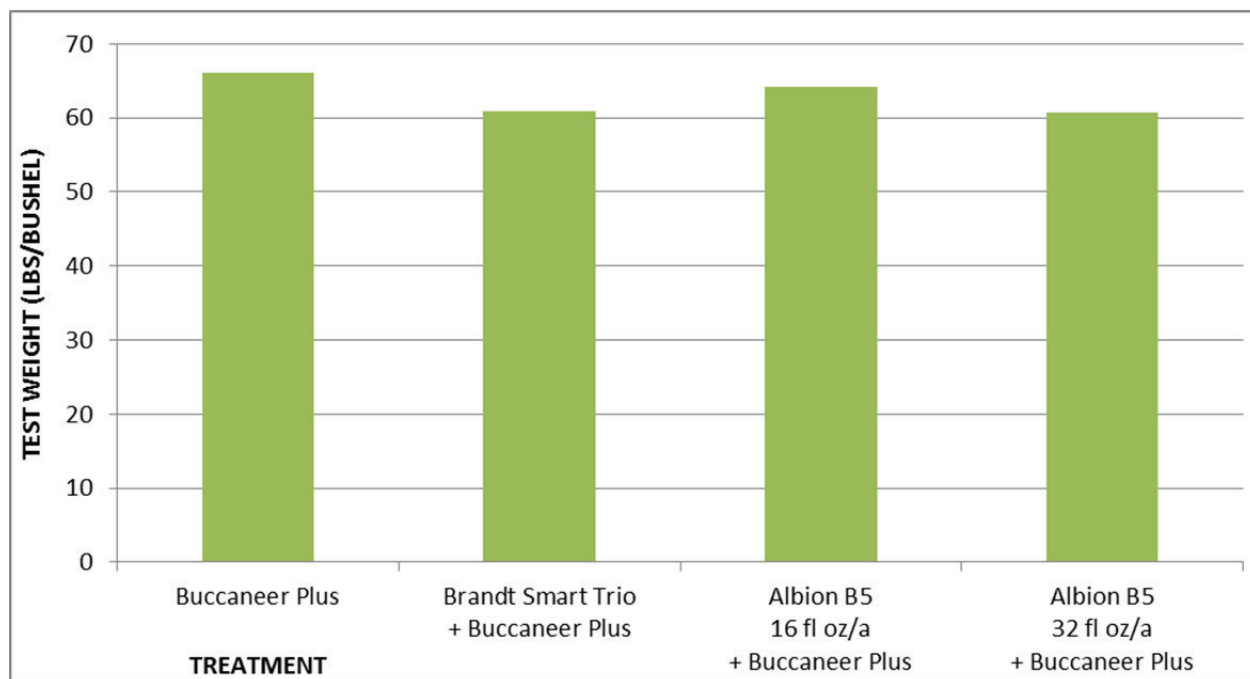


Chart 10. Test Weight (Lbs/Bushel). The test weight (in pounds/bushel) of corn at harvest was recorded for each plot on October 15 (76 DA-B), 2015.

RESULTS

Table 11. Moisture-Adjusted Bushels per Acre. An estimate of the number of bushels per acre was adjusted to 15.5% moisture content for corn.

#	Treatment Name	Rate	10/15/15 118 DA-A
1	Buccaneer Plus	32 fl oz/a (A)	206.35 a
2	Brandt Smart Trio Buccaneer Plus	32 fl oz/a (A) 32 fl oz/a (A)	201.62 a
3	Albion B5 Buccaneer Plus	16 fl oz/a (A) 32 fl oz/a (A)	215.98 a
4	Albion B5 Buccaneer Plus	32 fl oz/a (A) 32 fl oz/a (A)	204.70 a

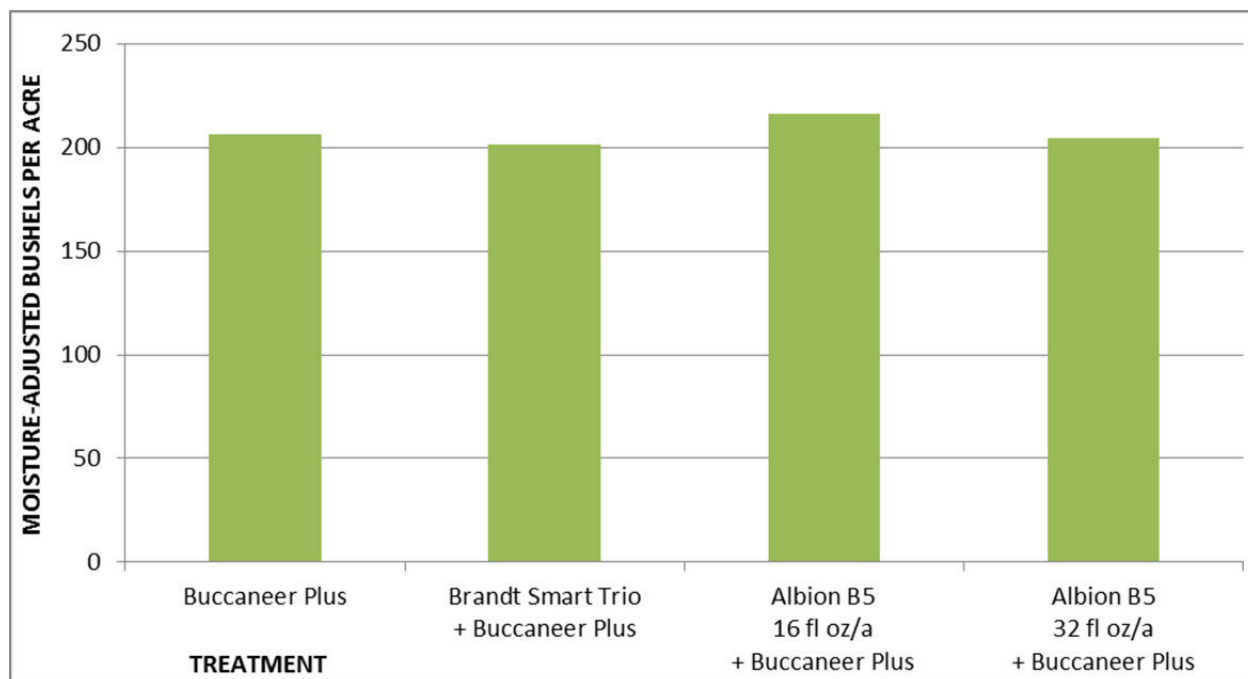


Chart 11. Moisture-Adjusted Bushels per Acre. An estimate of the number of bushels per acre was adjusted to 15.5% moisture content for corn.

RESULTS

Table 12. Estimated Gross Returns (\$/Acre). Estimated gross returns (in dollars per acre) were calculated using a value of \$3.6775 per bushel.

#	Treatment Name	Rate	10/15/15 118 DA-A
1	Buccaneer Plus	32 fl oz/a (A)	\$758.84 a
2	Brandt Smart Trio Buccaneer Plus	32 fl oz/a (A) 32 fl oz/a (A)	\$741.45 a
3	Albion B5 Buccaneer Plus	16 fl oz/a (A) 32 fl oz/a (A)	\$794.27 a
4	Albion B5 Buccaneer Plus	32 fl oz/a (A) 32 fl oz/a (A)	\$752.79 a

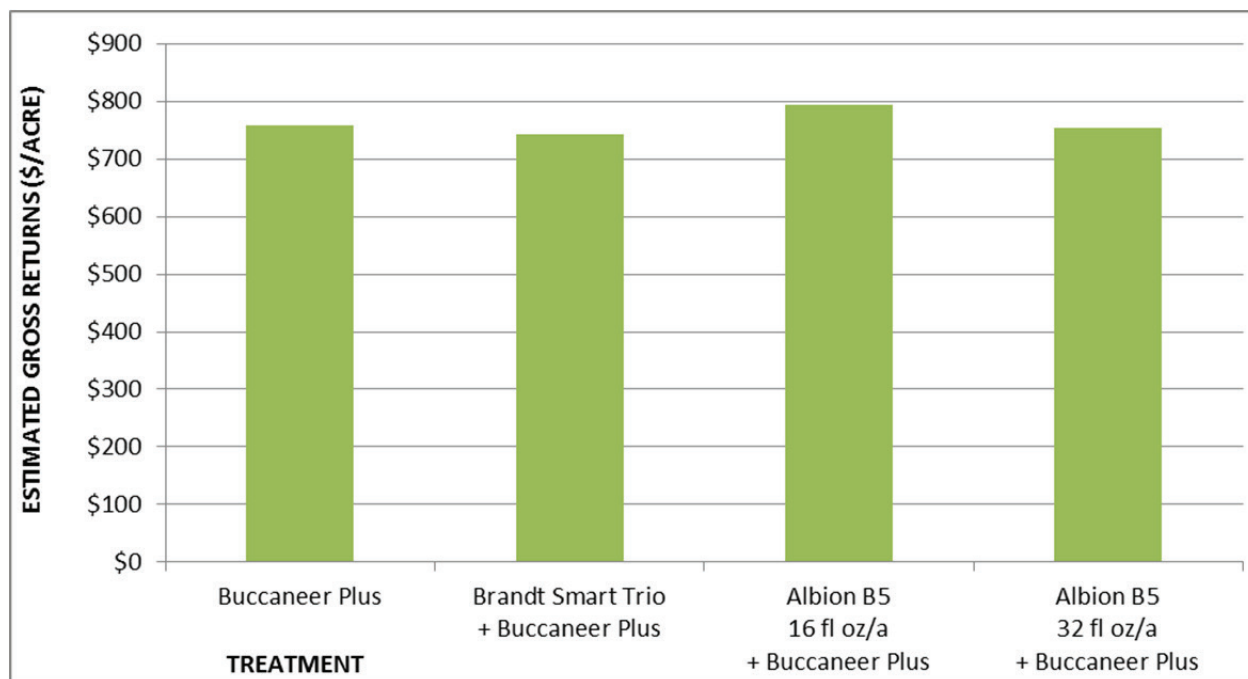


Chart 12. Estimated Gross Returns (\$/Acre). Estimated gross returns (in dollars per acre) were calculated using a value of \$3.6775 per bushel.

TRIAL INFORMATION SHEET

Trial Setup Info:

Trial ID: ALB1502M	Location: Albion, MI
Sponsor Protocol ID: ALB1502M	Study Director: Brian Cortright
Discipline: Herbicide	Sponsor Contact: Jeremy O'Brien
Trial Initiation Date: 05/11/15	Trial Completion Date: 10/15/15

Objective:

Evaluate the efficacy of Albion B5 compared to Brandt Smart Trio when applied with glyphosate for weed control and yield enhancement on corn under field conditions.

Crop and Pest Info:

Crop: Corn	Pest(s): Weeds
Variety: DK-43-30	Common Lambsquarters: <i>Chenopodium album</i>
Planting Date: 05/20/15	Crab Grass: <i>Digitaria sp.</i>
Planting Method: Seeded	Wood Sorrel: <i>Oxalis sp.</i>
Planting Equipment: JD 7100 Planter	Foxtail Millet: <i>Setaria sp.</i>
Row Spacing: 30 Inches	Common Ragweed: <i>Ambrosia artemisiifolia</i>
Spacing Within Rows: 6 Inches	Canada Horseweed: <i>Conyza canadensis</i>
Planting Density: 34,848 Plants/Acre	Harvested Width: 5 Feet (2 Rows)
Harvest Equipment: Sheller	Harvested Length: 40 Feet

Experiment Site Info:

Site Name: MAR Station	Soil pH: 5.9
Block: 169	Soil CEC: 5.5 meq/100g soil
Plot Width: 10 Feet (4 Rows)	Soil % OM: 2.3%
Plot Length: 40 Feet	Soil % Sand, Silt, Clay:
# Treatments, # Replicates: 5 trts, 4 reps	Irrigation Method: Rainfall
Tillage Type: Conventional Till	Statistical Design: RCB Design

Applications:

Letter and Date:	Method and Placement:	Equipment Notes (Pressure, # Nozzles, Etc.):
A - 06/19/15	Spray, Foliar	Backpack CO2 Sprayer, 25 PSI, 3 Nozzle Boom XR8002 Nozzles, 15 GPA Spray Volume, 3L Mix Size

Evaluations:

Weed Percent Control: 6/28
Harvest: 10/15

TREATMENT LIST

Reps: 4

Plots: 10 by 40 feet

Spray vol: 30 GAL/AC

Mix Size: 2 gallons (calculated mix size 1.3774)

Trt No.	Treatment Name	Form Conc	Form Unit	Form Type	Rate Rate	Appl Code	Spray Volume	Volume Unit	Mix Size	Mix Unit	Amt to Measure	Rep			
												1	2	3	4
1	Buccaneer Plus	41 %		EC	32 fl oz/a	A	15	GAL/AC	3	liters	50.0 ml/mx	102	203	301	402
2	Brandt Smart Trio	10.5 LB/GAL		EC	32 fl oz/a	A	15	GAL/AC	3	liters	50.0 ml/mx	101	204	302	403
	Buccaneer Plus	41 %		EC	32 fl oz/a	A	15	GAL/AC	3	liters	50.0 ml/mx				
3	Albion B5	10.5 LB/GAL		EC	16 fl oz/a	A	15	GAL/AC	3	liters	25.0 ml/mx	104	202	304	401
	Buccaneer Plus	41 %		EC	32 fl oz/a	A	15	GAL/AC	3	liters	50.0 ml/mx				
4	Albion B5	10.5 LB/GAL		EC	32 fl oz/a	A	15	GAL/AC	3	liters	50.0 ml/mx	103	201	303	404
	Buccaneer Plus	41 %		EC	32 fl oz/a	A	15	GAL/AC	3	liters	50.0 ml/mx				

PLOT MAP



APPENDIX A: DAILY METEOROLOGICAL SUMMARY

Enviro-weather Station: Albion, MI
(8.3 Miles from Experiment Site)

Date	Precip (in)	Cumul Precip (in)	Max Air Temp (F)	Min Air Temp (F)	Max Rel Hum (%)	Min Rel Hum (%)	Max Soil Temp (F)	Min Soil Temp (F)	Max Wind Speed (mph)
05/01/15		0.00	74.3	38.8	88.2	22.6	57.6	52.1	15.5
05/02/15		0.00	74.3	39.8	87.2	20.1	59.3	53.7	14.2
05/03/15		0.00	78.2	46.7	75.8	23.6	60.3	55.3	15.9
05/04/15	0.10	0.10	75.9	56.0	92.2	43.4	62.0	58.4	14.9
05/05/15	0.80	0.90	57.6	47.2	94.0	44.8	61.6	57.3	9.5
05/06/15	0.14	1.04	75.5	49.9	95.2	57.0	62.2	56.3	12.2
05/07/15		1.04	84.5	52.5	94.8	30.4	64.7	59.5	12.2
05/08/15	0.48	1.52	82.8	56.8	93.5	41.5	65.4	61.7	16.9
05/09/15	0.03	1.55	77.1	59.3	94.9	59.0	66.2	63.4	13.9
05/10/15	0.41	1.96	74.7	58.3	94.5	66.9	66.5	64.7	11.2
05/11/15	0.06	2.02	73.9	56.9	95.3	61.2	65.9	64.3	11.5
05/12/15		2.02	61.5	47.1	79.0	59.0	65.3	59.3	19.9
05/13/15		2.02	57.3	39.1	84.9	46.5	60.8	57.0	15.9
05/14/15		2.02	61.7		93.1		60.2		12.5
05/15/15	0.08	2.10	76.6	49.0	90.4	57.8	63.0	58.3	11.5
05/16/15	0.04	2.14	77.2	59.7	94.5	59.8	65.9	61.6	8.8
05/17/15		2.14	81.7	62.8	94.1	56.8	68.7	64.0	16.6
05/18/15		2.14	82.3	57.1	89.4	36.3	70.9	66.6	12.5
05/19/15		2.14	57.0	39.1	75.3	46.3	69.6	62.3	17.6
05/20/15		2.14	59.3	33.9	83.2	31.3	62.9	58.5	14.2
05/21/15		2.14	63.6	43.3	87.2	26.5	63.4	59.6	14.5
05/22/15		2.14	69.3	42.1	65.3	19.8	65.5	59.6	15.9
05/23/15		2.14	78.2	38.0	90.7	15.7	67.2	59.9	14.9
05/24/15		2.14	75.9	50.0	84.3	37.2	66.3	62.7	10.8
05/25/15	0.11	2.25	79.5	62.6	90.1	46.5	68.2	64.0	17.9
05/26/15	0.11	2.36	83.6	62.1	93.0	43.5	69.3	65.3	19.9
05/27/15	0.17	2.53	76.6	60.0	90.4	54.4	68.7	66.1	20.9
05/28/15	0.01	2.54	80.7	50.6	95.0	33.5	71.4	64.5	13.2
05/29/15		2.54	84.5	58.4	84.5	44.2	72.8	66.9	11.9
05/30/15	0.93	3.47	75.5	49.6	93.1	64.9	72.0	68.9	19.6
05/31/15	0.99	4.46	52.7	45.2	93.8	72.0	68.9	62.5	23.6
06/01/15		4.46	66.8	42.6	87.5	33.4	65.8	60.5	14.9
06/02/15		4.46	71.8	39.3	94.2	34.1	67.8	60.9	14.2
06/03/15		4.46	74.6	44.2	92.1	46.2	68.5	62.6	10.5
06/04/15		4.46	80.5	55.7	83.2	37.3	71.2	65.3	10.2
06/05/15		4.46	76.6	57.7	93.0	57.4	71.7	67.5	15.9
06/06/15		4.46	76.9	53.0	87.9	35.5	72.5	66.8	15.9
06/07/15	0.22	4.68	78.0	51.7	94.3	63.4	71.4	67.1	17.2
06/08/15	1.17	5.85	78.9	58.8	94.4	55.0	71.3	67.6	15.5

Date	Precip (in)	Cumul Precip (in)	Max Air Temp (F)	Min Air Temp (F)	Max Rel Hum (%)	Min Rel Hum (%)	Max Soil Temp (F)	Min Soil Temp (F)	Max Wind Speed (mph)
06/09/15	0.01	5.86	76.1	53.2	95.0	44.0	71.9	66.8	11.5
06/10/15		5.86	86.6	60.9	89.2	46.2	74.8	68.7	18.2
06/11/15	0.37	6.23	74.3	62.2	93.0	58.7	74.1	70.9	9.8
06/12/15	0.39	6.62	75.2	58.8	94.1	70.7	71.3	69.0	12.9
06/13/15	0.08	6.70	76.4	58.0	94.9	74.8	71.7	68.4	10.2
06/14/15	2.31	9.01	81.8	66.4	94.6	61.3	73.9	69.9	12.9
06/15/15	0.37	9.38	79.7	69.5	93.8	67.8	74.4	72.1	6.8
06/16/15	0.04	9.42	81.4	62.3	94.2	33.7	77.2	72.2	12.9
06/17/15	0.04	9.46	72.3	60.5	92.9	62.7	76.0	71.9	10.5
06/18/15	0.20	9.66	80.0	65.9	94.3	66.8	74.0	71.5	11.2
06/19/15		9.66	71.8	58.4	89.2	53.7	74.1	70.5	12.9
06/20/15		9.66	78.8	56.5	92.6	66.1	74.2	69.8	9.2
06/21/15		9.66	82.6	63.5	91.1	42.9	75.9	72.0	12.2
06/22/15	0.53	10.19	82.1	61.2	94.1	62.8	74.9	71.6	16.2
06/23/15	0.70	10.89	79.1	61.6	93.3	44.9	76.9	72.3	18.9
06/24/15		10.89	79.2	52.6	95.2	29.8	75.8	71.1	7.5
06/25/15	0.15	11.04	69.6	60.0	92.9	78.1	74.9	71.6	7.2
06/26/15		11.04	74.3	57.8	95.0	52.9	72.6	69.7	10.8
06/27/15	1.01	12.05	64.6	54.0	93.3	62.1	72.0	67.1	18.9
06/28/15		12.05	77.5	54.3	88.6	34.2	71.7	65.2	12.5
06/29/15		12.05	73.1	58.2	89.6	53.4	71.1	68.4	12.5
06/30/15	0.04	12.09	74.6	57.0	93.4	61.1	71.4	68.6	9.5
07/01/15		12.09	71.1	57.1	93.8	45.5	71.8	68.5	10.8
07/02/15		12.09	74.0	51.3	95.0	40.4	72.5	67.6	13.2
07/03/15		12.09	76.2	51.5	93.5	33.6	72.2	67.6	10.5
07/04/15		12.09	79.4	51.3	95.4	34.3	73.3	67.6	8.8
07/05/15		12.09	82.8	54.5	95.1	42.7	74.7	68.9	7.5
07/06/15		12.09	83.7	57.0	94.5	49.9	75.6	70.2	12.5
07/07/15	0.40	12.49	75.1	53.9	94.4	65.5	75.0	72.2	16.6
07/08/15	0.01	12.50	64.5	50.4	94.2	61.3	72.2	68.4	8.8
07/09/15	0.39	12.89	73.0	58.8	94.9	64.6	69.8	67.6	12.2
07/10/15		12.89	81.9	53.4	95.1	43.1	72.0	67.1	7.5
07/11/15		12.89	78.0	57.3	95.1	46.1	72.8	68.7	7.5
07/12/15	0.01	12.90	80.0	64.5	89.4	50.9	74.6	70.6	8.8
07/13/15	0.38	13.28	82.5	59.9	95.1	54.2	74.1	70.2	10.5
07/14/15	0.56	13.84	78.2	64.1	95.0	60.5	73.9	71.6	18.2
07/15/15		13.84	77.1	56.3	88.6	35.3	74.9	70.3	16.2
07/16/15		13.84	73.9	52.4	94.4	50.9	73.8	69.8	9.8
07/17/15	0.66	14.50	88.5	63.2	94.8	59.5	75.5	70.2	11.5

Date	Precip (in)	Cumul Precip (in)	Max Air Temp (F)	Min Air Temp (F)	Max Rel Hum (%)	Min Rel Hum (%)	Max Soil Temp (F)	Min Soil Temp (F)	Max Wind Speed (mph)
07/18/15	0.74	15.24	84.5	66.3	95.1	61.5	75.8	72.9	16.6
07/19/15		15.24	85.1	60.6	94.3	39.8	77.2	73.5	15.2
07/20/15		15.24	82.6	56.1	95.3	46.7	76.5	72.1	12.2
07/21/15		15.24	78.4	58.1	88.9	34.5	77.0	73.5	15.9
07/22/15		15.24	78.7	52.7	95.0	36.6	75.7	71.4	12.5
07/23/15		15.24	84.2	55.8	95.2	36.9	76.1	71.0	9.8
07/24/15		15.24	85.5	58.0	95.3	34.5	77.0	72.1	15.9
07/25/15		15.24	86.1	63.1	94.0	57.0	76.9	73.3	11.9
07/26/15		15.24	84.8	61.9	95.1	39.9	76.9	73.6	8.5
07/27/15		15.24	88.6	61.0	95.2	30.5	77.8	73.4	9.8
07/28/15		15.24	88.5	60.3	95.1	34.9	78.0	73.7	9.2
07/29/15		15.24	86.5	62.7	85.3	37.0	77.9	74.8	12.2
07/30/15		15.24	82.8	58.4	92.4	33.4	76.8	72.9	17.2
07/31/15		15.24	83.9	59.8	91.7	28.3	76.2	72.7	18.6
08/01/15		15.24	81.9	56.2	94.4	30.0	75.4	71.6	17.2
08/02/15	0.58	15.82	89.0	60.2	93.4	34.0	76.9	72.1	22.9
08/03/15	0.08	15.90	79.2	57.7	95.0	31.2	75.9	72.4	15.9
08/04/15		15.90	80.0	53.8	94.1	32.6	74.3	70.4	13.2
08/05/15		15.90	80.4	52.8	95.5	35.7	74.0	69.7	9.5
08/06/15		15.90	79.1	59.7	90.8	36.0	74.4	70.6	10.2
08/07/15		15.90	79.9	54.3	93.8	35.4	73.9	70.1	11.5
08/08/15		15.90	78.7	62.9	82.6	55.5	73.5	71.4	7.8
08/09/15		15.90	82.6	64.7	93.5	63.1	74.2	71.4	8.2
08/10/15	1.30	17.20	77.7	65.0	94.3	67.2	73.8	72.3	11.9
08/11/15		17.20	80.7	61.4	95.3	41.7	74.5	70.9	16.9
08/12/15		17.20	76.8	54.8	92.8	37.2	73.7	70.1	13.5
08/13/15	0.01	17.21	83.2	57.0	95.1	48.1	73.6	69.6	11.9
08/14/15	0.09	17.30	84.8	64.1	92.7	54.0	75.1	71.4	18.9
08/15/15	0.01	17.31	86.9	62.7	93.7	48.0	75.8	71.9	23.3
08/16/15		17.31	87.3	63.8	95.3	51.0	76.5	72.7	9.2
08/17/15	0.01	17.32	85.4	66.3	95.4	55.6	76.0	73.5	11.2
08/18/15		17.32	81.8	63.2	94.9	55.2	75.3	73.1	12.2
08/19/15	0.07	17.39	84.4	67.2	91.7	53.4	75.7	73.3	13.5
08/20/15	0.31	17.70	69.6	56.2	95.0	54.4	75.3	71.2	16.9
08/21/15		17.70	78.1	51.8	95.5	37.4	72.1	68.7	10.8
08/22/15		17.70	80.3	54.5	95.2	39.9	72.1	68.8	10.5
08/23/15	0.32	18.02	79.9	55.5	93.6	56.2	71.5	68.8	14.5
08/24/15		18.02	71.8	52.4	95.6	36.2	70.4	67.2	19.2
08/25/15		18.02	62.5	53.6	91.0	64.9	68.3	66.7	14.9

Date	Precip (in)	Cumul Precip (in)	Max Air Temp (F)	Min Air Temp (F)	Max Rel Hum (%)	Min Rel Hum (%)	Max Soil Temp (F)	Min Soil Temp (F)	Max Wind Speed (mph)
08/26/15		18.02	66.5	55.3	93.8	61.0	67.0	65.8	9.8
08/27/15		18.02	66.2	46.6	95.8	58.9	66.8	64.3	6.8
08/28/15		18.02	76.6	50.4	95.8	52.9	67.5	63.6	7.8
08/29/15	0.20	18.22	70.6	58.5	94.8	77.5	67.6	66.1	5.5
08/30/15		18.22	78.9	62.6	95.4	66.4	70.1	67.2	7.5
08/31/15		18.22	83.4	58.0	95.7	55.0	71.4	67.6	10.2
09/01/15		18.22	88.0	61.2	95.6	46.9	72.8	68.5	8.2
09/02/15		18.22	89.4	66.5	95.4	47.4	73.9	70.3	10.8
09/03/15	0.10	18.32	87.2	65.8	95.3	48.8	73.7	71.2	11.2
09/04/15	0.02	18.34	83.5	64.8	95.4	52.1	74.2	71.9	12.9
09/05/15	0.19	18.53	80.9	64.6	95.3	60.3	73.8	71.6	11.2
09/06/15		18.53	89.5	62.0	95.7	39.5	74.6	70.7	8.5
09/07/15	0.01	18.54	89.7	66.6	93.3	42.5	75.2	71.9	10.2
09/08/15	0.11	18.65	86.8	69.4	94.7	50.9	75.4	73.3	11.2
09/09/15	0.01	18.66	75.4	55.6	92.8	53.6	74.9	72.8	9.5
09/10/15		18.66	78.8	50.0	96.0	31.4	72.9	68.7	9.8
09/11/15	0.02	18.68	67.8	53.9	95.9	51.4	70.9	68.5	12.9
09/12/15		18.68	60.6	46.2	93.5	55.2	68.5	65.4	13.5
09/13/15		18.68	68.9	39.4	96.1	34.0	65.5	62.3	15.2
09/14/15		18.68	77.1	42.9	95.6	33.7	65.5	61.2	11.5
09/15/15		18.68	82.4	56.5	84.4	31.4	67.2	63.6	10.2
09/16/15		18.68	83.1	52.0	91.8	29.1	67.6	64.1	12.5
09/17/15		18.68	82.6	52.7	93.7	33.7	68.0	64.3	11.5
09/18/15	0.72	19.40	79.7	62.1	94.8	54.5	69.0	66.2	8.5
09/19/15	0.04	19.44	70.4	50.2	95.1	48.3	69.0	67.2	21.6
09/20/15		19.44	71.4	42.3	95.7	32.1	67.2	63.2	10.5
09/21/15		19.44	74.2	43.1	95.9	33.1	65.0	61.6	11.2
09/22/15		19.44	78.8	43.5	96.0	27.7	65.0	61.1	7.8
09/23/15		19.44	80.1	45.7	95.8	29.9	65.1	61.3	12.2
09/24/15		19.44	78.6	46.8	95.7	38.8	65.1	61.6	9.8
09/25/15		19.44	79.8	53.0	95.2	35.5	66.1	62.7	15.2
09/26/15		19.44	76.0	58.8	91.1	30.0	66.2	64.1	13.9
09/27/15		19.44	77.7	59.5	90.8	49.6	66.7	64.6	11.2
09/28/15		19.44	80.3	63.5	92.3	54.6	68.1	65.9	10.8
09/29/15	0.01	19.45	70.0	52.2	93.8	52.9	67.9	66.2	19.2
09/30/15		19.45	64.6	42.3	90.5	35.1	66.2	62.5	21.3
10/01/15		19.45	61.6	41.2	84.9	32.0	63.3	60.2	22.9
10/02/15		19.45	59.8	43.3	72.5	28.3	61.5	58.9	23.9
10/03/15	0.13	19.58	48.2	43.5	92.1	45.6	59.8	57.4	19.2

Date	Precip (in)	Cumul Precip (in)	Max Air Temp (F)	Min Air Temp (F)	Max Rel Hum (%)	Min Rel Hum (%)	Max Soil Temp (F)	Min Soil Temp (F)	Max Wind Speed (mph)
10/04/15	0.03	19.61	55.8	44.9	95.8	90.2	58.3	56.9	10.8
10/05/15		19.61	72.3	52.8	95.7	59.2	61.2	58.3	7.8
10/06/15		19.61	67.6	50.9	95.6	65.6	61.8	60.2	8.8
10/07/15		19.61	73.3	47.0	95.8	39.0	62.0	59.3	12.5
10/08/15	0.03	19.64	77.1	45.8	95.2	43.5	62.5	59.2	10.8
10/09/15	0.06	19.70	62.6	41.8	94.6	58.9	62.5	60.5	15.9
10/10/15		19.70	65.2	36.6	96.0	39.4	60.5	57.0	9.8
10/11/15		19.70	75.4	46.4	80.7	30.2	60.3	56.9	13.5
10/12/15		19.70	73.1	53.1	74.1	48.1	60.5	58.2	13.5
10/13/15	0.01	19.71	60.1	48.6	89.7	54.0	60.2	58.2	17.6
10/14/15	0.01	19.72	58.5	38.6	93.6	44.1	58.2	57.1	14.9
10/15/15	0.06	19.78	58.1	38.2	94.9	44.7	57.1	54.9	24.9
10/16/15	0.01	19.79	52.8	29.9	96.6	38.8	55.1	52.2	18.6
10/17/15	0.01	19.80	48.4	27.6	93.3	28.3	52.5	50.6	18.6
10/18/15		19.80	53.4	26.3	95.5	28.5	51.0	48.4	16.2
10/19/15		19.80	68.4	29.9	91.8	22.0	52.1	48.1	17.2
10/20/15	0.05	19.85	74.5	53.0	93.8	22.9	54.7	51.6	12.9
10/21/15	0.06	19.91	75.3	49.5	94.0	36.3	56.8	54.1	11.5
10/22/15		19.91	67.1	43.1	80.5	31.8	57.5	55.9	10.8
10/23/15		19.91	60.2	39.9	92.5	48.6	56.4	53.6	14.9
10/24/15	0.17	20.08	68.9	50.7	91.0	70.8	57.2	54.8	16.2
10/25/15		20.08	62.7	37.6	93.6	31.1	56.9	54.1	15.5
10/26/15		20.08	64.1	30.9	96.0	31.4	54.7	51.1	11.9
10/27/15	0.02	20.10	58.9	39.9	93.9	38.5	53.3	51.5	16.6
10/28/15	0.60	20.70	58.3	43.3	95.0	84.4	54.6	52.7	18.6
10/29/15	0.05	20.75	43.7	34.9	94.3	67.4	54.4	49.9	15.5
10/30/15	0.01	20.76	50.7	33.0	96.6	64.4	50.6	49.0	5.5
10/31/15	0.17	20.93	49.2	39.4	94.2	67.2	50.4	49.4	13.9
11/01/15	0.11	21.04	62.1	36.4	94.4	33.5	51.7	49.7	19.9
11/02/15		21.04	71.6	36.4	95.5	26.7	52.0	48.7	12.9
11/03/15		21.04	76.9	42.7	94.0	25.5	53.2	49.9	8.8
11/04/15		21.04	75.4	45.8	94.3	41.2	54.3	50.8	9.8
11/05/15	0.21	21.25	71.6	52.5	92.8	52.3	56.1	53.1	18.2
11/06/15	0.19	21.44	65.3	46.4	91.2	67.2	56.7	54.3	25.9
11/07/15		21.44	53.2	30.4	93.0	39.0	54.3	51.3	20.9
11/08/15		21.44	50.7	25.2	96.3	43.4	51.3	48.2	10.5
11/09/15	0.01	21.45	56.4	26.1	95.7	28.7	48.7	46.1	9.5
11/10/15	0.15	21.60	54.6	32.0	94.5	44.2	49.2	47.7	11.2

APPENDIX B: DATA SUMMARIES

Nov-20-2015 (ALB1502M Weed Corn)

ARM 2014.7 Spray/Seeding Plan Page 1 of 4

Pacific Agricultural Research

Evaluate the efficacy of Albion B5 compared to Brandt Smart Trio when applied with glyphosate for weed control and yield enhancement on corn under field conditions.

Trial ID: ALB1502M Location: Albion, MI Trial Year: 2015
 Protocol ID: ALB1502M Investigator: Brian Cortright
 Project ID: Study Director: Brian Cortright
 Sponsor Contact: Jeremy O'Brien

Reps: 4 Plots: 10 by 40 feet
 Spray vol: 15 GAL/AC Mix Size: 3 liters (calculated mix size 2.607)

Trt No.	Treatment Name	Form Conc	Form Unit	Form Type	Rate Rate	Rate Unit	Appl Code	Spray Volume	Volume Unit	Mix Size	Mix Unit	Amt to Measure	Product	Rep 1	Rep 2	Rep 3	Rep 4
1	Buccaneer Plus	41%		EC	1qt/a		A	15GAL/AC		3liters		50.0 ml/mx		102	203	301	402
2	Brandt Smart Trio	10.5LB/GAL		EC	1qt/a		A	15GAL/AC		3liters		50.0 ml/mx		101	204	302	403
	Buccaneer Plus	41%		EC	1qt/a		A	15GAL/AC		3liters		50.0 ml/mx					
3	Albion B5	10.5LB/GAL		EC	16fl oz/a		A	15GAL/AC		3liters		25.0 ml/mx		104	202	304	401
	Buccaneer Plus	41%		EC	1qt/a		A	15GAL/AC		3liters		50.0 ml/mx					
4	Albion B5	10.5LB/GAL		EC	1qt/a		A	15GAL/AC		3liters		50.0 ml/mx		103	201	303	404
	Buccaneer Plus	41%		EC	1qt/a		A	15GAL/AC		3liters		50.0 ml/mx					

Sort Order: Treatment

Pacific Agricultural Research

Evaluate the efficacy of Albion B5 compared to Brandt Smart Trio when applied with glyphosate for weed control and yield enhancement on corn under field conditions.

Trial ID: ALB1502M Location: Albion, MI Trial Year: 2015
 Protocol ID: ALB1502M Investigator: Brian Cortright
 Project ID: 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		CHEAL	DIGSS	OXASS	SETSS	AMBEL
Pest Scientific Name		Chenopodium al>	Digitaria sp.	Oxalis sp.	Setaria sp.	Ambrosia artem>
Pest Name		Common lambsqu>	Crabgrass	Wood sorrel	Foxtail millet	Common ragweed
Crop Code	ZEAMX	ZEAMX	ZEAMX	ZEAMX	ZEAMX	ZEAMX
BBCH Scale	BCOR	BCOR	BCOR	BCOR	BCOR	BCOR
Crop Scientific Name	Zea mays	Zea mays	Zea mays	Zea mays	Zea mays	Zea mays
Crop Name	Corn	Corn	Corn	Corn	Corn	Corn
Crop Variety	DK-43-30	DK-43-30	DK-43-30	DK-43-30	DK-43-30	DK-43-30
Description	Total % control	% Control LQ	% Control Crab>	% Control Oxal>	% Control Foxt>	% Control Ragw>
Part Assessed	CANOPY C	CANOPY C	CANOPY C	CANOPY C	CANOPY C	CANOPY C
Assessment Date	Jun-28-2015	Jun-28-2015	Jun-28-2015	Jun-28-2015	Jun-28-2015	Jun-28-2015
Assessment Type	PERCEN	PERCEN	PERCEN	PERCEN	PERCEN	PERCEN
Assessment Unit	0-100	0-100	0-100	0-100	0-100	0-100
Sample Size, Unit	1 PLOT	1 PLOT	1 PLOT	1 PLOT	1 PLOT	1 PLOT
Collection Basis, Unit	1 PLOT	1 PLOT	1 PLOT	1 PLOT	1 PLOT	1 PLOT
Number of Subsamples	1	1	1	1	1	1
Days After First/Last Applic.	9 9	9 9	9 9	9 9	9 9	9 9
Trt-Eval Interval	9 DA-A	9 DA-A	9 DA-A	9 DA-A	9 DA-A	9 DA-A
Plant-Eval Interval	39 DP-1	39 DP-1	39 DP-1	39 DP-1	39 DP-1	39 DP-1
ARM Action Codes						
Number of Decimals	2	2	2	2	2	2
Trt Treatment	Rate	Appl				
No. Name	Rate Unit	Code	1	2	3	4
1Buccaneer Plus	1qt/a	A	88.75a	92.50a	90.00a	100.00a
2Brandt Smart Trio	1qt/a	A	90.00a	90.00a	82.50a	100.00a
Buccaneer Plus	1qt/a	A				
3Albion B5	16fl oz/a	A	88.75a	90.00a	90.00a	100.00a
Buccaneer Plus	1qt/a	A				
4Albion B5	1qt/a	A	86.25a	90.00a	90.00a	95.00a
Buccaneer Plus	1qt/a	A				
LSD P=.05	4.267	3.999	11.996	7.997	0.000	5.332
Standard Deviation	2.668	2.500	7.500	5.000	0.000	3.333
CV	3.02	2.76	8.51	5.06	0.0	4.68
Bartlett's X2	1.7	0.0	0.0	0.0	0.0	4.199
P(Bartlett's X2)	0.427	0.241
Skewness	-1.89*	4.0*	-4.0*	-4.0*	.	-1.2739*
Kurtosis	3.0346*	16.0*	16.0*	16.0*	.	1.9072
Replicate F	1.976	1.000	1.000	1.000	0.000	4.875
Replicate Prob(F)	0.1883	0.4363	0.4363	0.4363	1.0000	0.0279
Treatment F	1.390	1.000	1.000	1.000	0.000	0.375
Treatment Prob(F)	0.3076	0.4363	0.4363	0.4363	1.0000	0.7733

Means followed by same letter do not significantly differ (P=.05, LSD)
 Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Nov-20-2015 (ALB1502M Weed Corn)

ARM 2014.7 AOV Means Table Page 3 of 4

Pacific Agricultural Research

Evaluate the efficacy of Albion B5 compared to Brandt Smart Trio when applied with glyphosate for weed control and yield enhancement on corn under field conditions.

Trial ID: ALB1502M Location: Albion, MI Trial Year: 2015
 Protocol ID: ALB1502M Investigator: Brian Cortright
 Project ID: 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	ERICA							
Pest Scientific Name	Conyza canadensis							
Pest Name	Canada horseweed							
Crop Code	ZEAMX	ZEAMX	ZEAMX	ZEAMX	ZEAMX	ZEAMX		
BBCH Scale	BCOR	BCOR	BCOR	BCOR	BCOR	BCOR		
Crop Scientific Name	Zea mays	Zea mays	Zea mays	Zea mays	Zea mays	Zea mays		
Crop Name	Corn	Corn	Corn	Corn	Corn	Corn		
Crop Variety	DK-43-30	DK-43-30	DK-43-30	DK-43-30	DK-43-30	DK-43-30		
Description	% Control Mare	Yield	% Moisture	Test Weight (L)	Bushels/Acre	Est Gross Return		
Part Assessed	CANOPY C	YIELD C	YIELD C	YIELD C	YIELD C	YIELD C		
Assessment Date	Jun-28-2015	Oct-15-2015	Oct-15-2015	Oct-15-2015	Oct-15-2015	Oct-15-2015		
Assessment Type	PERCENT	WEIGHT	MOICON	WEITES	YIELD	COMPRO		
Assessment Unit	0-100	LB	%	LB	BU	DOLLAR		
Sample Size, Unit	1 PLOT	80 ROWFT	80 ROWFT	80 ROWFT	1 A	1 A		
Collection Basis, Unit	1 PLOT	1 PLOT	1 PLOT	1 PLOT	1 A	1 A		
Number of Subsamples	1	1	1	1	1	1		
Days After First/Last Applic.	9 9	118 118	118 118	118 118	118 118	118 118		
Trt-Eval Interval	9 DA-A	118 DA-A	118 DA-A	118 DA-A	118 DA-A	118 DA-A		
Plant-Eval Interval	39 DP-1	148 DP-1	148 DP-1	148 DP-1	148 DP-1	148 DP-1		
ARM Action Codes					TY1	T2		
Number of Decimals	2	2	2	2	2	2		
Trt Treatment	Rate	Appl						
No. Name	Rate Unit	Code	7	8	9	10	11	12
1Buccaneer Plus	1qt/a	A	67.50a	53.28a	15.83a	66.10a	206.35a	758.84a
2Brandt Smart Trio	1qt/a	A	70.00a	52.53a	16.60a	60.93a	201.62a	741.45a
Buccaneer Plus	1qt/a	A						
3Albion B5	16fl oz/a	A	67.50a	55.84a	15.95a	64.23a	215.98a	794.27a
Buccaneer Plus	1qt/a	A						
4Albion B5	1qt/a	A	67.50a	53.26a	16.48a	60.70a	204.70a	752.79a
Buccaneer Plus	1qt/a	A						
LSD P=.05			3.999	5.157	1.255	5.678	19.358	71.188
Standard Deviation			2.500	3.224	0.785	3.550	12.103	44.507
CV			3.67	6.0	4.84	5.64	5.84	5.84
Bartlett's X2			0.542	5.74	9.159	6.723	7.146	7.146
P(Bartlett's X2)			0.91	0.125	0.027*	0.081	0.067	0.067
Skewness			0.4213	0.648	-1.5776*	2.0059*	0.3564	0.3564
Kurtosis			-0.4537	0.0771	3.4325*	5.2603*	-0.1223	-0.1223
Replicate F			3.667	1.058	2.935	2.072	0.869	0.869
Replicate Prob(F)			0.0565	0.4138	0.0918	0.1743	0.4920	0.4920
Treatment F			1.000	0.809	0.949	2.191	1.049	1.049
Treatment Prob(F)			0.4363	0.5199	0.4573	0.1588	0.4172	0.4172

Nov-20-2015 (ALB1502M Weed Corn)

ARM 2014.7 AOV Means Table Page 4 of 4

Pacific Agricultural Research

Evaluate the efficacy of Albion B5 compared to Brandt Smart Trio when applied with glyphosate for weed control and yield enhancement on corn under field conditions.

Trial ID: ALB1502M Location: Albion, MI Trial Year: 2015
 Protocol ID: ALB1502M Investigator: Brian Cortright
 Project ID: Study Director: Brian Cortright
 Sponsor Contact: Jeremy O'Brien

Pest Type

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

Pest Code

CHEAL, Chenopodium album, = US

DIGSS, Digitaria sp., = US

OXASS, Oxalis sp., = US

SETSS, Setaria sp., = US

AMBEL, Ambrosia artemisiifolia, = US

ERICA, Conyza canadensis, = US

Crop Code

ZEAMX, BCOR, Zea mays, = US

Part Assessed

CANOPY = canopy

YIELD = yield

C = Crop is Part Rated

Assessment Type

PERCEN = percent

WEIGHT = weight

MOICON = moisture content

WEITES = weight - test

YIELD = yield

COMPRO = commercial product, general

Assessment Unit

0-100 = 0-100 index/scale-percent

LB = pound

% = percent

BU = bushel

DOLLAR = dollar

PLOT = total plot

ROWFT = row-foot

A = acre

PLOT = total plot

A = acre

Plant-Eval Interval

39 DP-1 = 1 ZEAMX May-20-2015

148 DP-1 = 1 ZEAMX May-20-2015

ARM Action Codes

TY1 = $3.889286 * [C8] * (100 - [C9]) / 84.5$

T2 = $[C11] * 3.6775$



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