# 2012 SumaGrow Spray Plots

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**Introduction:**

Bio Soil Enhancers, Inc organic SumaGrow liquid product was evaluated in 2012 at the Allison Organic Research Farm in southern Warren County and the conventional WIU farm near campus in McDonough County. SumaGrow is a polymicrobial formulation containing multiple strains of naturally occurring soil microbes with humic acid and is intended to inoculate soil to improve plant and soil health and crop yield. Soybean and corn plots were sprayed with the product and grain yields were estimated and compared to control (no spray) plots.

**Methods:**

The 1st application of the product at the WIU farm (block 14) occurred about 3 weeks after the soybeans were planted. Soybeans (Blue River Hybrids 35C2) were planted on 5/25 at a rate of 160,000 plants/a. On 6/15, 5 plots were sprayed for the 1st and only time at a rate of 1.8 gal/a. 5 other plots in the same small field were sprayed at a rate of 0.6 gal/a on 6/15 and again on 7/24 at a rate of 0.34 gal/a. 17 gal/a of water was used for the carrier in the spray mix for all plots.

On 6/25, the Allison Organic Farm cornfield (field 3-1) received one application of the SumaGrow. 4 plots at this site received the spray application at a rate of 0.5 gal/a and 4 other plots received an application at 1.0 gal/a. 17 gal/a of water was used for the carrier in the spray mix for all plots. Corn (Great Harvest Organics 59R5) in this field was planted on 5/30 at a population of 30,000 plants/a and did not receive any additional fertilizer.

Soybean/SumaGrow plots at the WIU site consisting of 2 rows at an average of about 15' in length (5 reps) were harvested on 10/26 with a plot combine and corn/SumaGrow plots at the organic farm consisting of 1 row each for 30' in length (4 reps) were hand harvested 10/30.

**Results:**

Statistics for the SumaGrow treatment of 1 application at 1.8 gal/a at the WIU site reveal a significant soybean yield improvement using the product with an increase of 9.8 bu/a over the highest yielding control (table 1). The other treatment consisting of 1 application at 0.6 gal/a and 1 application at 0.34 gal/a revealed no improvement or significant difference compared to any of the controls (table 1).

No improvement or significant yield differences were observed in the corn/SumaGrow plots at the organic farm location (tables 2 and 3).

**Table 1: Soybean Yields of SumaGrow and Control Plots**

| Site | Treatment | Date(s) Applied | Grain Yield (Bu/A) |
|---|---|---|---|
| WIU conventional | 1.8 gal/a | June 15 | 68.6[a] |
| WIU conventional | Control (northwest section) | N/A | 58.8[b] |
| WIU conventional | Control (southeast section) | N/A | 57.0[b] |
| WIU conventional | 0.6 & 0.34 gal/a | June 15 and July 24 | 54.4[b] |
| | | | LSD (alpha 0.05) = 5.4 |

Different letters associated with yields in the table indicate significant differences among treatments.

**Table 2: Corn Yields of SumaGrow and Control Plots**

| Site | Treatment | Date(s) Applied | Treated Plot Grain Yield (Bu/A) |
|---|---|---|---|
| Allison organic | Control | N/A | 147.2 |
| Allison organic | 0.5 gal/a | June 25 | 141.1 |
| | | | LSD (alpha 0.05) = 20.0 |

**Table 3: Corn Yields of SumaGrow and Control Plots**

| Site | Treatment | Date(s) Applied | Treated Plot Grain Yield (Bu/A) |
|---|---|---|---|
| Allison organic | Control | N/A | 148.0 |
| Allison organic | 1.0 gal/a | June 25 | 135.1 |
| | | | LSD (alpha 0.05) = 18.8 |

**Discussion:**

One SumaGrow treatment yield comparison out of 4, at both sites, revealed an improvement over controls. This treatment was the only one sprayed at a higher rate of 1.8 gal/a and was the earliest sprayed with the exception of one that had a partial application of a low rate. Another factor may have contributed to its significant improvement in soybean yield. Every plot yield for the WIU field was analyzed within their content of spatial arrangement and it appeared that linear compared sections of the field had large yield differences. Post harvest soil probing revealed that higher yielding sections were located where the soil density was tighter than the lower yielding sections. These large yield difference patterns paralleled each other in a north-south direction. The direction of most wheel traffic also runs north-south and likely produced these tighter soil sections. Control plots (9 reps) compared to neighboring control plots just 5' away laterally and running the distance of most of the field north-south had a statistically significant yield difference of 5.2 bu/a. Usually slightly compacted soils don't lead to higher crop yields, but there is evidence that they can during a drought season like the one that occurred during this study.

If we assume the SumaGrow treatment of 1.8 gal/a grown in the favorable tighter soils had an external advantage of 5.2 bu/a and deduct that from its difference of the highest yielding control, then it still could have yielded 4.6 bu/a higher than the control treatment. Table 4 considers those 2 different yield margins for the higher rate treatment.

Table 4 shows the economics of using SumaGrow in soybeans at the higher rate of 1.8 gal/a with 2 different yield increase options and with 2 different markets. Economics for the lower rate (2 pass) treatment were not calculated due to the statistics not indicating a significant yield difference. This product was not used on soybeans at the organic farm so revenue figures for the organic market are only hypothetical based on the yield gain at the conventional farm.

**Table 4: Economics of SumaGrow in Soybeans at rate of 1.8 gal/a**

| Soybean market type | Market price of soybeans | Cost of 1 gal. of SumaGrow | Cost of SumaGrow per acre | Gross $ increase @ 9.8 bu/a | Net profit @9.8 bu/a boost | Gross $ increase @ 4.6 bu/a | Net profit @4.6 bu/a boost |
|---|---|---|---|---|---|---|---|
| conventional | $14/bu | $40 | $78.75* | $137.20 | $58.45 | $64.40 | (-$14.35) |
| organic | $28/bu | $40 | $78.75* | $274.40 | $195.65 | $128.80 | $50.05 |

*Cost includes custom spray application cost of $6.75/ac

The rate of 1.8 gal/a is higher than normally recommended and a lower rate closer to 1 gal/ac may have produced similar yields, therefore, there may not have been a net loss, as shown in table 4, even with the 4.6 bu/a boost in conventional grain.

**Conclusion:**

A study of the SumaGrow under more normal weather conditions may be necessary to answer questions with more conviction. The extremely hot and dry conditions at our later applications were most likely not favorable for optimum research. Based on this study, more plots with higher rates and earlier applications may prove to show the benefits of this product in more plots. More research is needed to know more about the profitability of the product.