

**Western Illinois University - School of Agriculture**  
**Organic Research Program**  
**2014 Organic Corn Seed Treatment Evaluation**  
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### **Introduction**

There are large differences in seed treatment products and prevalence in conventional and organic corn production. Nearly all conventional corn seed is treated with both an insecticide and fungicide and some seed also receives a microbial inoculant such as VOTiVO. In contrast, until recently most organic corn seed was planted untreated. A variety of organically approved seed treatments are now on the market that make claims such as, disease protection, early vigor, improved nutrient uptake and higher yield. Organic seed treatments vary widely in formulation but generally include 1 or more of the following: living organisms, nutrients, growth factors and carrier materials. Independent research is needed to guide seed company and farmer decisions with respect to these products. In 2014, a study was conducted at the Allison Organic Research Farm evaluating the impact of 2 commercial products, *LVF Myco Plus* from Lakeview Farms and *1r - Seed Treatment* from SoilBiotics, on corn stand and yield. *LVF Myco Plus* is a microbial inoculant containing mycorrhizal spores, humic acid, and seaweed extract. *1r - Seed Treatment* is a liquid seed treatment consisting of humic acid (14%) derived from Leonardite ore. Both treatments were pre-applied to corn seed by the seed vendor prior to delivery.

### **Methods**

The study was conducted in 2014 at the WIU Allison Organic Research Farm (field 3-3) in southwest Warren County, IL.

#### Field preparation

On 7/12/13, Blue River Hybrids Daytona sunflowers were planted on 30" rows at 28,000 seeds/ac. The sunflowers were initially planted with the intention of harvest, but were terminated on 10/3/13 with a Howard Rotavator. They had finished flowering and were just beginning to produce viable seed. A significant amount of sunflower residue covered the soil going into the winter.

The next spring, on 5/6/14, the field was tilled about 3" deep with a Howard Rotavator, terminating a strong stand of field pennycress and lesser amounts of lambsquarter, redroot pigweed, and smartweed. On 5/22, Nature Safe 13-0-0, a pelletized organic fertilizer comprised primarily of feathermeal, was applied to the whole field with a drop spreader at 392 lbs/ac (51 lbs of total N/ac) and then incorporated the following the day with a field cultivator, a few hours before planting corn.

Prairie Hybrids 5879 corn (107 day relative maturity) was planted at 29,000 seeds/ac with a 12-row John Deere 1760 planter using RTK guidance on the tractor. Stand counts were performed on 6/9 by counting the # of plants per 1/1000<sup>th</sup> of an acre (17.6'), 2 times per plot.

Weed control consisted of rotary hoeing on 5/31 and 1 row crop cultivation with a 6-row IH 153 cultivator on 6/19. The corn was almost 18" tall at the time of cultivation and a second cultivation was deemed unnecessary because of very low weed pressure. On 6/24, the entire field was quickly walked to remove a moderate amount of volunteer sunflowers and some isolated broadleaf weeds. Weed control remained excellent throughout the season.

The 4-row wide plots were harvested on 11/14 using a John Deere 9570 combine with a 6-row head. Plot lengths were approximately 1,200 feet. Yields were calculated by using the yield monitor data on the combine and a correction factor determined by 6 different weigh wagon weights from the same field.

## Results

At  $\alpha = 0.05$ , there were no treatment effects on yield or stand count. At  $\alpha = 0.20$ , both seed treatments: 1r- Seed Treatment and LVF Myco Plus resulted in significant yield enhancement (x bu/ac and y bu/ac respectively) over the no treatment control, but there was no significant difference between the seed treatments (table 1).

The highest yielding plot (201.7 bu/ac) received the LVF Myco Plus treatment, the 2<sup>nd</sup> highest yielding plot (190.0 bu/ac) received the 1r - Seed Treatment and the lowest yielding plot (157.3 bu/ac) received no seed treatment (map 1).

**Table 1: Corn Stands and Yields**

Treatment	Corn Population (Plants/A)	Significance Groups ( $\alpha = 0.05$ )	Corn Yield (Bu/A)	Significance Groups ( $\alpha = 0.05$ )	Corn Yield (Bu/A)	Significance Groups ( $\alpha = 0.20$ )
SoilBiotics (1r - Seed Treatment)	26,900	a	177.5	a	177.5	a
Lakeview Farms (LVF Myco Plus)	27,500	a	175.1	a	175.1	a
Control (no seed treatment)	26,200	a	165.0	a	165.0	b
	LSD=1,467		LSD=15.8		LSD=9.8	

LSD = Least Significant Difference

Different letters in the significance groups column indicate significant yield differences among varieties, e.g., yield(s) associated with "a" are different than those associated with "b."

**Table 2: Economic Summary of Seed Treatments**

Treatment	Corn Yield (Bu/A)	Gross Revenue <sup>1</sup> (\$/A)	Treatment Expense (\$/A)	Net Revenue Increase over Control (\$/A)
SoilBiotics (1r - Seed Treatment)	177.5	2,130	2.24	147.76
Lakeview Farms (LVF Myco Plus)	175.1	2,101	2.54	118.66
Control (no seed treatment)	165.0	1,980	0.0	N/A

<sup>1</sup> Based on \$12/bu organic corn in 2014.

## Discussion

The results of this experiment suggest that a modest investment (less than \$3/ac for both treatments applied by a seed vendor) can result in a large return on investment, potentially greater than \$100/ac. Table 2 illustrates the increase in revenue as a result of using the products tested in this study.

The yields reported in Map 1 and Tables 1&2 represent some of the highest corn yields ever recorded at the Allison Farm with very modest N rates (51 lbs/ac of total N applied as NS 13-0-0). Favorable weather, excellent weed control, the sunflower cover crop/fallow the preceding season and the seed treatments all seem likely to have contributed to the high yields.

## Conclusion

More in-depth study (e.g., replication over time and collection of additional parameters such as tissue nutrient levels) is needed to increase confidence in the seed treatment products tested and to potentially identify specific mechanisms of yield enhancement.

We repeated the experiment in 2014 but unfortunately many of the plots were compromised by extreme weather. We are planning to repeat the experiment in 2016.

# Map 1: Treatment Plots and Corn Yields

Corn Seed Treatment Study															
	Trt 1 = LVF Myco Plus			Trt 2 = SoilBiotics ST			Trt 3 = Control (no seed treatment)			N ↑					
Rep >	1	1	1	2	2	2	3	3	3	4	4	4	5	5	5
Trt. >	1	2	3	2	3	1	3	2	1	1	3	2	1	2	3
30' buffer planted to corn	174.6 bu/a	172.1 bu/a	168.9 bu/a	173.2 bu/a	157.3 bu/a	169.5 bu/a	158.8 bu/a	167.5 bu/a	161.7 bu/a	168.0 bu/a	163.3 bu/a	190.0 bu/a	201.7 bu/a	184.8 bu/a	176.5 bu/a
Adjacent corn field serving as buffer															

Planted in field 3-3 on 5/23/14 at 29,000 plants/a with a 12 row planter using RTK guidance  
 Corn hybrid = Prairie Hybrids 5879  
 Plot width = 4 rows wide