

## 2016 Prescription Foliar Fertilizer Trial

**Purpose:** Soybean producers identified prescription foliar fertilization based on soil or plant tissue sampling as a high priority for the 2016 SMaRT trials. The AgroLiquid company agreed to collaborate on this project. The purpose of this trial was to determine the effect of field-specific prescription foliar fertilization on soybean yields and income in 2016.

**Procedure:** Field-specific prescription foliar fertilizer mixtures were compared to an unfertilized control at nine locations in 2016. The field-specific prescription foliar fertilizer mixtures (table 3) were developed by AgroLiquid and based on soil nutrient levels (table 2) at each of the trial locations. The application timing was also determined by AgroLiquid and was based on row spacing. Foliar fertilizers were applied at V4 (fourth trifoliolate leaf) where the row spacing was 15 inches or less and at R1 (one open flower on 50% of the plants) where row spacing was more than 15 inches.

Table 1. The effect of a single application of a prescription foliar fertilizer on soybean yield in 2016

Location	Unfertilized control	Foliar fertilizer	LSD <sub>0.10</sub>	Yield difference
	----- Yield (bu/ac) -----			Yield (bu/ac)
Cass	27.2 b	28.7 a	1.3	1.5
Ionia	65.4 b	66.8 a	1.0	1.4
Gratiot	71.9	73.1	1.5	1.2
St. Joseph	57.2	58.0	2.2	0.8
Van Buren	61.7	62.2	4.1	0.5
Lenawee 2	45.3	45.4	6.9	0.1
Monroe	67.0	66.9	1.0	-0.1
Lenawee 1	75.2	74.7	1.4	-0.5
Sanilac	54.1	52.6	5.2	-1.5
<b>Average</b>	<b>58.4</b>	<b>58.7</b>	<b>0.9</b>	<b>0.3</b>



*field sprayer in soybeans*

Table 2. Soil test levels at the 2016 prescription foliar fertilizer trial locations

Location	O.M.	P	K	Mg	Ca	pH	CEC	S	Zn	Mn
	%	----- ppm -----				1:1	meq/100g	----- ppm -----		
Cass	1.4	93	172	93	1057	6.7	6.5	<b>8</b>	2.1	<b>4</b>
Ionia	2.1	50	152	241	1243	6.6	9.3	<b>8</b>	1.9	<b>7</b>
Gratiot	2.8	27	165	248	1593	7	10.6	17	2.4	<b>4</b>
St. Joseph	1	64	99	79	665	6	5.1	23	1.8	<b>7</b>
Van Buren	1.5	29	162	81	719	5.9	5.7	13	1.4	16
Lenawee 2	2.1	99	177	179	975	6.1	8	<b>10</b>	1.7	<b>3</b>
Monroe	2.4	49	177	193	1131	6	9.2	13	2.5	<b>4</b>
Lenawee 1	2.7	16	141	254	1712	6.2	12.6	15	1.4	<b>5</b>
Sanilac	3.7	31	244	227	2460	7.9	14.9	20	1.8	<b>2</b>

Bold figures indicate low or very low soil test levels.

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**Results:** The prescription foliar fertilizer treatment significantly increased soybean yields at two of the nine locations in 2016. However, the yield increases were not large enough to cover the cost of the foliar fertilizer mixture at these sites (figure 1). The lack of a profitable response to foliar fertilization in these trials is most likely due to the medium to high soil test levels for most of the nutrients at the trial locations. However, sulfur levels were low at three locations and manganese levels were low or very low at eight locations. These results are consistent with previous university research trials conducted over the past 40 years showing that foliar fertilization of soybeans is rarely profitable. One exception is when foliar applications of manganese are applied to plants displaying visible manganese deficiency symptoms.

We want to thank AgroLiquid for providing and delivering the products and Martin Nagelkirk, Dan Rajzer and Ned Birkey for coordinating these trials.

## 2016 Prescription foliar fertilizer trial locations



Table 3. Prescription foliar fertilizer products, application rates and costs for each location

Location	Foliar fertilizer products and application rates	Foliar fertilizer cost
		----- \$/ac -----
Cass	1.5 gal/ac of fertiRain, and 1 qt/acre of Manganese	\$19.10
Ionia	1.5 gal/ac of fertiRain, 2 qt/acre of Manganese, and 2 qt/ac of LiberateCa	\$28.70
Gratiot	1.5 gal/ac of fertiRain, and 1 qt/acre of Manganese	\$19.10
St. Joseph	1.5 gal/ac of fertiRain, and 1 qt/acre of Manganese	\$19.10
Van Buren	1.5 gal/ac of fertiRain, 1 qt/acre of Manganese, and 1 qt/ac of LiberateCa	\$19.50
Lenawee 2	1.5 gal/ac of fertiRain, 2 qt/acre of Manganese, and 2 qt/ac of LiberateCa	\$28.70
Monroe	1.5 gal/ac of fertiRain, 2 qt/acre of Manganese, and 1 qt/ac of LiberateCa	\$20.80
Lenawee 1	1 gal/ac of fertiRain, 1 gal/ac of Sure-K, and 2 qt/acre of Manganese	\$21.40
Sanilac	1.5 gal/ac of fertiRain, and 1 qt/acre of Manganese	\$19.10

Analyses of the foliar fertilizer products are listed below:  
 fertiRain: 12-3-3 plus 1.5% S, 0.10% Fe, 0.05% Mn, and 0.10% Zn  
 LiberateCa: 3% calcium from calcium sulfate  
 Manganese: 4% manganese from manganese sulfate  
 Sure-K: 2-1-6

Figure 1. Yield difference produced by a single application of a prescription foliar fertilizer in 2016

