

Foliar Fertilizer Applications for Soybean Production

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Objective

To determine the effects of foliar fertilizer sources, application frequency, and rates on soybean yield.

Background

Cooperator:	Nate Andre	Fertilizer:	See Treatments
County:	Fulton	Variety:	Garst 295
Soil Type:	Mermill loam	Planting Date:	April 25, 2000
Previous Crop:	Corn	Planting Rate:	200,000 seeds/A
Tillage:	No-till	Harvest Population:	180,000 plants/A
Soil Test:	pH 7.1, P 33 ppm, K 77 ppm Mn 7 ppm, OM 5.3%, CEC 12.4	Harvest Date:	October 11, 2000

Methods

The plot design was a randomized complete block with six replications. Plots were 15 ft. x 50 ft. with a harvest area of 7.5 ft. x 35 ft. The site in north central Fulton County was selected due to a history of Mn deficiency in soybeans. Soil testing showed medium to high for all values tested except for manganese that was in the low range. Foliar manganese was applied on 6/28/00 at R1 (early flower). For treatments with two applications, the second application occurred on 7/12/00 at R2 (late flower). All products were applied in 30 gallons of water per acre.

Table 1. Complete Product Listing for Study.

Product	Company	Formulation	Use Rate	Nutrient Applied (lbs/A)	Cost (\$/A)
ElamMax Mn (EM)	Phosyn	27% Mn	0.5 pt/A	0.13 Mn	\$2.46
Folizyme (Fol)	Stoller	12%N, 3%K, 3% Ca, 3% Mg	2 qt/A	0.63 N, 0.15 K, 0.15 Ca, 0.15 Mg	\$1.62
Keylate (Key)	Stoller	5% Mn	2 pt/A	0.06 Mn	\$2.86
White Label Mn (WL)	Stoller	6% Mn	2 pt/A	0.07 Mn	\$1.80

Harvest More Urea Mate (HMUM)	Stoller	5% N, 10% P, 27% K, 4% Ca, 1.5% Mg, 0.15% B, 0.008% Co, 0.3% Cu, 0.5% Mn, 0.008% Mo, 0.5% Zn	5 lbs/A	0.25 N, 0.5 P, 1.35 K, 0.2 Ca, 0.075 Mg, 0.0004 Co, 0.015 Cu, 0.025 Mn, 0.0004 Mo, 0.025 Zn	\$4.30
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Results

Table 1. Soybean Yield Response to Foliar Fertilizer Applications and Timing.

Treatment	Application Date (Growth Stage)	Total Actual Mn (lb/A)	Yield* (bu/A)
EM	6/28 (R1)	0.13	38.6 a
Fol + WL + Key	6/28 (R1)	0.19	38.0 a
EM	6/28 (R1) & 7/12 (R2)	0.26	37.5 a
WL	6/28 (R1) & 7/12 (R2)	0.14	36.0 a
WL	6/28 (R1)	0.07	35.4 ab
EM + HMUM	6/28 (R1)	0.17	34.8 ab
Check		0	27.4 b

LSD (0.05) = 8.4 bu/A
CV = 20.1%

* Yields followed by the same letter are not significantly different from each other.

Summary and Notes

Due to a calculation error, the ElamMax Mn+ Harvest More Urea Mate treatment resulted in a 1.6 times over-application of the Urea Mate. Eight pounds per acre were applied instead of the intended five pounds per acre. This did result in foliar burning of the upper leaves which may have decreased yields. There is some margin of safety in these products, since the over-application did not result in a significant yield loss, but growers should be cautious in applications of foliar fertilizer to limit foliar damage.

Observations of foliar color did not vary greatly among any of the treatments. Yellowing from manganese deficiency was more apparent due to difference in plot location than treatment applied.

Manganese is commonly low in availability on higher organic matter soils with pH greater than 7. Yield was significantly greater than the no Mn check in four of the six treatments. There was no significant difference between any two of the foliar fertilizer products.

Area farmers using the ElamMax Mn product experience plugged nozzles when the mix sits overnight in a boom sprayer. For the plot trial, this was not a problem. The manufacturing company is aware of and working on the problem.

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