

Evaluation of Foliar Manganese Applications in Glyphosate Tolerant Soybeans

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Objectives

To determine if the application of foliar Manganese (Mn) to soybeans at two different timings will provide a yield benefit.

Background

Cooperator:	Farm Focus, Inc.	Herbicide:	
County:	Van Wert	PREPLANT:	1.5 oz/A Valor + 0.3 oz/A
Soil Type:	Hoytville silty clay loam, Hoytville clay	(April 24)	FirstRate + 22 oz/A Roundup OriginalMax + 1 pt/A 2,4-D LVE + 17 lb/100 gallons AMS
Drainage:	Tile- nonsystematic	POST(June 23):	26 oz/A Roundup WeatherMax + 17 lb/100 gal. AMS
Previous Crop:	Corn	Variety:	Dekalb DKB31-52
Tillage:	No-till	Row width:	7.5 inches
Soil Test (2002):	pH 6.8, P 29 ppm, K 142 ppm	Planting Rate:	220,000 seeds/A
Fertilizer:	300 lb/A 4-18-39 surface broadcast (Fall 2003)	Planting Date:	May 5, 2004
		Harvest Date:	September 28, 2004

Methods

This study consisted of three treatments replicated eight times in a complete randomized block design. The treatments are as follows:

1. 2 qt/A Postman (0.26 lb Mn/A) with postemergence glyphosate herbicide application at V6 (applied June 23)
2. 2 qt/A Postman (0.26 lb Mn/A) only, no glyphosate, at growth stage R3-beginning pod set (applied July 13)
3. Untreated Check-glyphosate only, no Mn (applied June 23)

Postman is a 5% chelated Manganese solution weighing 10.5 lb/gallon. Applications were made with a Great Plains ground sprayer operated at 40 psi application pressure in 15 gallons per acre spray volume. Turbo TeeJeet wide angle flat spray tips (TT11004-VP) on 30-inch spacings were used for all applications. Plot size was 45 feet wide by 450 feet long. Tissue samples were taken 7 days after application on June 30 and July 20. Tissue samples were collected randomly by removing blades from the uppermost fully expanded leaves (petioles discarded). A composite sample from each treatment was submitted to Mercer Landmark for manganese analysis.

Harvest populations (September 23) were estimated by counting the number of plants from 10 foot sections of two adjacent rows at three different locations in each plot. The average number of plants counted per 10 feet was converted to plants per acre. Yields were determined by

harvesting one round (28 feet) out of the center of each plot with a John Deere 6620 combine equipped with a calibrated AgLeader PF3000 yield monitor. Plot weights were measured with a calibrated weigh wagon and moistures were taken from the combine yield monitor. All yields were adjusted to 13% moisture.

Results

Table 1. Soybean harvest population, moisture, and yield means for each treatment.

Treatment	Harvest Population (plants/A)	Moisture (%)	Yield (bu/A)
Untreated Check	162,300	12.4	60.9
2 qt/A Manganese – Growth Stage V6	165,100	12.4	59.6
2 qt/A Manganese – Growth Stage R3	157,500	12.4	59.6
LSD (P=0.05)	NS	NS	NS
F-test	1.1	2.0	<1
CV (%)	6.4	<1	7.0

NS= not significant

Table 2. Manganese concentrations in soybean leaf tissue 7 DAT¹.

Treatment	Soybean Growth Stage V6 (ppm Mn)	Soybean Growth Stage R3 (ppm Mn)
Untreated Check	38	22
2 qt/A Manganese	72	62

¹DAT = days after treatment

Summary

Results of this one year study indicate no statistical differences in harvest population, moisture, or yield from a foliar application of manganese at soybean growth stage V6 or R3. Results from this year's research are similar to work conducted in 2003 at Farm Focus that found no yield increase as a result of foliar manganese application to soybeans at growth stage V2-V3. Tissue samples taken 7 DAT in 2004 did show a marked increase in manganese concentration compared to the untreated check. These results indicate that foliar applied manganese does increase manganese concentration in the uppermost fully emerged trifoliates of the soybean plant.

This test field had not previously shown any symptoms of manganese deficiency, nor were visual manganese deficiency symptoms noted in this year's plots. The additional cost for adding the Postman manganese supplements in this trial was \$3.63 for the 2 qt/A rate based on in season pricing with no discounts. This cost does not reflect commercial applications fees, which are approximately \$5 per acre.

Acknowledgement

The authors express appreciation to Royster Clark of Delphos for supplying the Postman (Traylor Chemical Company) used in this study. Thanks also to Dekalb/Asgrow/Monsanto, Valent, and Dow Agrosiences for supplying the seed and chemicals used in this trial.

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