

Glyphosate, Manganese, and Zinc Soybean Trial

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Introduction

Often there is yellowing of soybeans following glyphosate applications that have been attributed by some as manganese or zinc deficiency. There have been varied reports of impacts of this ‘yellow flash’ on soybean yields. This trial was conducted to investigate such claims.

Materials and Methods

This tillage trial was planted on May 11, 2011 at 138,000 seeds/acre with Pioneer 92Y51 in 30-in. rows. The trial was repeated in 2012 with planting on May 17, 2012 at 140,000 seeds/acre with FC 29R219. Each plot was 20 ft wide by approximately 150 ft long. A preplant herbicide application of Dual II Magnum and glyphosate was applied followed by a post glyphosate application of Select and glyphosate in mid-June. The seven treatments were applied on July 8, 2011 and July 31, 2012 and included; 1) zero control, 2) 40 oz/acre glyphosate, 3) 4 qt/acre manganese, 4) 4 qt/acre zinc, 5) glyphosate +

Mn, 6) glyphosate + Zn, and 7) glyphosate + Mn + Zn. Soil test phosphorus and potassium was adequate and no additional phosphorus or potassium was applied. Yields were collected using a John Deere 9410 equipped with a Harvest Master weigh system. Additional data collection included pre- and post-application tissue analysis and grain moisture at harvest.

Results and Discussion

In 2011, the Mn tissue analysis, both pre- and post-application, was significantly different, however the source of that significance was between replications and not between treatments. However, in 2012, for both sampling periods there was no significant treatment differences. In both 2011 and 2012, the zinc tissue test was not significantly different at either pre- or post-application.

Grain yield and grain moisture means were not different for the treatments in both years. In 2011, the grain yield across plots averaged 60.9 bushels/acre and in 2012 grain yields across plots averaged 61.7 bushels/acre.

It should be noted that a ‘yellow flash’ was not observed in either treated or control plots, and no Mn or Zn deficiency symptoms were identified in either year.

Table 1. Manganese and zinc tissue analysis, grain moisture, and grain yield for seven treatments at the ISU Bennett Farm, Story Co. in 2011 and the ISU Curtiss Farm, Story Co. in 2012.

Year	Treatment	Tissue Mn		Tissue Zn		Grain moisture	Grain yield
		Pre-trt	Post-trt	Pre-trt	Post-trt		
2011		ppm	ppm	ppm	ppm	%	bu/ac
	Control	62	76	23	41	6.36	59.2
	Glyphosate	61	59	26	44	5.64	61.6
	Manganese	64	69	25	41	6.11	59.7
	Zinc	71	78	25	41	5.71	60.9
	Gly + Mn	67	77	25	42	5.62	60.9
	Gly + Zn	60	63	24	43	5.63	62.4
	Gly + Mn + Zn	64	71	27	45	6.05	61.9
	Pr > F	0.001	0.002	0.169	0.088	0.679	0.283
2012		ppm	ppm	ppm	ppm	%	bu/ac
	Control	75	58	38	44	11.1	63.2
	Glyphosate	71	61	38	43	11.2	64.0
	Manganese	73	61	39	49	11.0	62.2
	Zinc	79	63	38	43	10.9	61.2
	Gly + Mn	73	62	36	47	10.8	58.8
	Gly + Zn	72	56	41	43	11.2	63.0
	Gly + Mn + Zn	75	66	38	45	10.9	59.6
	Pr > F	0.90	0.53	0.57	0.53	0.52	0.48