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Abstract

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Keywords

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Summary of Sulfur Strip Trials Conducted in Central and Northeast Iowa Preliminary 2009 Results

RFR-A9132

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Introduction

Sulfur (S) strip trials were conducted by ISU Extension field agronomists Brian Lang, George Cummins, and Mark Wuebker; Heartland Co-op; Innovative Ag; Five Star Co-op; Calcium Products, Inc; and cooperating growers.

Materials and Methods

Treatments were spring preplant broadcast gypsum, with comparison to no sulfur (S) application. One rate of S was used in each field, but the rate varied between sites (Table 1). Because only one S rate was used, the needed S application rate cannot be determined, but potential yield increase from S application can be determined as an adequate to above adequate S rate was applied. With and without S alternating strips were replicated from 3 to 9 times in a field. The S fertilizer was applied with commercial applicators, with strip width dependent on equipment (50 to 90 ft). Strip applications were located either by manual flagging or with GIS mapping and GPS directed application.

Corn was combined by the cooperating producer, using yield monitor equipment when available. Yields for treatment strips were determined from weigh wagon, yield monitor strip summary, or yield monitor recorded point data using GIS software to clean and average recorded yields for each

strip. Strip average yield data was analyzed for treatment significance with PROC MIXED using SAS ver. 9.2 statistical analysis software.

A total of 15 fields had treatment strips applied. However, due to several reasons, four fields were not used for yield comparison. Three fields that had the planter split with two hybrids were kept for this preliminary summary, but may be excluded later if the hybrid yields are found to be different or influence results. Site information and yield data summarization will continue, therefore this report is considered preliminary.

These strip trials are considered a survey of potential S response in corn, rather than detailed research. Due to funding and time constraints, there were no soil or plant samples collected from the sites. Plant canopy sensing, as a potential in-season measurement for S deficiency, was performed at three of the sites using a Crop Circle ACS-210 canopy sensor at the V10 corn growth stage. We will continue to gather site information (such as soils and soil texture from soil survey, recent manure history, and recent P and K application) for these 2009 sites.

Results and Discussion

Six of the eleven field sites had a corn yield increase from the S application (Table 1). The other five sites had no yield difference with or without S application. This is a 55% response rate to S application, which is similar to other recent small plot research conducted in north central to northeast Iowa on S response in corn. For the six responding sites, the average yield increase from S application was 9 bushels/acre, with a range of 5 to

13 bushels/acre. These yield increases are large enough to more than pay for an S application (for corn, suggested rates are 15 lb S/acre for fine-textured soils and 25 lb S/acre for coarse-textured soils).

This initial strip trial work indicates that S deficiency is occurring across a wide geographic area of Iowa from central to northeast Iowa, and at a frequency that justifies continued research on S fertilization

and deficiency identification across Iowa corn and soybean production.

Acknowledgements

Calcium Products, Inc. provided the SuperCal SO₄ gypsum used in the central Iowa trials with Heartland Co-op. We thank all of the individuals and cooperators who made this work possible. Support from the Committee for Agricultural Development is also acknowledged and appreciated.

Table 1. Sulfur strip trials conducted in central and northeast Iowa.

Site	Order no.	Cooperator	County	Previous crop	Special remarks	Sulfur rate (lb S/acre)	Corn yield	
							- S	+ S
3	30-12122	Weaver (N)	Greene	corn	a	40	225	229
4	30-12123	Weaver (S)	Greene	corn	a	40	210	215†
5	30-12124	Wenger	Greene	corn	b	40	217	228†
6	32-25146	Taylor	Dallas	soybean	f	40	201	200
9	25-7490	Collins	Dallas	corn	c, f	40	147	152†
10	25-7491	Rowe	Dallas	corn	a, d	40	135	134
1	---	Gilbertson CEA	Fayette	soybean	--	15	224	236†
2	---	Howard Co.	Howard	soybean	--	20	186	192†
7	---	Pottebaum	Dubuque	soybean	f	30	216	229†
8	---	McGregor	Floyd	---	e	20	199	203
11	---	Hunter	Winneshiek	soybean		30	215	212

Special remarks.

- a) Planter split with two hybrids.
- b) Sixteen of twenty four rows cultivated.
- c) Visual S deficiency symptoms on June 17, corn at V6-V7 growth stage.
- d) Field has manure history.
- e) Only two replications and considerable yield data missing from two strips.
- f) In-season canopy sensing for S deficiency.

† Significantly different yield than with no S applied, $P < 0.10$. If no symbol, then yields are not significantly different.