

On-farm Sulfur Fertilization of Corn Trials

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In the past several years, sulfur (S) deficiency has been showing up more frequently in Iowa fields than what had been seen in the past. This has been especially true in corn and alfalfa fields in northern Iowa. The sulfur deficiencies are thought to be partially due to Iowa receiving less S in the rainfall because of more stringent air pollution regulations, less S application in fertilizers, higher crop yields, eroded topsoil (organic matter loss), and less widespread use of manure. Sulfur fertilizer applications can offer yield increases where S deficiencies are present. The objective of these trials was to evaluate potential for S deficiency and grain yield response in corn to S application.

Methods

In 2012, S was applied to two soybean fields and one cornfield with no manure history to test the response of these crops to S in 2012, and the response of corn in 2013 to the residual effect of S applied to the prior year crop. In addition, S was applied to one cornfield in 2013 when the corn was at V5 growth stage to test the response of corn to S in the year of application. Calcium sulfate (gypsum) was the source of S in all four trials. The rate of applied S ranged from 15 to 17 pounds/acre. Sulfur was applied in strip plots with three or more replications per treatment in each trial. All trials were conducted in western Iowa. See Table 1 for details on the four trials.

Results

First-year trial

There was a significant increase in grain yield to the S applied at V5 corn growth stage in the one trial that looked at response to S in the year of application (Table 2).

Second-year residual

There was a significant grain yield increase of six bushels/acre to the residual S in one of the three trials. The other two trials did not have a yield response to the prior-year S application. These results indicate there are some cornfields in western Iowa that could benefit from an S application, and that the benefits can be seen for at least one year after the application. Across the two years of all FARM trials with S application (first-year or residual-year in corn and soybean), there was a 29 percent positive yield response rate to S application.

For further information on these trials and other research on S fertilization, contact John Sawyer, professor, Department of Agronomy, Iowa State University Extension and Outreach (jsawyer@iastate.edu).

Table 1. Hybrid, row spacing, planting date, planting population, previous crop, and tillage practices in the sulfur trials on corn.

Exp. No.	Trial	County	Hybrid	Row spacing (in.)	Planting date	Planting population (seeds/A)	Previous crop	Tillage
130620	1	Taylor	Stine 980G	30	5/12/13	29,850	Soybean	No-till
130126	2	Osceola	Pioneer P0392 AMX	30	5/13/13	Variable 32-36K	Soybean	No-till
130303	3	Monona	LG 2602VT3PRIB	30	5/5/13	32,500	Soybean	Spring mulch finisher
130305	4	Monona	LG 2602VT3PRIB	30	5/12/13	32,500	Corn	Fall disk, spring disk

Table 2. Yield from corn sulfur trials.

Exp. No.	Trial	Sulfur rate (lb S/A)	Application timing	Yield (bu/A)			P-value	Year
				Sulfur	Control	Response		
130620	1	17	6/19/13 (V5)	180.6	171.5	9.7	0.04	1
130126	2	15	2012	205.2	201.4	3.8	0.42	2
130303	3	16	2012	235.9	230.3	5.6	0.04	2
130305	4	16	2012	239.9	227.7	12.2	0.17	2