General Protocol for Simple On-farm Sulfur Trials With Corn

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Objective: Evaluate corn yield response to applied sulfur (S) fertilizer.

Two Treatments: (1) With S fertilizer and (2) Without S fertilizer
We suggest using liquid ammonium-thiosulfate (ATS) as the S source at about 5.2 gal/ac to provide about 15 lbs S, applied with sidedress application of liquid UAN (28% or 32% N).

Individual plot length = Whole length of field

Individual plot width = That which is most compatible with widths of planter, combine, and nitrogen (N) applicator. For example, the most compatible width if using a 16-row planter, 16-row applicator and an 8-row header would be 16 rows (40 ft).

Given that the S treatments will be applied at sidedress, we strongly suggest no additional S be applied to the field, either before planting or during planting. Furthermore, if MAP or DAP was spread on the field in the off-season, we would like to know the application rate and whether it was VR spread or not. Ideally, we would like to receive an as-applied spread log data file for the field. Our interest in MAP and DAP is that recent analyses suggest that those fertilizer products contain small amounts of S. Depending on spread rates, that S can confound our interpretation of corn yield responses to field trial applicatons of S fertilizer.

One of us will try to be available the days of sidedressing and harvest, but cannot guarantee. For sidedress, we can provide guidelines on coming up with the correct tank mixture for adding the ATS. We recommend first sidedressing every other plot using only UAN, then adding the ATS to the UAN tank and sidedress the remaining plots. NOTE: Because ATS provides less N per gallon than UAN, the application rate for the tank mixture will be slightly higher than for straight UAN to maintain the same total amount of N to the crop. For harvest, regardless whether we are there or not, we strongly encourage the cooperator to calibrate the yield monitor for the conditions of the field.

Regardless of exact plot width, we strongly encourage harvesting the middles of each plot to use as data for the trial. Using the previous 16-row example, the middle 8 rows would be used as data. The in-between 8-row harvest passes would be considered "bulk" and not used for trial analyses. The reason for that is to avoid possible "neighbor" effects of adjacent plots that have "S" and "no S" treatments.

After harvest, we are willing to take the yield monitor data and use our GIS software to 1) process and clean the yield data 2) extract the yield data from the plot middle harvest passes, 3) match up the yield data with the individual plots, and 4) perform the appropriate statistical analyses.

Suggested Plot Layout for Simple On-farm Sulfur Trials

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Example: 16-row planter and N applicator, 8-row combine head

Individual plot length = Length of field
Individual plot width = 16 rows

Two Treatments: (1) With S fert and (2) Without S fert

Treatments replicated as many times as is possible for size of field

The following example would require a field at least 560ft wide.

Field edge

		16 rows Bulk corn
		16 rows Bulk corn
Plot 1	Rep 1	Sidedress N without S
Plot 2	Rep 1	Sidedress N plus S (ATS)
Plot 3	Rep 2	Sidedress N without S
Plot 4	Rep 2	Sidedress N plus S (ATS)
Plot 5	Rep 3	Sidedress N without S
Plot 6	Rep 3	Sidedress N plus S (ATS)
Plot 7	Rep 4	Sidedress N without S
Plot 8	Rep 4	Sidedress N plus S (ATS)
Plot 9	Rep 5	Sidedress N without S
Plot 10	Rep 5	Sidedress N plus S (ATS)
		16 rows Bulk corn
		16 rows Bulk corn

Sidedress: Sidedress the "without S" plots first, using only UAN.
Add ATS to the tank per guidelines and sidedress the "plus S" plots.

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Harvest: Calibrate the yield monitor & moisture sensor using harvest passes from the bulk corn areas of the field.

Beginning with Plot #1, harvest the middle 8 rows and then simply continuing harvesting every 8 rows across the field. The yield monitor data for the plot middles will be extracted for trial analyses later by Purdue Extension Agronomists using their GIS software.