Report of results of corn experiment of Summer 2025 – Tony Manzara, Friends of Lake Elmo's Sunfish Lake Park

About May 23, 2025 a dozen corn seedlings were liberated from the northern edge row of the cornfield just south of the Sunfish Lake Park prairie, identified as the "Donor Row", at N 45.00053 W 92.90282. These were planted in two groups at the east end of the Commercial Agriculture strip at the south edge of the 3 Sisters Garden plot at SMINC, a few hundred feet away at N 45.00238 W 92.90386. One group of 6 was planted close together and the other 6 further apart, to test the effect of the "land area per stalk" variable on the corn yield, which had been identified as a possibly significant factor in last year's (2024) results. Unfortunately the 13-lined ground squirrels did not understand the plan and consumed 5 of the seedlings at random, leaving only 7 to grow, with no special spacing.

10 Soybean seedlings were liberated in late May from the edge row of the field (N 45.02252, W 92.8014) across the street from my home at 5050 Kirkwood, and planted in the west end of the same Commercial Agriculture strip at SMINC. Unfortunately all the pods were consumed by predators so there is no data to compare with last year's observations.

About October 1 2025 i harvested the ears of corn from the 7 "3 Sisters" stalks (which looked comparatively robust), along with the ears from 7 consecutive stalks in the Donor Row (which looked decidedly stunted), and from 7 more consecutive stalks from the area identified as "Field Row" (about 10 rows deeper in the field to the south, which looked OK but smaller than "normal" for field corn in this area). The husks were stripped - and here is the comparison picture:

Again this year, there were many more ears per stalk in the 3 Sisters corn than in the Donor row corn. It was observed (but not rigorously tracked) that in the center group in the picture (3 Sisters), the larger ears were higher on the stalk in general. Also some of the lower ears from this group were very small with very few kernels, although the individual kernels were good-sized. It seems logical that the tighter distribution of kernels on the ears from the Field rows is due to the higher density of air-borne pollen in that area compared with that in the 3 Sisters area. No attempt at human-assisted pollination was made this year.

But the individual kernels on the Field Row ears were all smaller than most of the kernels on the 3 Sisters ears. This difference should not be due to rainfall effects because of the proximity of these locations. It could be due to soil fertility being lower or stalk spacing being lower in the Field Row area than in the 3 Sisters Garden.

Clearly the corn in the Donor Row performed much more poorly than the corn in the other two locations.

The cobs were allowed to dry in the house until December 10, 2025. Then the three sets of cobs were shucked and the kernels from each set were collected together and weighed. Results were :

	Stalks	Ears		Grams of Kernels
SMINC	7	15	(7 large, 8 smaller)	1329
Field Row	7	7	(7 large)	923
Donor Row	7	7	(medium to tiny)	231

Soil samples from the pertinent locations were collected in June for analysis. The five samples were sent to Midwest Laboratories in Omaha for their S3C analysis package, as recommended by Dr. Paul Red Elk. The samples were identified (using Midwest 8-character limit) as:

1- 3SisEdge - taken from the SMINC "3 Sisters" plot, from the 2ft. x 12ft. strip where corn and soybeans were planted last year in two parallel rows, and this year in opposite ends of the same strip.

3- CrnDonR - taken from the Donor Row along the field edge where the liberated seedlings had germinated, and where the "Donor Row" ears were harvested

4- CrngoodR - taken from the row in the field about 10 rows to the south of the donor row, from which the "Field Row" ears were harvested

5 SoydonR - taken from the edge row of the field across from my home at 5050 Kirkwood Ave, from which last year's corn seedlings and this year's soybean seedlings had been liberated.

2- 3SisMid - taken from the approximate midpoint of the 3 Sisters Garden where Barb had added volcanic ash treatment as recommended by Paul, and planted corn, pole beans and yellow Summer squash this year. The results from that planting will be summarize separately.

The full report of the Midwest Labs soil analyses is attached as a .pdf file. I would like to summarize what seemed to me to be the possibly-significant differences (like a 2:1 difference) in the usual fertilizer elements of concern (NPK number, for Nitrogen Phosphorus Potassium).

In the tested soils,
Nitrate was highest in 3SisEdge (31 ppm), less in CrngoodR (22 ppm), lower in CrnDonR and 3SisMid (17 and 16 ppm) and lowest in SoyDonR (5 ppm)

Phosphate (P2 Strong Bray test = readily available and active reserve) was higher in 3SisEdge, 3SisMid, and CrngoodR, 40-50 ppm, compared with 10-20 ppm in CrnDonR and SoydonR.

Potassium (K) had less variation, 2SisEdge 110 ppm and 3SisMid 96 ppm, with CrnDonR at 82 ppm, CrngoodR 80 ppm, and SoyDonR 80 ppm.

Looking at the results for other "trace" elements (which i copied, spliced, and pasted here)

LAB NUMBER *463*	SAMPLE IDENTIFICATION	ORGANIC MATTER L.O.I.		POTASSIUM K		MAGNESIUM Mg		CALCIUM Ca		SODIUM Na		pH SOIL pH 1:1	pH BUFFER INDEX	SULFUR S ICAP		ZINC Zn DTPA		MANGANESE Mn DTPA		IRON Fe DTPA		COPPER Cu DTPA		BORON B SORB. DTPA		EXCESS LIME RATE	SOLUBLE SALTS 1:1	
		percent	RATE	ppm	RATE	ppm	RATE	ppm	RATE	ppm	RATE			ppm	RATE	ppm	RATE	ppm	RATE	ppm	RATE	ppm	RATE	ppm	RATE		mmhos/cm	RATE
72486	1-3SisEdge	2.7	M	110	M	219	VH	1295	M	9		6.2	6.8	7	L	2.2	M	9	M	62	VH	0.7	L	0.2	VL	L	0.3	L
72487	3-CrndonR	1.4	VL	82	L	242	VH	964	M	15		6.2	6.9	5	VL	1.8	M	6	L	47	VH	0.5	L	0.1	VL	L	0.2	L
72488	4-CrngoodR	1.4	VL	80	M	263	VH	940	M	11		6.7		5	VL	4.4	H	3	VL	21	H	0.4	L	0.1	VL	L	0.2	L
72489	5-SoydonR	2.0	L	80	L	162	VH	1338	H	9		7.2		3	VL	1.1	M	7	L	20	H	0.5	L	0.2	VL	L	0.2	L
72490	2-3SisMid	1.9	L	96	M	220	VH	1450	H	11		7.1		5	VL	2.1	M	8	L	98	VH	0.8	L	0.4	VL	L	0.3	L

you can see that the soybean donor row soil is relatively low in Magnesium, Sodium, Sulfur, Zinc, and Iron. The 3 Sisters Mid sample is higher in Iron, possibly due to the volcanic ash amendment.

It is tempting to ascribe the difference in corn yield per stalk to the differences in major nutrients. Gary suggested that a key difference in the soil analysis may be the sulfur content. The soil in which the best corn yield was produced had significantly more sulfur than soil from the other locations. He described how a sulfur compound is needed by the plants to enable them to use the other nutrients properly, and that farmers often add ammonium sulfate to sulfur-deficient fields, which has immediate effect and provides a nitrogen compound too. It is also possible to supply the sulfur from yellow elemental sulfur, or from sulfur-containing organic materials, but these forms take time to be oxidized before the plants can absorb and use it. For enquiring minds, here is a good explanation: https://www.cropscience.bayer.us/articles/bayer/the-importance-of-sulfur-for-corn-and-soybeans.

It would be interesting to get your input into how the more "trace elements" may be affecting the results. If you can suggest any other variables, controlled or uncontrolled, that may be involved here, please let me know as we consider next Summer's test plan.

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Possibilities considered so far for 2026:
Retest the "area per stalk" hypothesis with better exclusion of predators.
Add sulfate to an area that measured low in sulfate, and see if the corn does better.