Thunder Bay Evaluation of Micro Essentials SZ Fertilizer

Purpose:

To determine the effectiveness of Micro Essentials SZ® as a starter fertilizer for silage corn.

Methods:

Micro Essentials SZ is a granulated fertilizer that combines several nutrients within each granule, which should reduce the chance that seedlings cannot access all the nutrients because they are not close enough to a plant root. It also includes a significant amount of sulphur, split between the sulphate and elemental forms. The analysis is shown in Table 1.

Table 1: MicroEssentials® SZ Typical Analysis

Total Nitrogen	12%
Available P_2O_5	40%
Total Sulphur	10%
Sulphur as Sulphate	5%
Sulphur as elemental S	5%
Total Zinc	1%

Starter fertilizer blends were prepared by blending urea with either MAP (11-52-0-) and Zinc sulphate, or the MESZ. These blends provided very close to the same rate of N, and comparable levels of phosphate and zinc. The sulphur application varied widely between the two materials.

Field plots were established on a silage corn field near Thunder Bay, as follows:

Table 2: Treatment Summary

Treatment	Actual N	Actual P_2O_5	Actual	Actual
Mix 1 (Urea, MAP + Zn)	50.8	44.5	0.36	1.8
Mix 2 (Urea + MESZ)	52.2	36.0	9.0	0.9
Mix 3 (check)	0	0	0	0
Agrifood Lab Soil test recommendation	42	45	5	1

Each treatment was replicated 4 times. Fertilizer treatments were applied through the planter in a 2x2 band. Field operations were carried out as follows:

April 27	• Soil samples taken.
May 10	• Sprayed with Round-Up Weather Max.
May 14 and 15	• Plowing was done.
May 17	• Field was disked. The back half of the field got 5000 Gallons or 18927 L/acre Liquid Dairy Manure (outside of plot area).
May 18, 2007	• Planting • Planting rate 30,000 seeds per acre. • Corn Hybrid used DEKALB 26-78
June 29	• Whole plant tissue samples collected
August 1	• Ear leaf tissue samples collected
November 7	• Hand sampling of cobs from plots

The planting season started out very dry, which was continuing a trend that had started in the fall of 2006 and continued through the winter. There was adequate rainfall during the growing season, and then conditions turned very wet in the fall, interfering with harvest. There was a light frost on August 18th, but damage was restricted to parts of the upper leaves on the plants.

Results:

Whole plant tissue analysis from samples collected June 29 showed that N, Mg and Zn levels were adequate in all treatments, but that sulphur levels were low. These results are shown in Table 3.

Table 3: Whole Plant Tissue Analysis Results

Treatment	N (%)	S(%)	Mg (%)	Zn (ppm)
Urea, MAP + Zn	5.07	0.10	0.41	58
Urea + MESZ	4.85	0.12	0.39	55
Check	3.67	0.10	0.43	43
Critical level	**2.5**	**0.2**	**0.1**	**20**

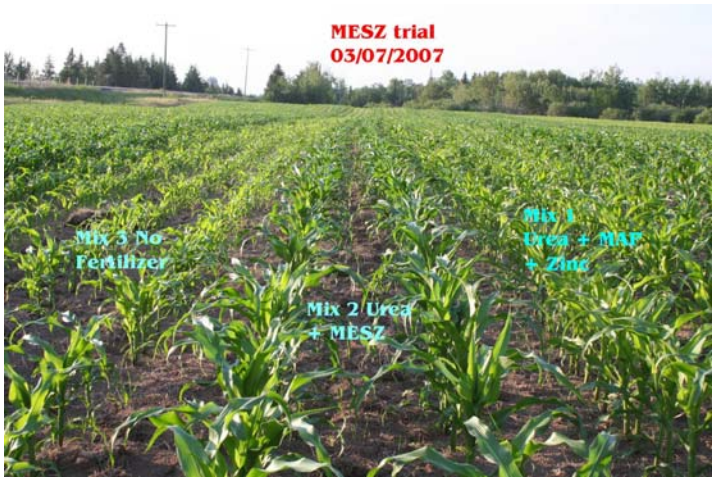
Visual differences in the amount of growth and the colour of the crop were evident throughout the season. The check strip, which received no starter fertilizer, had the poorest growth, followed by the urea + MAP + Zn treatment.

Ear leaf tissue analysis also showed adequate levels of Mg and Zn, but S levels in all treatments were below the critical level. N levels were near the critical level, ranging from just above in the Urea, MAP +Zn treatment, to just below in the check and Urea + MESZ treatments.

Table 4: Ear Leaf Tissue Analysis Results

Treatment	N (%)	S (%)	Mg (%)	Zn (ppm)
Urea, MAP + Zn	2.56	0.05	0.41	57
Urea + MESZ	2.46	0.09	0.39	46
Check	2.43	0.12	0.32	41
Critical level	**2.5**	**0.2**	**0.1**	**12**

Striping was noted on the leaves in all of the treatments when the corn was about knee-high. The symptoms were consistent with either magnesium or sulphur deficiency. The tissue analysis confirmed that the plants were low in sulphur. The symptoms persisted in the check and Urea + MAP treatments, but were short lived in the Urea + MESZ treatments.



Wet conditions in September and October prevented silage harvest, so silage weights were not available. Hand samples of the cobs were collected from each of the treatments in three of the reps, to give an indication of the yield differences between the treatments. Figure 1 shows the estimated grain yields, based on the hand samples collected from 1000th of an acre. The red "T" showing above each bar is the standard error (except for the manure, which had only one rep).

Adding nitrogen, in the form of urea, increased the yield above the check treatment. The Urea + MESZ treatment yielded more than the Urea + MAP + Zn treatment, which is probably due to the additional sulphur in the MESZ.

Summary:

MESZ appears to be a good starter fertilizer for corn, but it is impossible to definitively say that there is an advantage to the granulated formulation. The yield increase from MESZ is most likely due to the additional sulphur which was provided in that material. Also, the hand harvested yield measurements are not going to be as accurate as if the entire plot had been harvested and weighed.

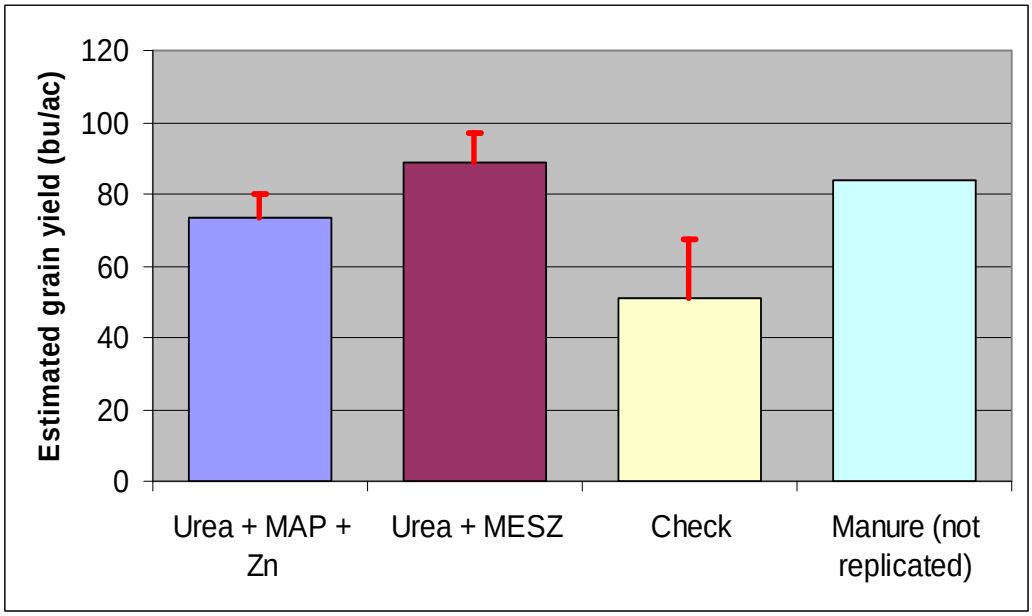


Figure 1. Grain Yield Associated with Evaluated Treatments

Next Steps:

This is the first year of a three year trial. With luck, the weather will be more amenable to plot harvest in 2008 and 2009. The steering committee will need to discuss whether it would be desirable to apply a blanket application of sulphate sulphur to the plot area, to focus on the impact of the MESZ formulation on nutrient availability.

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Location of Project Final Report: