Evaluation of Environmentally Smart Nitrogen

Purpose:

To determine the effectiveness of Environmentally Smart Nitrogen (ESN) as a nitrogen source for corn.

Methods:

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

Table 1: Treatment Summary

Treatment	Application Rate	Percentages	Actual N (lb/acre)	Bulk Density
Urea (46-0-0)	100 lb/ac	46 % N	46	47 lbs
ESN (44-0-0)	100 lb/ac	44 % N	44	47 lbs
Check	0	-	0	None
Nitrogen recommendation (from pre-plant soil test)			42	

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, first set of soil nitrate samples collected. Planting rate 30,000 seeds per acre. Corn Hybrid used was DEKALB 26-78
June 15	• PSNT samples collected
June 29	• Whole plant tissue samples collected
August 1	• Ear leaf tissue samples collected
October	• 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 2.

Table 2: Whole Plant Tissue Analysis Results

Treatment	N (%)	S(%)	Mg (%)	Zn (ppm)
Urea	5.81	0.1	0.34	52
ESN	5.25	0.12	0.36	51
Check	4.32	0.1	0.45	48
Critical level	2.5	0.2	0.1	20

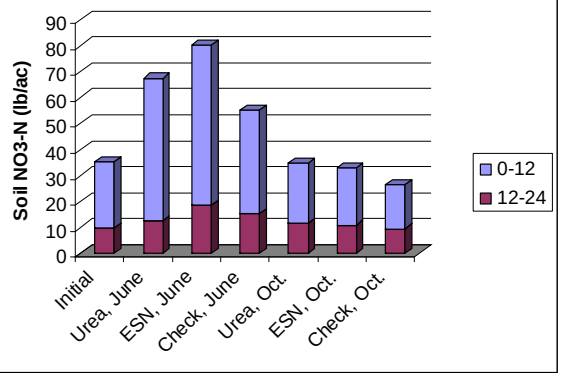
Ear leaf tissue analysis also showed adequate levels of N, Mg and Zn, but S levels in all treatments were below the critical level.

Table 3: Ear Leaf Tissue Analysis Results

Treatment	N (%)	S (%)	Mg (%)	Zn (ppm)
Urea	2.96	0.06	0.32	47
ESN	2.76	0.09	0.32	42
Check	2.7	0.12	0.33	37
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.

Figure 1: Soil Nitrate-N Contents at planting, late June and post harvest



The fertilized treatments showed higher levels of soil nitrate at both the June and post-harvest sampling times, as shown in Figure 1. The ESN treatment appeared to have higher soil nitrate levels than the urea in the late June sample, but there was no difference between the fertilizer sources in the post-harvest samples.

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. Differences were small and inconsistent.

Table 4: Weight of Cobs (lbs.) in 1000th of an Acre

Treatment	Rep 1	Rep 2	Rep 3	Average
Urea	7.8	6	3.6	5.8
ESN	9.2	6.8	4.8	6.9
Check	10	5.8	4.4	6.7

Summary:

In this trial, there was no discernable difference between urea and ESN as a source of nitrogen for growing silage corn. The sulphur deficiency which was evident in this field may have masked differences between the two sources of N, so there should not be too much weight put on the results of this trial. Also, the hand harvested yield measurements are not going to be as accurate as if the entire plot had been harvested and weighed.

Next Steps:

This trial should be repeated with sulphur included in the fertilizer treatment that was applied across all the plots. This would give greater confidence that sulphur deficiency was not masking any differences between the treatments.

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Location of Project Final Report: