Gen5-2011 - ESN Controlled Release Fertilizer on Corn and Spring Wheat

CROP ADVANCES

Field Crop Reports

Volume 8 — February 2, 2012

Field Crops Team, Agriculture Development Branch
Ministry of Agriculture, Food and Rural Affairs
In partnership with
Ontario Soil and Crop Improvement Association
And other Agricultural Organizations and Businesses

http://www.ontariosoilcrop.org/cropadvances.htm

ESN Controlled Release Fertilizer on Corn and Spring Wheat

Purpose:

To evaluate the economic benefits of ESN® Controlled Release Fertilizer, or Environmentally Smart Nitrogen use in corn and spring wheat production in eastern Ontario.

Methods:

At each field location, the equivalent nitrogen rates of ESN Controlled Release Fertilizer and urea fertilizer products were applied at planting. The grower's standard nitrogen rate and ½ grower's standard rates were applied and replicated twice at each site. The ½ grower's standard rates were included to measure any potential residue soil nitrogen effect, which may not show up in the standard grower nitrogen rates.

In 2009, 100% urea was compared to 100% ESN nitrogen products. In the 2010 and 2011 crop year, a blend of Urea:ESN coated urea was applied; 5 (see plot data for blend ratio). At harvest, plots were weighed and measured for moisture and test weights. In addition, spring wheat samples were collected and the grain analyzed for protein and quality. The nitrogen products were applied with either a Gandy Fertilizer Applicator (Figure 1) or a field broadcast spreader in strips.

Figure 1: Used Gandy Fertilizer Applicator to get accurate product rates:

Results:

Table 1 shows the difference in spring wheat grain yield and protein between the plots where the ESN blends were applied compared to urea alone.

Table 1. Yield and Grain Protein Difference between ESN as compared to Urea on Spring Wheat (bushels/acre)

Year	Yield Difference* (bushels/acre)			Protein Difference* (%)	
	½ N Rate	Full N Rate		½ N Rate	Full N Rate
2009	1.8	1.1		-0.2	0.6
2010	-3.1	0.9		0.1	0.2
2011	-0.6	-1.1		-0.3	-0.6
Average	-0.6	0.3		-0.1	0.1

*Yield Difference = ESN Yield less Urea Yield (bushels/acre)
Note: the Yield Difference between the ESN and Urea treatments are not Statistically Different

Table 2 shows the difference in grain corn yield between the plots where the ESN blends were applied compared to urea alone.

Table 2. Yield Difference between ESN as compared to Urea in Grain Corn

Year	Yield Difference* (bushels/acre)	
	½ N Rate	Full N Rate
2009	-5.7	-0.9
2010	-4.3	-1.1
2011	-3.5	-0.8
Average	-4.5	-0.9

*Yield Difference = ESN Yield less Urea Yield (bushels/acre)
Note: the Yield Difference between the ESN and Urea treatments are not Statistically Different

Summary:

Over the three years of this project, there has been no statistically significant difference in yield between the ESN treatments as compared to urea treatments at the same rate of nitrogen on the spring wheat or grain corn in most years and at most sites (see Table 1 & 2). At a few sites, there was about a ½ percent increase in spring wheat grain protein when the full rate of nitrogen was applied. At a yield of 60 bu/ac, increasing the protein from 12% to the maximum protein premium of 12.5% would add another $13.07 per acre. Therefore, ESN treated urea would have an economic benefit of ($13.07 – $8.47) $4.59 per acre in fields that have a history of low protein levels in the spring wheat.

Based on the current price of ESN at $900 per tonne and urea at $750 per tonne and the common fertilizer rates used in this project, the additional cost of ESN per acre was $8.47 per acre for spring wheat and $8.29 per acre for grain corn (Table 3).

Table 3. Additional cost per acre of ESN as compared to Urea

Spring Wheat

N actual Rate (lb/ac)	Product	Additional Cost of ESN $/ac
45	50:50 Urea:ESN	$4.24
90	50:50 Urea:ESN	$8.47

Corn

N actual Rate (lb/ac)	Product	Additional Cost of ESN $/ac
55	60:40 Urea:ESN	$4.14
110	60:40 Urea:ESN	$8.29

Further small plot research looking at more rates and combinations of ESN as compared to urea fertilizer products is being conducted at the Kemptville Research Farm and the Winchester Research Farm of the Kemptville Campus – University of Guelph. Data to date supports the findings of this trial.

Next Steps:

2011 was the final project year.

Acknowledgements:

Thank you to the co-operators; John Nanne, Bruce Hudson, Ian McGregor, Doug Cleary, Ed Robinson, Rideauside Farms & Dean Patterson, for their time, effort and inconvenience on this project. Thank you also to the Harry Bennett, Harvex Agromart, Agrium Inc. for supplying the ESN fertilizer, Justin Brennan & Alana Mains, Kemptville Campus – University of Guelph, Mackenzie Denyes, Emily Schwager and Paul Nopper, OMAFRA Summer Technicians and Patti Arts, Client Service Representative, Kemptville OMAFRA. This project was supported by the Ottawa Valley Seed Growers Association and the Ontario Soil & Crop Improvement Association

Project Contacts:

Scott Banks, OMAFRA, Scott.Banks@ontario.ca

Location of Project Final Report:

Crop Advances Report 2011