

Corn Nitrogen Calculator – Infield Trials (Final Report)

Purpose:

The purpose of the project was to compare the corn nitrogen (N) calculator rate to the rate of nitrogen a cooperators normally applies to a field. In 2005 the general corn nitrogen recommendations were revised, based on 40 years of research, and presented in the form of a nitrogen calculator. The calculator assesses a number of factors (soil type, yield expectation, crop heat unit accumulation, previous crop, manure N credits and application timing) to determine the nitrogen rate for a field. As the cost of nitrogen increases it becomes more important to apply the correct rate of nitrogen.

Methods:

The project planned to establish 12 sites in Lambton County on a range of soil types under different management practices. 15 showed an interest in participating and were sent cooperators packages. The packages included the paper version of the nitrogen calculator, project protocol and plot data forms to record plot information. The cooperators calculated their nitrogen rate using the worksheets. The plots were laid out with the cooperators normal rate of nitrogen and the calculator rate of nitrogen replicated twice. There was also a strip left where only starter nitrogen was applied. The nitrogen rates were applied at sidedress time. The plots were field length or at least 300 m (1000') long and the width of the treatments at least two combine header widths. The strips were marked and harvested with a weigh wagon.

Results:

Ten plots were taken to harvest (one couldn't be used) and the results are presented in the table below.

Table 1. Nitrogen rate, yield and net profit loss comparison for grain corn.

Plot Location	Calculator N Rate (Yield)	Normal N Rate (Yield)	Yield Difference Calc - Normal	Net \$
Watford*	82 lbs/ac (162 bu/ac)	120 lbs/ac (172 bu/ac)	-10 bu/ac	-\$12.76
Forest	106 lbs/ac (187 bu/ac)	160 lbs/ac (196 bu/ac)	-9 bu/ac	-\$1.98
Wyoming**	6 lbs/ac (202 bu/ac)	51 lbs/ac (194 bu/ac)	0 bu/ac	\$21.60
Florence	166 lbs/ac (240 bu/ac)	180 lbs/ac (241 bu/ac)	-1 bu/ac	\$3.62
Sombra	130 lbs/ac (189 bu/ac)	160 lbs/ac (190 bu/ac)	-1 bu/ac	\$11.30
Arkona	106 lbs/ac (151 bu/ac)	144 lbs/ac (165 bu/ac)	-14 bu/ac	-\$25.16
Ipperwash	88 lbs/ac (200 bu/ac)	110 lbs/ac (197 bu/ac)	0 bu/ac	\$10.56
Petrolia***	74 lbs/ac (145 bu/ac)	108 lbs/ac (159 bu/ac)	-14 bu/ac	-\$27.08

Crop Advances: Field Crop Reports

Average	(87 lbs/ac) 185 bu/ac	(121 lbs/ac) 189 bu/ac	-6 bu/ac	-\$2.49
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Notes: * 2,500 gallons hog manure applied in the spring of '06 and incorporated, ** 4,000 gallons layer manure applied in the fall of '05, *** alfalfa plowed down fall of '05.

Table 2. Nitrogen rate, yield and net return to nitrogen for silage corn.

Plot Location	Calculator N and Normal N Rate (Silage Yield)	Lower N Rate (Silage Yield)	Yield Difference Normal (Calc) less lower rate	Benefit to Nitrogen Net \$
Wyoming 2*	(110 lbs/ac) 20 tons	(77 lbs/ac) 17.3 tons	2.7 tons	74.91

Note: * moisture and protein was the same for the crop for both N rates.

Summary:

The corn nitrogen calculator (table 1) recommended 14 – 54 lbs/ac less nitrogen than the cooperators' normal rate of nitrogen, an average of 34 lbs/ac less than the cooperators' normal N rate. The yield difference ranged from -14 to 0 with an average of -6 bu/ac. The net return for nitrogen and yield ranged from -\$27.08 to \$21.60 and the average was a loss of \$2.49 per acre. Overall the calculator did well coming out positive or within a few dollars on five out of the eight plots. It is hard to determine why the calculator was not as close for the other three plots. The Watford plot had manure added in the spring so maybe it was credited for more nitrogen than it actually supplied. The alfalfa that was plowed down in the Petrolia plot may have been give a larger N credit that it actually supplied. The corn nitrogen calculator recommended the same rate of nitrogen as the grower's normal rate so a lower rate was used as a comparison. The results in table 2 show that the grower's normal rate of nitrogen is correct and the calculator agreed. The calculator is intended to determine general nitrogen recommendations so it may not predict the right rate for some fields and management systems. The N calculator or the worksheets can be found at www.gocorn.net or www.omafra.gov.on.ca/english/crops/field/corn.html#Fertility



Next Steps:

The results will be communicated in the regional newsletter and a meeting of the cooperators is being planned.

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Location of Project Final Report: