

# Comparing Corn Nitrogen Rates in Mineral and Muck Soils

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## INTRODUCTION

Nitrogen rates applied to corn have changed over the years. Originally, when the Tri-State Fertilizer Recommendations were released in Ohio, 1.2 pounds of nitrogen was recommended to produce a bushel of corn. Later, that number was reduced to 0.8 pounds of nitrogen, and today that number can be closer to 0.6 pounds of nitrogen to produce a bushel of corn depending on soil types, mineralization, organic matter, and other factors. Corn hybrids today have more starch and less protein compared to hybrids grown 20 years ago. More efficient use of nitrogen can be accomplished by reducing risk of loss, varying application times, and use of modern sampling and application methods. This poster compares three years of nitrogen rate trials in mineral soils to three years of nitrogen rate trials in muck soils with high organic matter content.

## OBJECTIVE

Compare corn yield response to nitrogen sidedress rates in mineral soils and muck soils.

## METHODS

Five different sidedress rates are compared with three replications in each trial over a period of three years in both a mineral soil field and a muck soil field. The sidedress rates are 0 pounds of nitrogen, 100 pounds of nitrogen, 150 pounds of nitrogen, 200 pounds of nitrogen, and 250 pounds of nitrogen per acre using 28% Urea Ammonium Nitrate (UAN). Starter fertilizer includes 32 pounds of 28% UAN in the mineral soil and 0 pounds of 28% UAN in the muck soil. Grain moisture was recorded as well as yield calculations at harvest. The mineral soil was 1.8% organic matter while the muck soil contained 24.2% organic matter. The first year of the study was 2015 with the second year 2016. The third year for the mineral soil 2018 while the third year for the muck soil was 2017. The mineral soil had an uneven stand in 2017 so it was decided to postpone the third year of the mineral soil trial by one year.

## CONCLUSIONS

The results of the studies over three years show the best economic sidedress nitrogen rate in these trials' mineral soils to be 150 lbs per acre with 32 pounds of starter nitrogen. The best sidedress nitrogen rate in these trials' muck soils over three years show the best economic rate to be 100 lbs per acre with no starter nitrogen. Although additional nitrogen can increase corn yields, Ohio corn producers are moving toward using the best economic rate as an answer to tighter budgets and environmental concerns. The Maximum Return to Nitrogen method is being recommended in the state with the new update of the Tri-State Fertilizer Recommendations in 2019. On-farm research such as these trials provide evidence of the results of this method for farmers to consider when managing their nitrogen dollars.

## KEY PARTNERS

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## PROJECT CONTACTS

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MINERAL SOIL - 2015

Nitrogen Rate (sidedress)	Grain Moisture	2015 Yield
0 lbs/ac	15.2 %	38.9 bu/ac a
100 lbs/ac	15.5%	94.9 bu/ac b
150 lbs/ac	15.7%	114.8 bu/ac c
200 lbs/ac	16.1%	133.4 bu/ac d
250 lbs/ac	16.4%	151.9 bu/ac e

MINERAL SOIL - 2016

Nitrogen Rate (sidedress)	Grain Moisture	2016 Yield
0 lbs/ac	18.5%	71.7 bu/ac a
100 lbs/ac	19.1%	131.0 bu/ac b
150 lbs/ac	19.2%	141.2 bu/ac c
200 lbs/ac	19.3%	148.1 bu/ac cd
250 lbs/ac	19.3%	151.9 bu/ac d

MINERAL SOIL - 2018

Nitrogen Rate (sidedress)	Grain Moisture	2018 Yield
0 lbs/ac	16.2%	136.4 bu/ac a
100 lbs/ac	16.7%	196.7 bu/ac b
150 lbs/ac	16.7%	205.0 bu/ac bc
200 lbs/ac	16.5%	206.2 bu/ac c
250 lbs/ac	16.9%	210.1 bu/ac c

MUCK SOIL - 2015

Nitrogen Rate (sidedress)	Grain Moisture	2015 Yield
0 lbs/ac	15.3%	102.1 bu/ac a
100 lbs/ac	15.0%	135.7 bu/ac ab
150 lbs/ac	15.6%	166.6 bu/ac b
200 lbs/ac	15.5%	129.0 bu/ac ab
250 lbs/ac	16.4%	132.1 bu/ac ab

MUCK SOIL - 2016

Nitrogen Rate (sidedress)	Grain Moisture	2016 Yield
0 lbs/ac	16.0%	186.0 bu/ac a
100 lbs/ac	16.9%	190.9 bu/ac b
150 lbs/ac	16.7%	189.8 bu/ac b
200 lbs/ac	15.7%	190.7 bu/ac b
250 lbs/ac	16.3%	189.2 bu/ac b

MUCK SOIL - 2017

Nitrogen Rate (sidedress)	Grain Moisture	2017 Yield
0 lbs/ac	16.4%	147.1 bu/ac a
100 lbs/ac	16.2%	182.4 bu/ac b
150 lbs/ac	16.4%	183.3 bu/ac b
200 lbs/ac	16.0%	184.3 bu/ac b
250 lbs/ac	16.4%	185.5 bu/ac b

