Pre-plant versus side-dress Nitrogen for corn in NW Minnesota

Nearest Town: Ada (Norman Co.) & Fosston (Polk Co.)
Soil Type: Norman County: Wheatville loam
Polk County: Chapett fine sandy loam
Row Width: 30"
Experimental Design: Split plot within a randomized complete block design
Main plot pre-plant nitrogen rates: 0, 40, 80, 120, 160, and 200 lbs N per acre
Split plot side-dress N (pre-plant N + side-dress N): 0 + 120, 40 + 80, 80 + 40, 120 + 40,
160 + 40, and 200 + 40 lbs N/acre
Nitrogen source: urea (46-0-0)
Side-dress urea treated with Agrotain and applied between V4-V6
4 replications
Previous Crop: Norman County: previous crop spring wheat
Polk County: previous crop soybean

Purpose of Study:
To determine if split application of nitrogen would result in
greater corn yield in Northwest Minnesota

Results:
Corn grain yield was increased by pre-plant nitrogen at both
locations. Economic optimum nitrogen rates (EONR) for both
locations were near 100 lbs of N per acre at Norman Co. and
175 lbs at Polk. Higher EONR at Polk was likely a result of
previous crop and a sandier soil.

Side-dress application of nitrogen increased corn grain yield
for the lowest three pre-plant application rates, 0, 40, and 80
lbs of N per acre. There was no yield advantage of split
application of nitrogen for pre-plant nitrogen rates 80 lbs of N
or greater.

Side-dress application of nitrogen did not increase yield for
applied N rates higher than the EONR. Application of 120 lbs
of N resulted in similar yield when applied all as a pre-plant or
a side-dress application. The results agree with research
from 2014 where there was no yield advantage from side-
dress application of nitrogen.

Table 1. Summary of economic optimum nitrogen rates using
the maximum return to N model for Northwest Minnesota from 2014-2015.

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