Corn Response to Nitrogen Rates

Trial Objective

- The optimum nitrogen (N) rate for corn can be difficult to determine as different corn products can require different amounts of N. Inadequate N can cause noticeable reduction in yield, whereas excess N can cause weak stalks and water quality risks.
- Short stature corn* is a new corn breeding innovation that will be part of the Bayer Preceon™ Smart Corn System with a targeted commercial introduction in the United States set for 2024. The product concept for short-stature corn is to design high-yielding hybrids with reduced internode distances (area between leaf nodes), resulting in shortened plant height.
- Short stature corn will have a target height seven feet and a target ear height of at least two feet above the soil level. The shortened height of short stature corn can potentially decrease greensnap and stalk lodging issues often associated with taller corn products.
- The objective of this trial was to evaluate the effects of N rates on three tall commercially available corn products and three short stature corn products.

Experiment/Trial Design

Location	Soil Type	Previous Crop	Tillage Type	Planting Date	Harvest Date	Potential Yield (bu/acre)	Seeding Rate (seeds/acre)
Gothenburg, NE	Hord silt loam	Corn	Strip-till	05/13/2022	11/02/2022	250	36,000

- The trial design was a split-plot with N fertilizer as the whole plot and corn product as the subplot with four replications.
- A total of six N rates and six corn products were selected for this trial.
  - » N rates: 0, 60, 120, 180, 240, and 300 pounds per acre
  - » Three tall corn products with relative maturity (RM) of 113 RM and three short stature corn products* with a 113 RM were evaluated under six different N rates (0, 60, 120, 180, 240, and 300 lb N/acre).
- Nitrogen was applied with 360 Y-DROP® fertilizer tube attachments on 6/20/22.
- Weeds were uniformly controlled with herbicides and no other pesticides were applied.
- The trial received 6 inches of water by sprinkler irrigation and 10.63 inches of rain during the growing season.
- Plots were combine-harvested with total plot weight, test weight, and moisture data collected.
- The grain yield was corrected to a standard moisture content of 15%.

*The Preceon™ Smart Corn System, including short stature corn developed through traditional breeding, is expected to be available, subject to final commercialization decisions, for planting in the 2024 growing season.

Corn Response to Nitrogen Rates

Understanding the Results

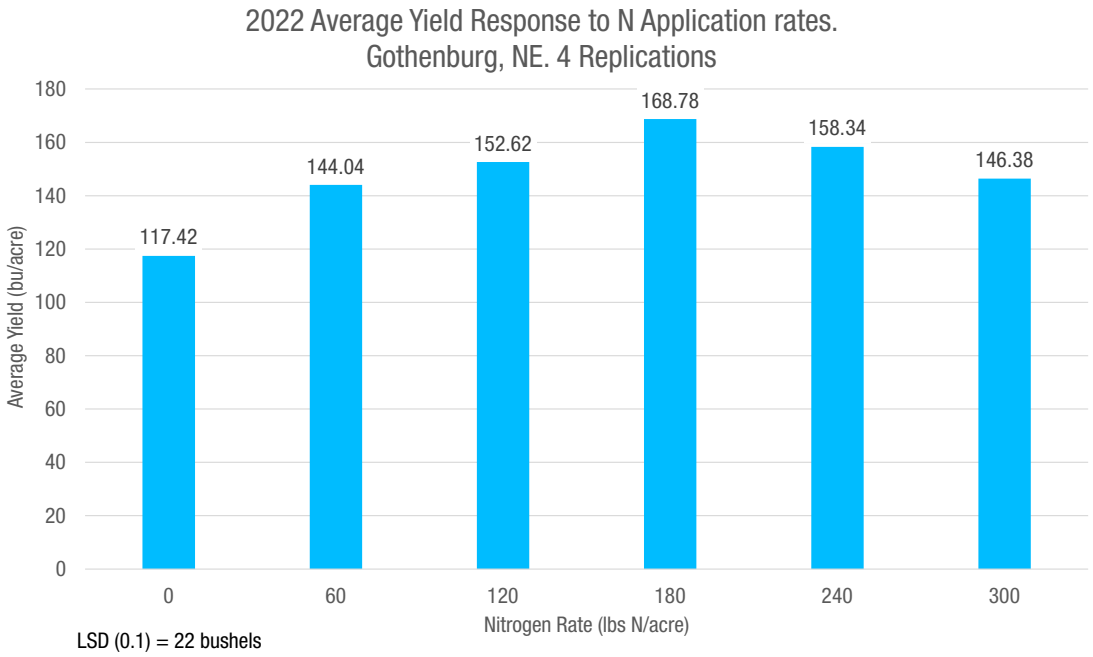

Figure 1. 2022 corn yield response to nitrogen rate averaged across all corn products tested in Gothenburg, NE.

- There was no significant interaction between N rate applied and corn product.
- No significant lodging was observed in this study, even at higher N rates. This could be due to the abnormally dry growing season.
- The greatest yield response to an incremental increase of N was from 0 lb/acre to 60 lb/acre across all corn products (Figure 1).
- There were no positive statistical differences in yield when N rates above 120 lb/acre were applied across all corn products (Figure 1).

*The Preceon™ Smart Corn System, including short stature corn developed through traditional breeding, is expected to be available, subject to final commercialization decisions, for planting in the 2024 growing season.

Corn Response to Nitrogen Rates

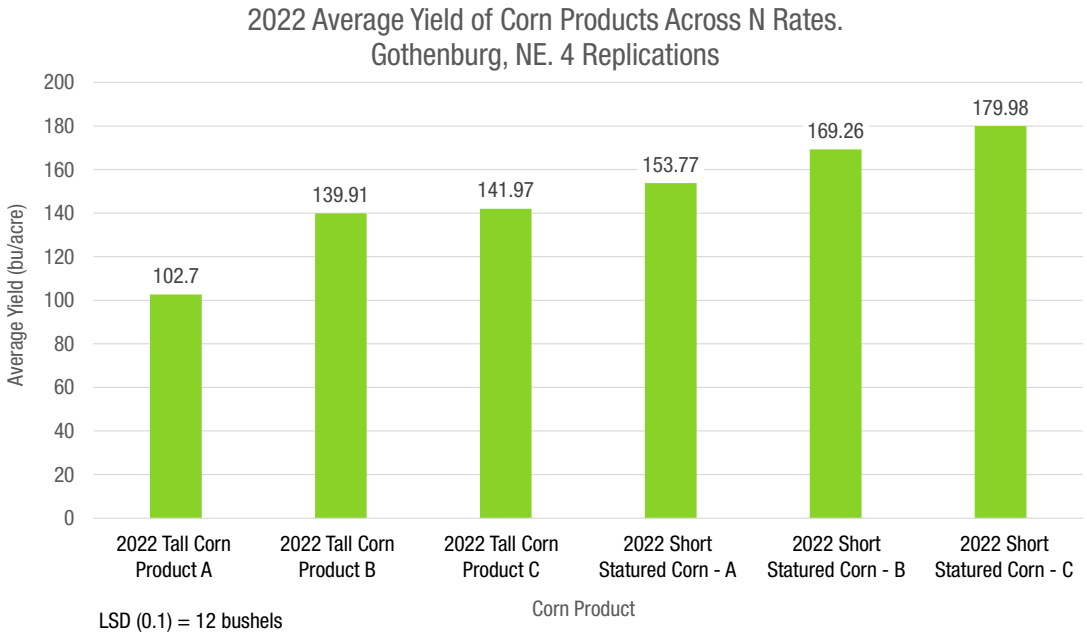

Figure 2. 2022 corn product yield response averaged across all nitrogen treatments in Gothenburg, NE.

- The short stature corn products* performed significantly better across all N rates than the commercially available corn products (Figure 2).

Key Learnings

- The diminishing return rate for nitrogen can vary because of several factors. These factors include but are not limited to corn product characteristics, population, precipitation, soil type and management practices such as crop rotation.
- Carefully matching nitrogen rate with corn product, yield potential, soil moisture conditions, and residual soil nitrogen is key to maximize the potential benefit of N fertilizer while minimizing potential drawbacks.

Legal Statements

The information discussed in this report is from a single site, replicated trial. This informational piece is designed to report the results of this demonstration and is not intended to infer any confirmed trends. Please use this information accordingly.

*The Preceon™ Smart Corn System, including short stature corn developed through traditional breeding, is expected to be available, subject to final commercialization decisions, for planting in the 2024 growing season.

ALWAYS READ AND FOLLOW PESTICIDE LABEL DIRECTIONS. Performance may vary, from location to location and from year to year, as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible and should consider the impacts of these conditions on the grower's fields.