



Corn Characteristic Response to Nitrogen

Trial Objective

- Many new corn products are developed each year as research and development pipelines aim to improve the corn portfolio and farmer choice. Farmers have a short time to become familiar with what nitrogen application strategy the corn product is most responsive to.
- Flex-ear corn products can adjust yield components and set more rows around on the cob, more kernels per row, or increase kernel depth if conditions are favorable. Increasing seeding rates to increase yield are recommended for fixed-ear corn products as the yield components do not change much.
- Agronomists make recommendations for corn products with high or low late-season plant health and ear flexibility. These corn characteristics may affect N uptake and allocation and impact corn yield potential. Additional information about N applications can help farmers improve their N management system for individual corn products.
- The objective of this study was to evaluate corn characteristics for a second year and compare results from year 1: (1) late season plant health and (2) corn ear flex and their influence on corn yield potential with different N application strategies.

Research Site Details

Location	Soil Type	Previous Crop	Tillage Type	Planting Date	Harvest Date	Potential Yield (bu/acre)	Seeding Rate (seeds/acre)
Gothenburg, NE	Hord silt loam	Soybean	Strip-till	4/26/2021	10/21/2021	290	36,000

- A soil test report on April 1, 2021, indicated 189 lb N/acre was recommended (31 lb N/acre in the top 2 ft of soil plus 40 lb N/acre legume credit) for a yield goal of 270 bu/acre.
- The study design was a split-plot with fertilizer as the whole plot and corn characteristics as the subplot with four replications.
- The trial was sprinkler irrigated.

Fertilizer Treatments:

- Up-front Nitrogen (N) – Strip-tilled 29 lb N/acre on 4/13/2021 and applied 160 lb N/acre with 360 Yield Center Y-Drops on 5/12/2021 when corn was at the V1 growth stage.
- Split N - Strip-tilled 29 lb N/acre on 4/13/2021 and applied 40 lb N/acre with the Y-Drops on 5/12/2021, followed by 120 lb N/acre applied by fertigation. The fertigation was split into 4 to 30 lb N/acre increments with applications on 6/29, 7/9, 7/27, and 8/6.

Corn Characteristic Treatments:

- Late-season plant health
 - » High – 105-day relative maturity (RM), 111RM, and 113RM
 - » Low – 110RM, 111RM, and 113RM
- Ear Flex
 - » High – 104RM, 113RM, and 113RM
 - » Low – 108RM, 109RM, and 113RM
- The study area also received 60 lb P/acre, 25 lb S/acre, and 0.25 lb Zn/acre with the 4/13/2021 strip-till application.



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- Weeds were uniformly controlled with herbicides and no other pesticides were applied.
- Test weight, moisture, and total shelled weight were collected to calculate yield.
- Yield was corrected to a standard of 15% moisture content.

Understanding the Results

Late Season Plant Health

- The difference in how corn that was classified as either ‘high’ or ‘low’ for late season plant health responded to a split nitrogen (N) or the up-front N treatments is detailed in Figure 1.
 - » Corn products with “high” late-season plant health had greater yields from the split N treatment compared to the up-front N treatment. Corn products with “low” late-season plant health had no yield difference between the two N strategies.
 - » These results are similar to those observed in 2020.

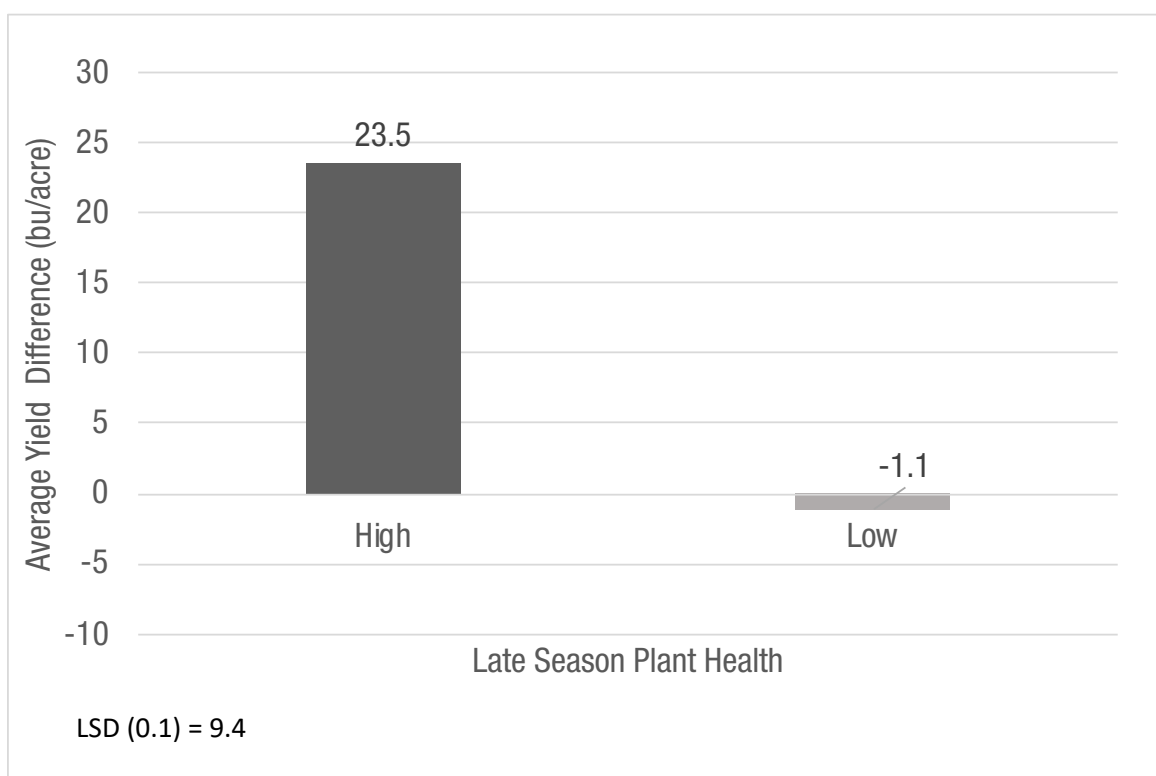


Figure 1. Response of late season plant health to nitrogen strategy. (Bars represent the split N application average yield minus the up-front N application average yield)

Ear Flex

- Corn rated either ‘high’ or ‘low’ for ear flex had a positive response to the split N application treatment with a significant difference observed for corn classified as ‘high’ ear flex. Corn rated with ‘low’ ear flex also had a positive response to the split N application but not to the same extent as corn rated with “high” ear flex (Figure 2).
- The differences were more pronounced than what was observed in 2020; however, the 2020 results with ‘high’ ear flex corn had a trend for higher yields with a split N application.



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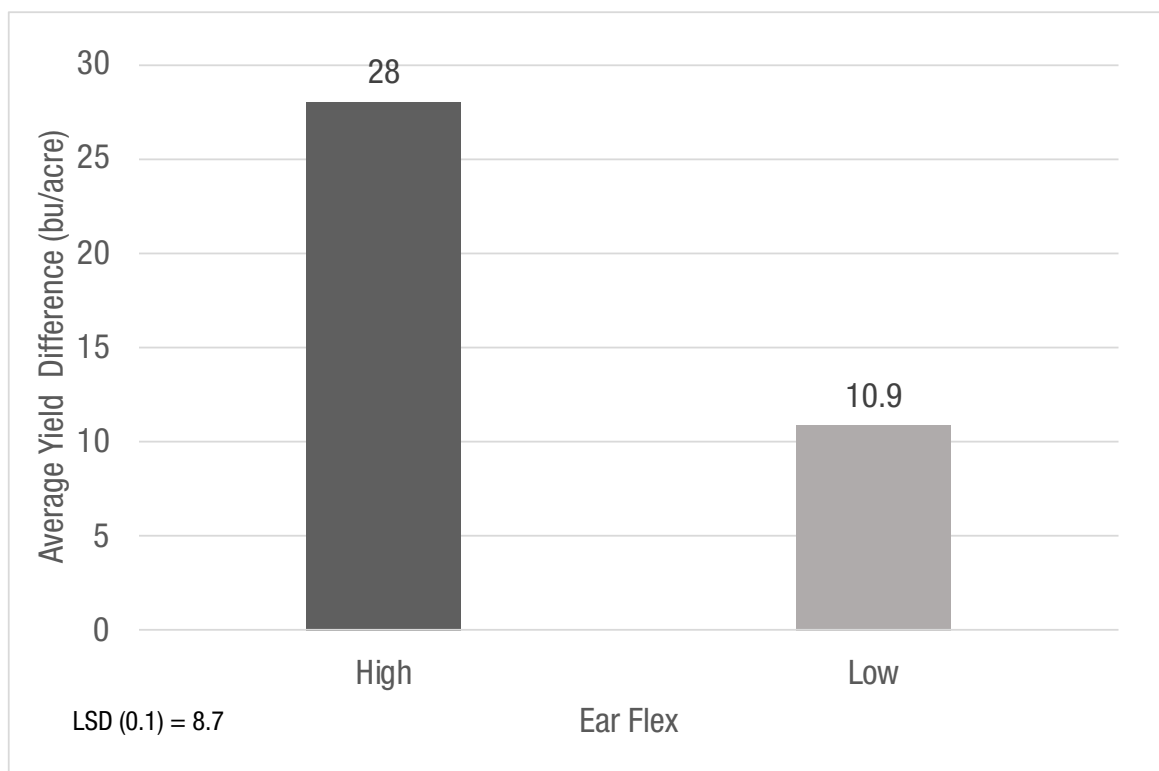


Figure 2. Response of corn ear flex to nitrogen strategy. (Bars represent the split N application average yield minus the up-front N application average yield)

Key Learnings

- Late season plant health - 'High' late season plant health had a consistent positive response to split N applications, whereas 'Low' late season plant health did not respond to split N applications in either 2020 or 2021.
- Ear Flex - Results varied between 2020 and 2021 on the impact that nitrogen strategy had on 'high' or 'low' ear flex. However, no negative response was observed from a split N application across either 'high' or 'low' ear flex products in either year.
- Testing to evaluate the response of corn characteristics to nitrogen strategy will continue in 2022.

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.

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.

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