

CORN PRODUCT RESPONSE TO NITROGEN AND HIGH DENSITIES

TRIAL OVERVIEW

- Every year, corn products are subjected to less-than-ideal situations in the field, resulting in stress.
- Farmers and agronomists need to know how their corn products react in stressful situations to better understand the implications on yield potential and general plant health.

RESEARCH OBJECTIVE

- This study evaluated the effect of nitrogen (N) strategy and planting density on corn product performance. The N rates utilized and the planting densities, which ranged from normal to very high, were intended to induce stress that would negatively impact yield, standability, and plant health.

Location	Soil	Previous Crop	Tillage Type	Planting Date	Harvest Date	Potential Yield/Acre	Planting Rate/Acre
Gothenburg, NE	Hord silt loam	Corn	Strip tillage	04/27/2017	11/10/2017	260 bu/acre	28K, 36K, 44K, 52K

SITE NOTES:

- This study was set up as a randomized complete block design with three replications.
- Six corn products with RM ranging from 110 to 116 were assessed.
- Two N treatments were assessed:
 - 120 AP: 120 lbs/acre N applied at planting (AP) with no additional N
 - 120 AP + 100 V7: 120 lbs/acre N applied at planting plus 100 lbs/acre N side dressed at the V7 growth stage
- Four planting densities were used: 28K, 36K, 44K, and 52K (K = 1,000) seeds/acre.
- Soil tests indicated 45 lbs/acre residual N in the top 2 ft. of soil, low phosphorus and sulfur levels, and adequate levels of potassium and micronutrients.
- Nutrients applied besides the N rates specified above were: 60 lbs/acre P₂O₅, 0.5 lbs/acre zinc, and 25 lbs/acre sulfur with strip tillage.
- A total of 6.6 inches of irrigation was applied during the growing season to meet crop needs.
- No fungicides or insecticides were applied to the trial and weeds were uniformly controlled across the study.
- Grain yield, stalk lodging, and plants that died prematurely were measured.

UNDERSTANDING THE RESULTS

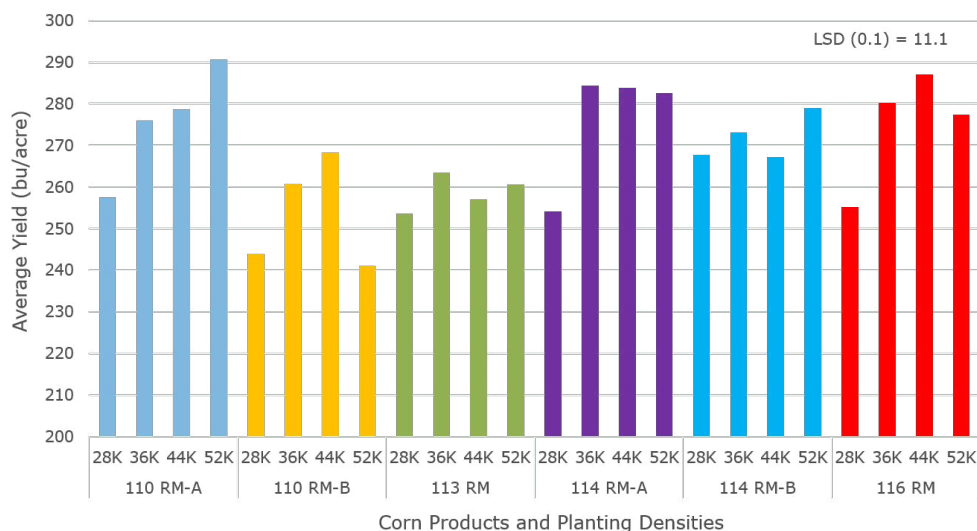


Figure 1. Yields by product and planting density

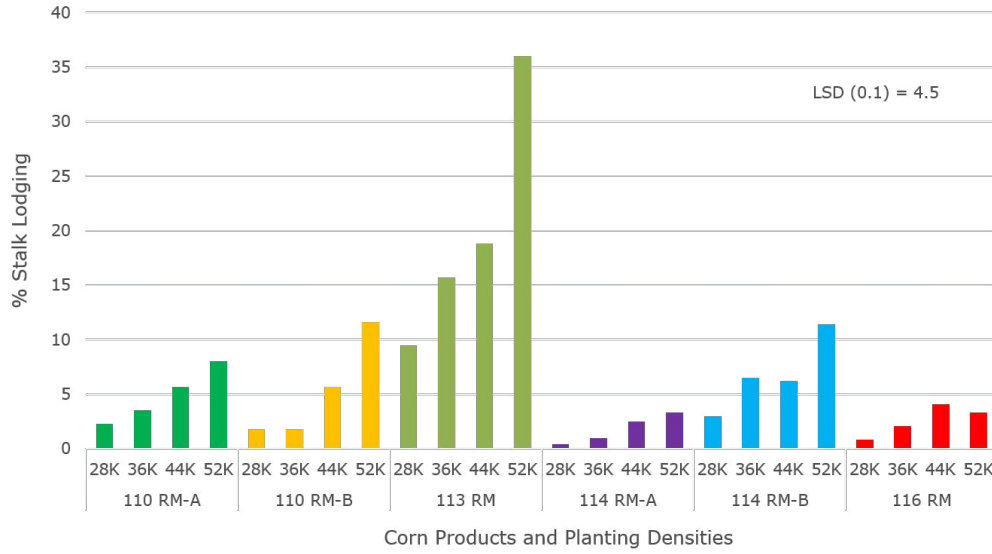


Figure 2. Late-season stalk lodging by product and planting density

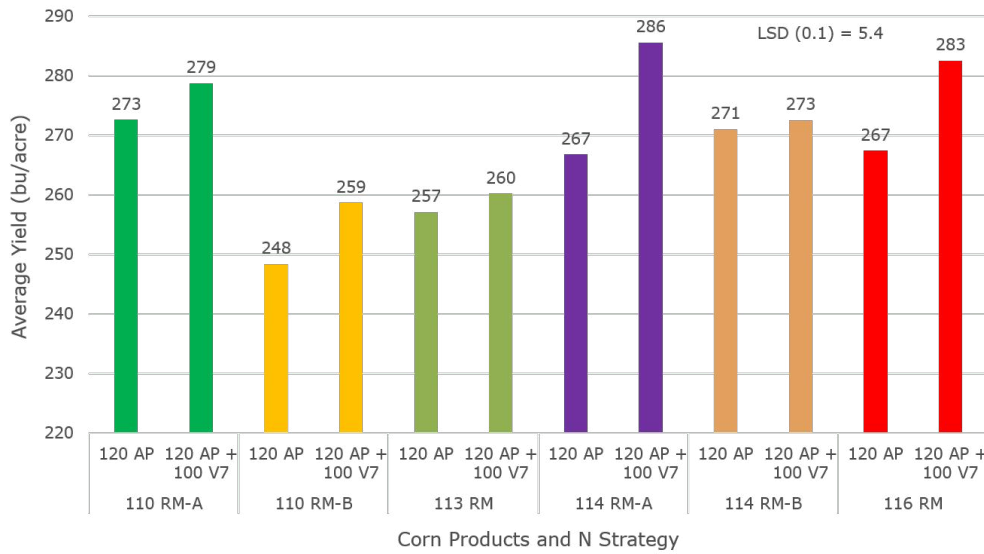


Figure 3. Corn product yield by nitrogen strategy

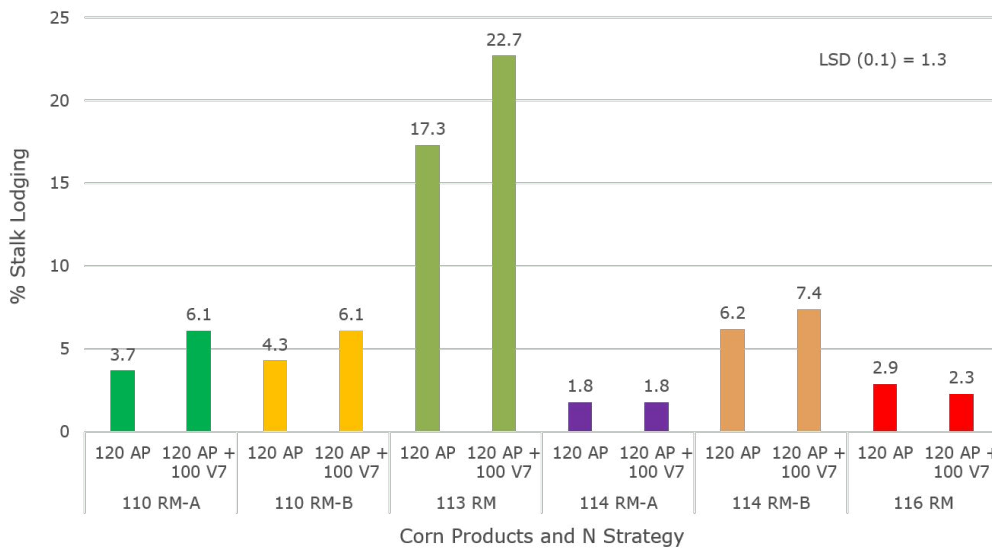


Figure 4. Late-season stalk lodging by nitrogen strategy and corn product



- **Yields by planting density**
- The corn products differed in their responses to planting density with respect to yield. The 110 RM-A product responded with increased yields up to the highest density, while yields of most other products trended downward at the highest density (Figure 1).
- **Stalk lodging by planting density**
- Higher planting densities resulted in higher rates of stalk lodging for nearly all products. Some corn products had higher lodging rates overall, particularly the 113 RM product. Conversely, stalk lodging in two products, 114 RM-A and 116 RM, remained below 5% in all treatments (Figure 2).
- **N application strategy and yields**
- Changing the N application strategy from the 120 AP treatment to the 120 AP + 100 V7 treatment significantly improved yields in four of the six corn products, indicating that the extra sidedressed N helped alleviate some of the N stress in most products (Figure 3).
- **N application strategy and stalk lodging**
- The N application strategy also impacted stalk lodging. The 110 RM-A, 110 RM-B, and 113 RM products had significantly increased stalk lodging in the 120 AP + 100 V7 treatment (Figure 4). The reason for this wasn't clear, but even with the increased lodging, higher yields were usually achieved.
- **Premature plant death**
- There was a significant difference among corn products for premature plant death, while the planting density and the N strategy had no impact on this measurement.

WHAT DOES THIS MEAN FOR YOUR FARM?

- The corn products had varying responses to the growing environments, which could be applied to field situations.
- Yield and standability can become issues in stressful growing environments. Further research is critical for understanding corn product performance in varying environmental conditions.
- Branded information to identify these corn products can be acquired from your local Monsanto seed sales team.

LEGAL STATEMENT

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

For additional agronomic information, please contact your local seed representative. Developed in partnership with Technology Development & Agronomy by Monsanto.

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