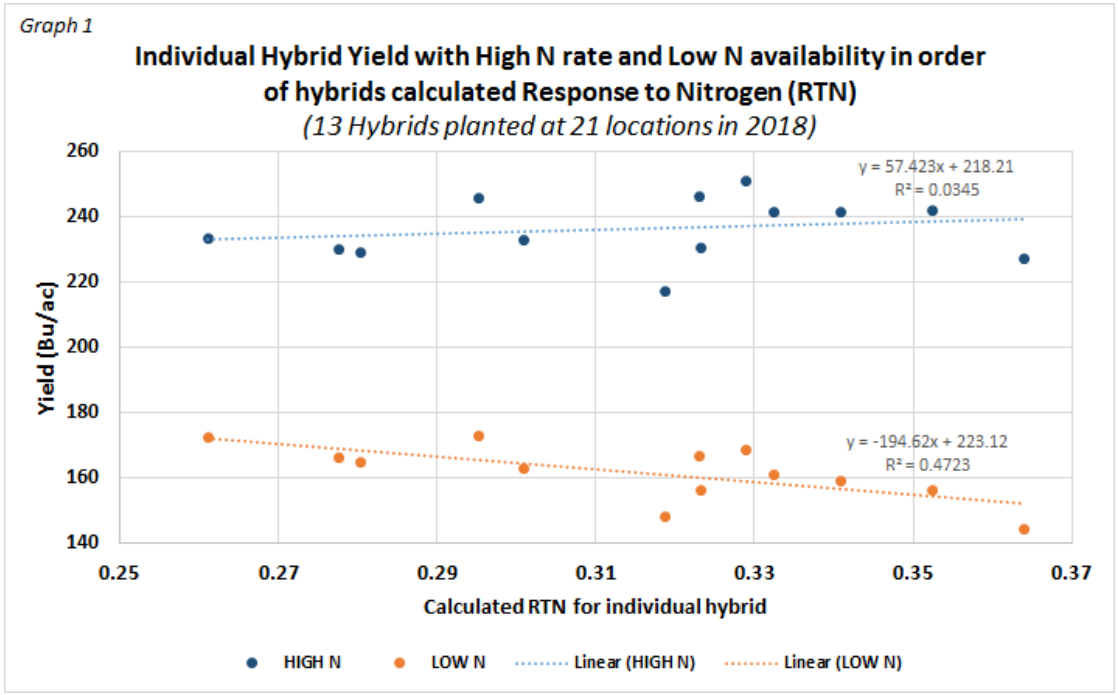
Table 2

Hybrid	RTN
G03C84-3120	0.28
G04S19-3010	0.32
06EXP-3010	0.26
G06Q68-3220	0.28
G07F23-3111	0.33
G08M20-3010	0.30
G09Y24-3220A	0.34
G11A33-3111	0.32
G12W66-3122	0.32
G13T41-3010	0.36
14EXP-3120	0.33
G15L32-3110	0.35
G15Q98-3000GT	0.30
Max	***0.36***
Min	***0.26***
Mean	***0.32***

Graph 1



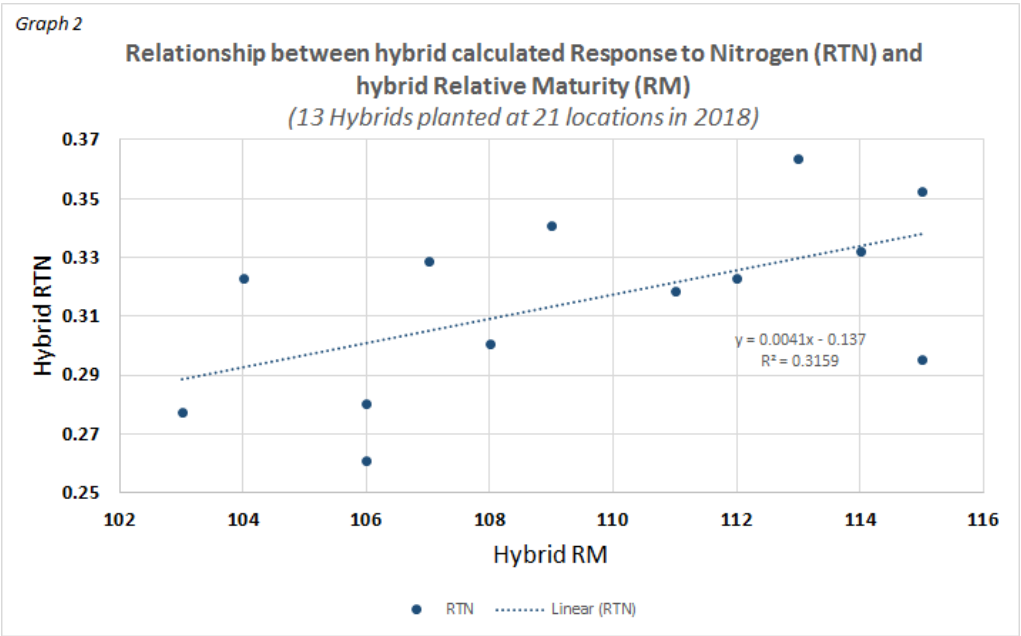
Hybrid Response using RTN

For identification of hybrids that most consistently have high/low RTN ratings, all 21 trials were combined and summarized for response trends. RTN ratings averaged 0.32 across 13 hybrids and ranged from 0.26 to 0.36 (*Table 2*). Yield loss in limited N environments ranged from 61-85 bu/ac across all hybrids with a 24 bu/ac variance (*Graph 1*). Previous interpretations of how to best manage hybrids with higher RTN ratings have implied they will be responsive to incremental nitrogen rates and split application timings, while maintaining above average yield potential in low N environments. These data (*Graph 1*) suggest a lack of relationship between yield and RTN score when high nitrogen rates were applied, indicating RTN scores likely have little to do with hybrid response to incremental N rates. In the low N treatments, a trend for decreased yield as RTN scores increased suggests that hybrids with higher RTN ratings are a better indicator of hybrids more sensitive to N loss.

Hybrid RM in Relation to Nitrogen Management

Relative Maturity is a common indicator of how long a corn hybrid requires to complete its grain filling period, otherwise known as reaching physiological maturity. Due to fuller season hybrids having a longer and later grain fill period, it is reasonable to anticipate they may respond differently to nitrogen.

Graph 2

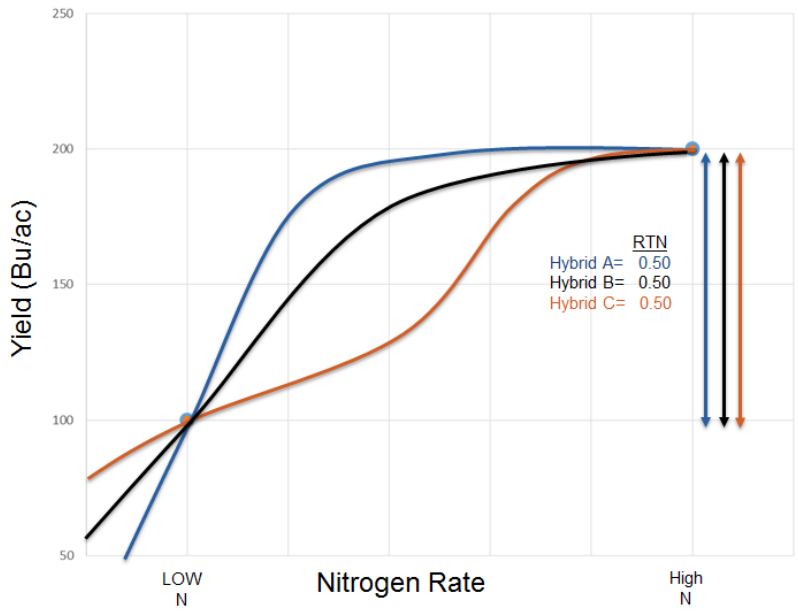


A mobile nutrient, such as nitrogen, will decrease in availability as the season progresses due to plant uptake and soil N losses, lending to fuller season hybrids being further disadvantaged. Observations from 2018 trials indicate a linear relationship between hybrid RTN score and RM (*Graph 2*). As hybrid RM increased, RTN ratings also increased. This relationship supports the concept that fuller season hybrids are more sensitive to yield loss, and illustrates the importance of higher intensity N management for fuller season hybrids.

Predicting Hybrid Response at Different Levels of N Availability

It is important to note, due to the trial design, it is not possible to extrapolate what may have happened in situations with less severe N loss. The following theoretical example illustrates potential yield response curves of hybrids receiving different nitrogen rates. This demonstrates how the critical amount of nitrogen needed to achieve the economic optimum rate could vary significantly among hybrids with the same RTN score (*Graph 3)*.

Graph 3



Summary

Trial results did not illustrate high RTN ratings as being a good indicator of hybrids that are responsive to more intensive N management practices such as split applications or increased rates. However, lower RTN ratings did identify hybrids that yield better under extreme N limiting conditions. Differences among hybrid RTN ratings do not appear to be large enough and consistent enough to justify hybrid specific management. The magnitude of RTN differences among hybrids would likely be less pronounced in low N stress situations representative of normal corn production scenarios. The results of RTN studies do support the observation that hybrids with a longer-grain fill period are most susceptible to yield loss in low nitrogen environments, and highlight the importance of intensive nitrogen management for these hybrids. RTN ratings are not able to predict economic optimum nitrogen rates or how hybrids would perform when managed to those levels, and therefore, have limited utility in creating hybrid specific N management plans.

Conclusions from this work suggest RTN ratings are of limited use in differential hybrid N management due to two factors. First, the experimental design limits the ability to predict hybrid differences at rates in-between the high and low rates utilized in testing. Second, the strong influence of environmental variability on hybrid nitrogen use efficiency requires an extensive multi-year and location evaluation of hybrids to gain confidence in difference between hybrids. Because of the relatively short life span of hybrids, characterization may not be completed until late into a hybrid lifecycle. Due to lack of actionable N management options associated with characterizing hybrids, analytical approaches that adjust for environmental factors, such as in-season soil and plant tissue testing or predictive nitrogen modeling tools, likely provide more opportunity for in-season management to correct for potential yield loss.

For more information about Golden Harvest Corn hybrids, contact your Golden Harvest Seed Advisor or visit **www.goldenharvestseeds.com**

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