

Department of Biosystems Engineering and Soil Science

PREDICTING CORN NITROGEN RESPONSE USING ALKALINE MINERALIZABLE-NITROGEN AND HANEY SOIL HEALTH TOOL-NITROGEN IN TENNESSEE

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Key Takeaway: Only the alkaline hydrolyzable-nitrogen (N) predicted corn response to N, which was observed at the 12-18-inch depth ($R^2 = 0.46$).

Introduction

- Current N fertilizer recommendation does not account for potentially mineralizable N; hence, there is a possibility for either over or under application of N fertilizer.
- Roberts et al. (2011) reported the adequacy of alkaline mineralizable N to predict rice response to N.
- Information on the adequacy of alkaline mineralizable-N or estimated biological N component of Haney Soil Health Test (HSHT) to predict corn response is limited.

Objective

- Assess the adequacy of alkaline mineralizable-N and Haney Soil Health Tool-N to predict corn N needs.

Trial

- **Year:** 2021.
- **Experimental Design:** RCB/4 replications.
- **Locations:** Milan and Jackson, Tennessee
- **Production System:** no-till dryland.

- **N rates:** 0, 60, 120, 180, 210 and 240 lbs. N/A (60 lbs. N/A was applied at planting and the remaining N applied between V4 to V6).
- **Crop:** Corn.
- **Crop management:** University of Tennessee recommendations.

Results

- Application of N significantly increased corn yields at both locations. Both locations exhibited a significant and a positive response to fertilizer N.
- Corn response to N at the Jackson location did not plateau. However, at the Milan location, grain yield increased with N rate and plateau at the 150 lbs. N/A (Figure 1).
- The best predictive relationship between the grain yield of the check-plots and alkaline hydrolyzable-N was found at the 12-18-inch depth ($R^2 = 0.46$). In contrast, the correlation between the yield of the check plots and the estimated biological N component of the Haney Soil Health Test was not significant at any depth (Figure 2).

Predicting Corn Nitrogen Response

Figure 1. Corn response to N fertilizer application at the Milan and Jackson locations.

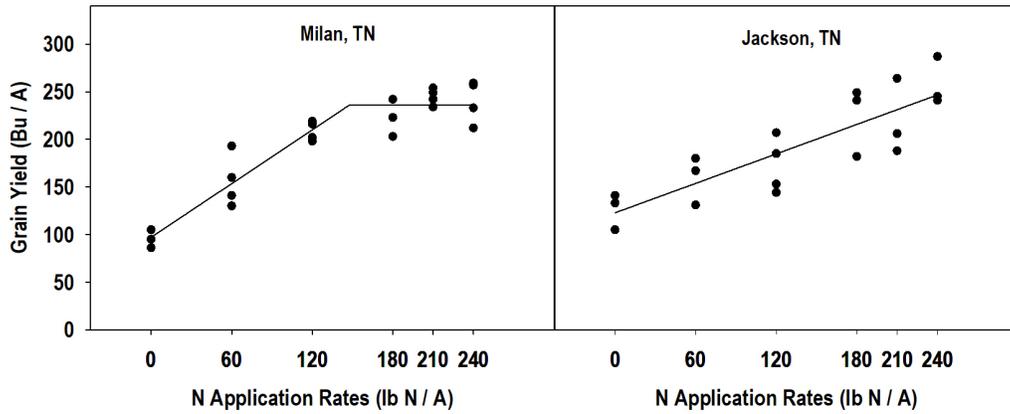
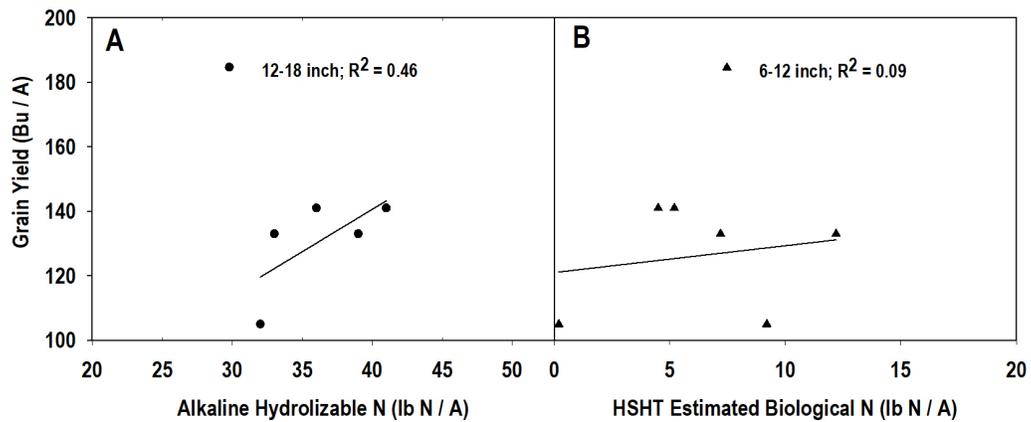


Figure 2. Relationship between grain yield of check plot and (A) alkaline-hydrolyzable nitrogen at the 12-18-inch depth and (B) estimated biological-N component of HSHT at 6-12-inch depth.





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