By-Plant Prediction of Corn Grain Yield Using Early-Season Sensor Measurements. (5842)

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Abstract:

Natural variability within corn fields is common, but the resolution at which this variability occurs and the methods of nitrogen (N) fertilization currently employed fail to factor in the spatial difference among plants. The objective of this study was to demonstrate that differences in plant yield occur on an individual plant basis and to estimate the yield of each plant by collecting the normalized difference vegetative index (NDVI) using a GreenSeeker optical sensor. NDVI readings were collected for every 1.1-cm in a 30-m row. Knowing the exact location of each plant, the average NDVI value and the coefficient of variation (CV) was calculated for each plant by assuming that each plant occupies half the distance between it and its neighbors. As the NDVI values were accumulated, it was clear that differences in plants could be detected using an optical sensor. Yield was then collected for each plant and was used to find a relationship with NDVI values. NDVI was found to estimate actual grain yield most of the time, but this yield prediction is expected to improve. Using NDVI alone assesses two dimensions of the plant characteristics, while a third dimension, height, could be added to the yield prediction, increasing prediction confidence. The yield prediction equation generated from this work will be used mid season to calculate the amount of N removed and the ensuing amount of N needed to maximize grain yield.

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