

The Relationship of Chlorophyll Concentration and Canopy Greenness with Maize Yield

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October 30, 2023

Abstract

Maximizing crop yield is a central goal in agriculture and plant breeding. Several phenotypic traits, including leaf chlorophyll content and canopy greenness, can help predict yield across different varieties. In this study, we aimed to quantify the relationship between leaf chlorophyll concentration, canopy greenness, and crop yield within the Genomes to Fields trials. Our goal was to assess the correlation and enhance predictive modeling between these factors, evaluating the effectiveness of canopy cover and spectral reflectance in predicting yield. We accomplished this by collecting chlorophyll data from multiple leaves within each field plot and utilizing imagery captured by unoccupied aerial systems. This image data provided RGB and multispectral reflectance information on a per-plot basis throughout the growing season, allowing us to model patterns linking chlorophyll concentration and yield for each plot. We integrated data from these two methods with genotypic data from the same maize varieties to explore the fundamental relationships between chlorophyll levels, canopy greenness, and crop yield.

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Keywords: Chlorophyll concentration, maize yield, drone/UAS, multispectral and RGB imagery, canopy greenness, crop yield prediction, Genomes to Fields