

By-Plant Prediction of Corn Forage Biomass at Various Growth Stages Using NDVI and Plant Height. (5879)

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Abstract:

Current strategies for developing precision agricultural practices for corn production focus on obtaining information and applying crop inputs to specific areas of fields. These areas could range from a square meter to many hectares. However, differences in corn production exist on a by-plant basis. Identifying the difference in biomass and nitrogen uptake between neighboring plants will be crucial for developing algorithms which can adjust crop inputs by-plant. A study was conducted to determine if corn forage biomass and nitrogen uptake can be determined on a by-plant basis. A corn hybrid was planted at a population of 23,000 plants per acre at two locations. Sensor readings were collected on corn plants at growth stages ranging from V6 to R1. The average NDVI and height for each plant was calculated and correlated with plant biomass and nitrogen uptake of that plant. The correlation between NDVI and biomass was 0.72, while NDVI and N uptake was 0.41. Plant height and biomass were better correlated with R2 of 0.87, however a lower correlation of 0.3 for N uptake. These results indicate that plant height is a better predictor of biomass, but NDVI was more correlated with N uptake. The correlation between sensor readings and plant height with biomass and N uptake will allow for a new avenue for accurate yield estimates and applying crop inputs on a by-plant basis.

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