Nitrogen Deficiency Effects on Corn Photosynthesis and Hyperspectral Reflectance. (C02-reddy161611-Poster)

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Abstract:

An experiment was conducted in sunlit controlled environment chambers in the 2001 growing season to determine corn (Zea mays L. cv 33A14) growth and leaf hyperspectral reflectance responses to varying N supply while keeping other factors at optimum for crop growth. Four N treatments were (1) control with half-strength Hoagland's nutrient solution throughout the experiment, (2) reduced N to 20% of the control starting 15 DAE (20% N), (3) 0% N from 15 DAE (0% N), and (4) 0% N from 23 DAE (0% NL). These treatments led to N concentrations in fully expanded uppermost leaves from 1.1 to 4.8% during the course of the experiment. Nitrogen deficiency significantly decreased rates of plant growth and leaf photosynthesis except for the 0% NL treatment. At final harvest, plant height, leaf area and shoot biomass were 64-66% of the control for 20% N, and 46-56% of the control for 0% N. Nitrogen deficiency treatments of 20% N and 0% N can be separated using leaf spectral reflectance in visible and near infrared ranges (400-800 nm) as early as seven days after treatments. The relationships between leaf reflectance and leaf N, chlorophyll or phenolic concentrations were also discussed in this paper.

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