Canopy Spectral Reflectance to Estimate Cotton Growth and Yield. (C02-zhao160843-Poster)

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Abstract:

Field experiments were conducted in 2001 to investigate relationships between canopy spectral reflectance (280-2500 nm) and growth and yield in cotton. Weekly or biweekly measurements of canopy reflectance, plant height, mainstem nodes, shoot dry weight, and leaf area index were made. Seed cotton yield was obtained by mechanical harvest at the end of the season. Seed cotton ranged from 2750 to 4310 kg/ha across 56 plots (15 x 8 m) treated with four rates of nitrogen or growth regulator (PIX) or two levels of irrigation. Fourteen published reflectance ratios of near inferred to red (NIR/R) range or normalized difference vegetation index (NDVI, (R935-R661)/(R935+R661)) were calculated and correlated with growth or yield parameters. Results indicated that cotton plant height and mainstem nodes could be estimated using NIR/R (R750/R550) by either a logarithmic or linear function (R2 = 0.63~0.67***). Leaf area index and biomass could be estimated using the NIR/R ratios (R935/R650, R750/R550, R935/R661) and the NDVI by an exponential function (R2 = 0.56~0.78***). Seed cotton yield was highly correlated with the NDVI at the first flower stage (R = 0.82**). A linear model could be used to estimate cotton yield by the NDVI at the first flower stage.

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