Linking Within-Field Crop Response With Soil Characteristics. (S06-kaul102644-Poster)

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Abstract:

Management zones for precision farming can be determined by identifying areas where soil, water, and management factors result in similar crop responses. Given the spatial distribution of LAI of a field, factors determining response patterns may be obtained via inversion of a model linking environmental factors with LAI. Soil water holding capacity (SWHC) is critical for determining crop response in non-irrigated fields and is therefore a major consideration when delineating crop response zones. Multiple linear regression (MLR), a neural network, a crop growth simulation model, and regression trees were tested for their ability to estimate LAI from SWHC, soil depth, slope, and leaf count using two years of data collected at the USDA-ARS in Beltsville, MD. Simulated LAI versus SWHC relationships were then compared to observed relationships for both years. The LAI and SWHC relationship appeared to fit a nonlinear function. Neural network and regression tree models resulted in R-square values ranging from 0.60 to 0.85. The MLR and simulation models resulted in r-squares ranging from 0.33 to 0.68. The latter two techniques were deemed inadequate for predicting LAI.

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