Nitrogen and Water Stress Impact on Hard Red Spring Wheat Crop Reflectance, Yield and Grain Quality

C. L. Reese  
South Dakota State University, Cheryl.Reese@sdstate.edu

D. Clay  
South Dakota State University, david.clay@sdstate.edu

D. Beck  
South Dakota State University

S. A. Clay  
South Dakota State University, sharon.clay@sdstate.edu

G. Seielstad  
University of Grand Forks

Follow this and additional works at: https://openprairie.sdstate.edu/plant_faculty_pubs

Recommended Citation  
https://openprairie.sdstate.edu/plant_faculty_pubs/146
Nitrogen and Water Stress Impact on Hard Red Spring Wheat Crop Reflectance, Yield and Grain Quality

Reese, C. L.; Clay, D. E.; Beck, D.; Clay, S. A.; Seielstad, G.

American Geophysical Union, Fall Meeting 2007, abstract id. B11F-05

0402 Agricultural systems, 0480 Remote sensing

Abstract
Water and nitrogen stress impact hard red spring wheat (Triticum aestivum) crop reflectance, yield and grain quality. To minimize yield losses from nitrogen (N) and water stress, it is essential to apply appropriate N in relation to water stress. The objective of this experiment was to determine the influence of N and water stress on hard red spring wheat crop reflectance, yield, and grain quality. Complete randomized block experiments were conducted in 2003, 2004 and 2004 in dryland and irrigated fields at three locations in central South Dakota. Treatments consisted of N rates and N application at different growth stages. Nitrogen fertilizer rates ranged from 0 to 200 kg ha-1. Nitrogen fertilizer application times were (1) planting; (2) planting and tillering (Feekes 2 -3) or (3) tillering (Feekes 2 -3). Reflectance data was collected using a Cropscan and a CropCircle radiometer. Reflectance data was collected at bare soil, tillering (Feekes 2-3) and flag leaf (Feekes 9-10). Carbon 13 isotopic discrimination (Ä) was used to determine yield loss to nitrogen or water stress. Reflectance data was compared to yield and Ä values or grain quality and Ä values. Correlation of crop reflectance (measured at the different growth stages and by the different radiometers) with yield loss to nitrogen or water and grain quality will be presented. Information presented will be used to make corrective nitrogen treatments and improve marketing decisions as related to grain quality.