12-2007

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

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

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

Affiliation: AA(South Dakota State University, Plant Science Department SAG 210, Box 2207A, Brookings, SD 57220, United States Cheryl.Reese@sdstate.edu), AB(South Dakota State University, Plant Science Department SAG 210, Box 2207A, Brookings, SD 57220, United States David.Clay@sdstate.edu), AC(South Dakota State University, Dakota Lakes Reserch Farm PO Box 2, Pierre, SD 57501, United States Dwyane.Beck@sdstate.edu), AD(South Dakota State University, Plant Science Department SAG 210, Box 2207A, Brookings, SD 57220, United States Sharon.Clay@sdstate.edu), AE(University of Grand Forks, Center for People & Environment Clifford Hall Room 334 4149 University Avenue Stop 9011, Grand Forks, ND 58202, United States gseielst@aero.und.edu)

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

Publication Date: 12/2007

Origin: AGU

Keywords: 0402 Agricultural systems, 0480 Remote sensing

Bibliographic Code: 2007AGUFM.B11F..05R

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.
