Remote Sensing of Barley Yellow Dwarf Virus and Wheat Streak Mosaic in Field-Grown Winter Wheat. (C03-riedell154012-Poster)

Authors:

- W.E.Riedell - *USDA-ARS, Brookings, SD*
- M.A.C.Langham - *South Dakota State Univ., Brookings, SD*
- S.L.Osborne - *USDA-ARS, Brookings, SD*
- L.S.Hesler - *USDA-ARS, Brookings, SD*

Abstract:

We characterized canopy spectral reflectance as well as other canopy and yield characteristics of winter wheat infected with BYD or WSM virus. A 2 year field experiment was conducted at Brookings SD. Winter wheat plants in the second leaf stage were infected with BYD or WSM. Leaf area index, canopy temperature, and canopy reflectance sensitivity (350 to 1100 nm) were measured at the flag leaf. Reflectance sensitivity analysis for BYD infected treatments revealed dramatically different responses, likely due to spring soil moisture, across the two years of the experiment. Leaf area index and yield were about 25 % lower than control in 1999. Sensitivity analysis results, leaf area index, and canopy temperature were very similar to control in 2000. Yield was reduced by about 15 % by BYD in 2000. WSM-damaged winter wheat crop canopies had very similar responses over both years of the experiment. Canopy temperature, however, was about 10 % higher than control in 2000. Yield loss to WSM was about 50 % in 1999 and 70 % in 2000. We conclude that BYD and WSM viral diseases cause changes in spectral reflectance in wheat canopies, but that viral disease stress-causing agents do not cause spectrally unique canopy reflective responses.

Corresponding Author Information:

Walter Riedell
USDA-ARS, Brookings, SD
2923 Medary Ave
Brookings, SD 57006-4267

phone: 6056935207
fax: 6056935240
e-mail: wriedell@ngirl.ars.usda.gov

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