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(1 Page Limit)

*Fusarium graminearum* Schwabe (teleomorph *Gibberella zeae* (Schwein.), the pathogen known to cause Fusarium head blight (FHB) or scab, is an increasingly important problem for wheat production in the North-Central United States. With the shift to reduced tillage and increases in corn acreage in response to the demand for ethanol, it is going to continue to be a problem into the future. Host plant resistance provides the most economical solution to this problem and the identification of different sources of resistance and their incorporation into adapted wheat varieties has been critical to the release of FHB resistant winter wheats in Missouri and beyond. Since we introduced FHB resistance as a major objective in our breeding program in 1993, we have released 3 FHB resistant cultivars. Two of those, Truman and Bess, were developed with funding from the US Wheat and Barley Scab Initiative (USWBSI). These lines have broad-based resistance including types I and II resistance, low DON and good kernel retention under conditions of significant disease pressure. We propose in this project to continue our efforts to release cultivars with broad-based resistance to FHB through the following objectives: (1) the continued identification and verification of useful sources of FHB resistance or elimination of susceptible varieties through routine greenhouse and field screening of all advanced breeding lines in the Missouri wheat breeding program; (2) the verification of potentially useful sources of FHB resistance through evaluation of both the Preliminary and Advanced Northern Uniform Winter Wheat Scab Nurseries and the Southern Uniform Winter Wheat Scab Nurseries (3) the incorporation of new sources of resistance, as they are verified, into elite Missouri soft red winter wheat breeding lines through conventional breeding procedures; (4) preliminary genetic characterization through haplotyping of Missouri resistant breeding germplasm; (5) evaluate lines with diverse sources of resistance derived in 2006 from mass selection populations; (6) convey information on scab resistance of commercially available wheat cultivars through evaluation of the 2008 Missouri Winter Wheat Performance Tests. The identification of native sources of resistance within the Missouri program has enabled us to have a productive pipeline of FHB resistant germplasm in adapted backgrounds which will continue to accelerate the release of FHB resistant varieties well into the future. Currently 80% of our early generation populations (F1 through F4) have at least one FHB resistant parent while 60% carry FHB alleles from two or more parents. These populations combine our native sources with other well known sources including derivatives of Sumai 3 or Ning 7840, Fundulea 201R, Crena, Roane, AgriPro Patton, Goldfield, Seu Seun 6, Mentana derived sources, Chinese landraces, and lines carrying multiple resistances acquired from A. Mésterhazy following a visit to the US. Our objective of combining these sources or resistance should be facilitated with genetic characterization of the FHB sources in our program and we expect to acquire that knowledge, preliminarily through haplotyping followed by more thorough characterization of potentially unique sources.