

**0203-MC-108 Accelerating the Development of Scab Resistant Soft Red Winter Wheat.**

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PROJECT ABSTRACT

(1 Page Limit)

*Fusarium graminearum* Schwabe (teleomorph *Gibberella zeae* (Schwein.)), (scab) is an increasingly important problem in the north-central region of the United States. Yield losses in Missouri alone have exceeded \$300 million dollars since 1990. Host resistance is considered the most practical and effective means of control but breeding has been hindered by a lack of effective resistance genes and by the complexity of the resistance in identified sources. The identification of different sources of resistance and their incorporation into adapted wheat varieties is critical to the continued improvement of *Fusarium* head blight resistance in winter wheat and is a major objective of the US Wheat and Barley Scab Initiative (USWBSI). The University of Missouri's wheat breeding program has had scab resistance as a focus since 1993. The resistant cultivar 'Ernie' was released from our program in 1995 and serves as the early maturity resistant check cultivar in both the Northern and Southern Winter Wheat Scab Nurseries. In 2001, 68 lines from 49 pedigrees were identified that contained moderate to good levels of types I and II resistance to scab. Of these, 37 differed from Ernie by descent. Thirty-two lines had type II resistance that was equal or better than that of Ernie while 38 had lower field incidence than Ernie. MO 980525 has been extensively tested for scab resistance, both at Missouri and in the Winter Wheat Scab Nursery. It differs from Ernie by descent and has better type II resistance, incidence and toxin levels in the grain than Ernie. It is anticipated that this line, which also yields well through the northern Corn Belt will be released in 2002 and should provide economic relief to wheat growers in those regions where scab is a major problem. This project has 4 primary objectives including: (1) continued evaluation of all advanced breeding lines to facilitate the identification of incidental sources of resistance in adapted backgrounds; (2) to share newly identified Missouri sources of scab resistance through participation in both the northern and southern winter wheat scab nurseries; (3) to pyramid resistance genes, identified both through the Missouri breeding program and through the Missouri germplasm evaluation efforts, into adapted backgrounds through cross composite development; (4) to characterize the genetics of scab resistance in MO 980525. For objectives 1 and 2, germplasm will be screened in both greenhouse and field environments to provide estimates of type II resistance, kernel quality, incidence, severity and the field index (incidence\*severity). Agronomic data will also be collected under field conditions on traits of value to Midwest soft red winter wheat breeding programs. Conventional genetic characterization of the resistance in MO 980525 will be accomplished through six-generation means analyses and should both complement molecular work for which population development was initiated in 2001 and facilitate the effective exploitation of this source of resistance in breeding programs.