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Project Title: Accelerating the Development of Scab Resistant Soft Red Winter Wheat.

PROJECT 1 ABSTRACT

(1 Page Limit)

The identification of native sources of resistance within the Missouri wheat breeding program has enabled us to have a productive pipeline of FHB resistant germplasm in adapted backgrounds that will continue to accelerate the release of FHB resistant varieties. We have built heavily on the Truman family base because of the extremely good resistance in that family and the broad adaptation of the lines in general, focusing on combining that source with other presumed genetically different resistances as well as early maturity, shorter stature, better milling and baking quality and better resistance to diseases such as barley yellow dwarf virus and leaf rust. Susceptible by susceptible crosses, however, still are yielding highly resistant offspring as evidenced by the pedigree L910097/MO 92-599. Several lines from this pedigree have been entered into the Northern Scab Nursery and have consistently been among the most resistant lines in the nursery. MO 080104 was entered into the Eastern Nursery in 2010 and finished second for grain yield, 3rd for test weight and 1st for FHB resistance. It now serves as a check variety in the Uniform Eastern Soft Red Winter Wheat Nursery. The family of lines carries Ppd-D1a for photoperiod insensitivity and so is very broadly adapted across the northern and southern soft red winter wheat region. Beyond its broad-based FHB resistance that is comparable to Truman, MO 080104 has the maturity of Bess, is short (although it doesn't carry markers for Rht 1, 2 or 8), has stripe rust resistance, resistance to soilborne viruses, and tolerance to acid soils. The source of the resistance based on pedigree analysis, differs from other known sources and preliminary marker data indicates that it is not derived from FHB1, or regions on 2D or 5A. In an effort to market this line widely, it was licensed in 2012 rather than being released through the public release system in Missouri. Where adopted, MO 080104 will lessen the threat of FHB while providing exceptional yield and test weight potential throughout the soft wheat region. Our objectives for 2011 are to: (1) continue our history of designing crosses that include FHB-resistant parents with native and/or exotic sources of resistance; (2) systematically screen all lines developed at the University of Missouri from preliminary yield testing for FHB resistance; (3) enter lines that combine FHB resistance with excellent agronomic performance into the Northern and Preliminary Scab Nurseries and other relevant breeding nurseries; (4) collaborate with Dr. Paul Murphy to validate Truman markers in the doubled haploid population Bess/Neuse where Bess is a full sib of Truman, (5) initiate phenotyping a set of recombinant inbred lines developed from the cross Bess/MO 94-317 for validation of Truman markers; and (6) develop a set of doubled haploid lines from the cross MO 080104/MO94-317 that will be used to map FHB resistance in MO 080104. Germplasm will be shared with any interested breeders within the initiative and will be available for research purposes under the conditions of the Wheat Breeders' Code of Ethics and the Plant Variety Protection Act