PI: Herbert Ohm **PI's E-mail: hohm@purdue.edu**

Project ID: FY12-NW-009 **ARS Agreement #: 59-0206-9-081**

Research Category: **VDHR-NWW** **Duration of Award: 1 Year**

Project Title: Male Sterile Facilitated Recurrent Selection for FHB Resistance (MPI-5).

PROJECT 2 ABSTRACT

(1 Page Limit)

Recurrent selection is a breeding procedure with the objective of increasing the frequency of desirable alleles for one or more traits while maintaining a high level of variability in the population. Intermating among the selected parents each generation allows recombination to occur thus combining genes from different sources. The objective of this project is to advance male-sterile facilitated recurrent selection populations that have been developed to combine genes for FHB resistance from multiple sources in soft winter wheat backgrounds adapted to the eastern U.S. The goal is for this project to further develop several pools of adapted breeding lines with genes for FHB resistance derived from multiples sources. This project is a continuation of the project that was begun in 2009 to generate FHB male sterile facilitated recurrent selection populations with FHB resistance in the eastern soft wheat region. The populations use a dominant male sterile gene. Preliminary work on development of male-sterile populations was conducted at Wooster, Ohio by Ed Souza, Mary Guttieri and Clay Sneller. They grew these populations each year from 2006 - 2010 using various soft red winter and soft white winter wheat breeding lines, germplasm and varieties as pollinators. Some of these lines and varieties were included as sources of FHB resistance and others were included as sources of adaptation and genes for high yield potential. Different generations of the male-sterile populations were grown in the field at Wooster, Ohio in 2009. In the 2011-2012 season the MSFRS populations were space-planted at six locations (one location is grown by each cooperator in Illinois, Indiana, Kentucky, Missouri, New York and Ohio) usually in an inoculated, and mist-irrigated FHB field evaluation nursery. Locally selected lines with FHB resistance were planted adjacent to the MSFRS population to serve as pollinators. In summer 2012, sterile heads were identified at each location. Sterile heads that were very susceptible to *Fusarium graminearum* were removed. Sterile heads remaining were harvested and threshed, and *Fusarium* damaged kernels were removed by aspiration. Each breeding program will plant the MSFRS population again the fall of 2012 to initiate the next cycle of selection and crossing. As a result of this project breeding programs in the eastern regions have several pools of germplasm from which to extract breeding lines. The breeding lines extracted from these populations potentially have unique combinations of FHB resistance genes. Because of the male-sterility in these populations individual breeders should be able to use these populations to develop new combinations of FHB resistance genes and continue to select lines from these populations