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**Project ID: FY16-NW-007**

**ARS Agreement #: 59-0206-4-025**

**Research Category: VDHR-NWW**

**Duration of Award: 1 Year**

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

### **PROJECT 1 ABSTRACT**

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Significant yield losses caused by *Fusarium graminearum* Schwabe, the pathogen known to cause Fusarium head blight (FHB) in wheat (*Triticum aestivum* L), continue to cause crop losses in Missouri. In 2015, excessive rainfall during the Missouri crop season caused high levels of FHB and high DON levels (exceeding 28ppm in susceptible varieties) rendering the grain unmarketable. Many 'native' sources of resistance have been identified in the Missouri program and in 2015 a milestone was reached when MO 080104 (which carries native resistance comparable to that in Truman) in a high yield and test weight background won the northern and south-western regions of the official Missouri variety trial. We have combined the FHB resistance in MO 080104 with our other native sources of resistance to develop good levels of resistance in our breeding pipeline. We have further combined these native resistances with sources from CIMMYT, Brazil, Japan, China and Europe. In FY16 and FY17, breeding lines that combine native and exotic resistances in desirable agronomic backgrounds will continue to be evaluated and will be included in the Northern and Preliminary Northern Scab Nurseries. Some of these lines have been included in the 2016 5-State Nurseries. Our overarching goals continue to be the improvement of FHB resistance, particularly DON levels, in high yield and test weight agronomic backgrounds that are earlier and shorter than Truman with the hope that they will meet all criteria necessary for grower selection. Breeding is necessarily long term and objectives typically are not 2-year objectives. Within the FY16-17 timeframe we will continue to: 1) design crosses that combine native and/or exotic sources of resistance; 2) screen breeding lines for all 4 types of FHB resistance in the year following preliminary yield testing and verify resistance in retained lines in greenhouse and field inoculated, FHB nurseries; 3) screen 300 F7 RILs of a mapping population developed from the cross Bess/MO 94-317 in both the greenhouse and field FHB Nurseries, ultimately to validate Truman FHB markers; and 4) where seed and/or funds permit, increase seed of a mapping population of MO 080104/MO 94-317 and begin to phenotype that population. This project should continue to produce high yielding, FHB resistant lines that will lessen the risk to the wheat economy of the soft red winter wheat region, and provide additional or validated markers to enhance the efficiency with which these sources of resistance can be moved into other wheat varieties.