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**Project ID: FY12-NW-002**

**ARS Agreement #: 59-0206-9-077**

**Research Category: VDHR-NWW**

**Duration of Award: 1 Year**

**Project Title: Coordinated Evaluation and Utilization of Marker Assisted Selection.**

#### **PROJECT 4 ABSTRACT**

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The objectives of this project are to 1) evaluate the effectiveness of use of FHB-resistance QTL in the NWW breeding programs through marker assisted selection (MAS); 2) quantify the effects of these QTL in reducing FHB and DON; and 3) measure their impact on other key traits such as yield and milling and baking quality. Approximately 700-1000 partially inbred lines (RIL) from crosses with an array of parents homozygous for the resistance alleles at *Fhb1* and other QTL have been planted in breeding nurseries in KY, MO, IN, IL, MI, OH and NY. These lines were genotyped at *Fhb1* and other resistance QTL during the spring and summer of 2010 at the USDA-ARS *Eastern Regional Small Grains* Genotyping Lab, Raleigh, NC. Based on genotypic and phenotypic data, a number of pairs of sister lines, homozygous for resistance and susceptibility alleles at each QTL were identified in each breeding program. Seventy lines (5 pairs of lines homozygous positive and homozygous null at the resistance QTL of interest x 7 breeding programs) were planted in agronomic tests in KY and MI and in scab nurseries in MO, IL, IN, and OH in the fall 2011. These lines will be phenotyped in the spring and summer 2012 (scab, agronomic and milling quality phenotype). Outputs will include information on the effect of genetic background on QTL expression, sharing of lines to use as parents, and possible identification of lines worthy of joint germplasm and/or cultivar release.