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**FY09 ARS Agreement #: 59-0206-9-074**

**Research Category: FSTU-S**

**Duration of Award: 1 Year**

**Project Title: Diagnostic Services for DON.**

### **PROJECT 1 ABSTRACT**

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The goal of this project is to provide rapid, cost-effective and accurate mycotoxin analysis - especially deoxynivalenol (DON) - for Fusarium Head Blight (FHB or scab) research projects. The analytical data provided by the services is essential to breeding (traditional and molecular) projects aimed at the development of wheat and barley varieties with improved resistance to the disease. The services have been used for epidemiology, genetics and molecular studies of the host, pathogen, and host-pathogen interaction aimed at improving our understanding of the biology of the disease as well as the development of disease control practices. A total of 28,779 samples was analyzed for DON and other mycotoxins such as 3-acetyl-DON (3-ADON), 15-acetyl-DON (15-ADON), nivalenol (NIV) and zearalenone (ZEA) by the project in the 2008/2009-crop year (from May 2008 to April 2009), which was about the same number of samples analyzed last year (29,217), but was 18.7% (6607) less than the estimate (35,386) presented in the proposal due to sample re-allocation by USWBSI and sample adjustments by PIs. The samples were submitted by 36 scab research groups from 16 states, including Arkansas, Georgia, Idaho, Illinois, Indiana, Kansas, Kentucky, Maryland, Michigan, Minnesota, Missouri, New York, North Carolina, North Dakota, Ohio, and South Dakota. They included 18,718 regular mature grain samples (6-100 g) and 10,061 small size samples such as grain samples less than 6 g, single kernels, single spikeletes, single heads, small stems, and fungal cultures extracts. Ergosterol, a chemical marker for measuring fungal biomass, was also analyzed for some samples as requested by researchers. A survey indicates that 32,231 and 32,081 samples will be submitted to our laboratory for DON analysis in the 2009/2010 and 2010/2011, respectively.

The project will use gas chromatography-mass spectrometry (GC-MS) to provide quick and accurate measurement of DON and related mycotoxins in harvested grains as well as individual kernels, spikelets, heads, small leaf and stem fragments at different disease development stages. The single kernel analysis has been used to determine toxin development in the early stages of infection, and study resistance mechanisms in barley.