PI: Yanhong Dong

PI's E-mail: dongx001@umn.edu

Project ID: FY14-DO-003

ARS Agreement #: New Agreement (Expiring Agreement # 59-0206-9-074)

Research Category: **FSTU**

Duration of Award: 1 Year

Project Title: Diagnostic services for DON.

PROJECT 1 ABSTRACT

(1 Page Limit)

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 DON data provided by the services is essential to breeding (traditional and molecular) projects aiming 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 aiming at improving our understanding of the biology of the disease as well as developing effective disease control practices. The services have also been used to assist the developments of other rapid DON screening methods such as IR and Raman. A total of 28,205 samples were analyzed for DON and other mycotoxins such as 3-acetyl-DON (3-ADON), 15-acetyl-DON (15-ADON) and nivalenol (NIV) by the project in 2012/2013, which was slightly less than the number of samples analyzed last crop year (29,440). However, it was about 14.5% less than the estimated number (32,978) based on the survey. This might be due to low scab severity in 2012 as we observed that some groups only submitted small amount of pilot samples for DON analysis while others didn't submit any samples. For this year, the samples were submitted by 28 FHB research groups from 17 states, including Arkansas, Georgia, Idaho, Illinois, Indiana, Kansas, Kentucky, Maryland, Michigan, Minnesota, Missouri, New York, North Carolina, North Dakota, Ohio, South Dakota, and Wisconsin. A survey indicates that 32,491 samples will be submitted to our laboratory for DON analysis for both 2014/15 and 2015/16.

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.