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Research Category: FSTU

Duration of Award: 1 Year

Project Title: Diagnostic Services for Vomitoxin (DON) in Wheat.

PROJECT 1 ABSTRACT

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Fusarium Head Blight (FHB) or 'scab' in cereal crops reduces yield and grain quality world-wide. The predominant fungus involved in scab is *Fusarium*, which can be stressed to produce various secondary fungal toxins or mycotoxins that can be toxic to both plants and animals. The presence of *Fusarium sp.*, in particular *Fusarium graminearum*, can result in unacceptable grains for processing into edible foods or animal feeds. Numerous countries have issued guidelines for tolerances of deoxynivalenol in grains for human and animal consumption. The U.S. Wheat and Barley Scab Initiative focuses on the development of plant genetics and management systems to reduce the incidence of scab. In a program of this type, there is a need for mycotoxin analyses on new varieties and processed food.

Project objectives and Expected Outcomes are:

- 1) The Department of Veterinary Diagnostic Services at North Dakota State University will provide vomitoxin (deoxynivalenol or DON) analyses on approximately 11,000 wheat samples/year for about 20 scientists from central USA. The gas chromatography/electron capture detector (GC/ECD) method used for vomitoxin analysis was developed at the Department of Veterinary Diagnostic Services and is quite selective. Samples are analyzed for vomitoxin, 15-acetyldeoxynivalenol (15-ADON), nivalenol and, by special request 3-acetyldeoxynivalenol (3-ADON). Cross-checks by gas chromatography/mass spectrometry (GC/MS) have shown a low incidence of false-positive results.
- 2) Veterinary Diagnostic Services has a GC/MS system for the trimethylsilyl derivatives of about 17 trichothecenes that are produced by *Fusarium sp.* This multi-mycotoxin screen, developed in the Veterinary Diagnostic lab and in place for over seven years, is available to screen for additional *Fusarium* mycotoxins that occur in cereals. Typically, the analytical lab tests ~100 grain samples per year for multiple mycotoxins.

Plans to Accomplish Objectives: The lab has the analytical equipment and trained personnel to test wheat samples through the year, with a majority of samples analyzed from late June through April. May to July is typically devoted to equipment maintenance and sample column preparations.

Relevance: The project is basic, providing the analytical support of vomitoxin or DON concentrations in wheat varieties for USWBSI plant breeders evaluating mitigation of FHB or scab.