

PI: Mostrom, Michelle

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Research Area: FSTU

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

PI's E-mail: Michelle.Mostrom@ndsu.nodak.edu

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PROJECT 1 ABSTRACT

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Fusarium Head Blight, commonly referred to as 'scab', is a fungal disease that can reduce yield and quality of cereal crops on farms in at least 18 states. Fungal toxins, mycotoxins, may be produced by scab and result in a cereal, such as wheat or barley, which is unacceptable for processing into flour or brewery products. The US Wheat and Barley Scab Initiative has put together a strong program to develop breeding and management systems to reduce the incidence of scab. In any program of this type, there is a need for mycotoxin analyses on new varieties and processed food.

This project, to be conducted in the Department of Veterinary Diagnostic Services at North Dakota State University, will provide vomitoxin (deoxynivalenol or DON) analyses on approximately 3500 wheat samples for about 10 scientists from North Dakota, Minnesota, Iowa, and South Dakota. 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. Cross-checks by gas chromatography/mass spectrometry (GC/MS) have shown a low incidence of false-positive results. As a secondary system, Veterinary Diagnostic Services has a GC/MS system for the trimethylsilyl derivatives of about 20 trichothecenes that are produced by *Fusarium* sp. This multi-mycotoxin screen is needed to guard against other mycotoxins, besides vomitoxin, being in the final varieties of wheat and barley. The laboratory is one of a few select labs in the USA that can provide this service promptly and at a reasonable price.

At the start of each vomitoxin campaign (about August 1), the lab employs an additional full-time chemist to help conduct large numbers of vomitoxin assays. The primary technician in charge of the vomitoxin campaign is a full-time chemist who has year-round experience with vomitoxin and the multi-mycotoxin systems. The laboratory has 1 GC/ECD system and 2 GC/MS systems that can be used to achieve the goals of this project. The project is relatively basic, but necessary, so that the wheat breeders can reach their final objective.