

**U.S. Wheat and Barley Scab Initiative  
Annual Progress Report  
September 15, 1999**

**Cover Page**

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<b>Grant Number:</b>	<b>59-0790-9-041</b>
<b>Grant Title:</b>	<b>Fusarium Head Blight Research</b>
<b>Amount Granted:</b>	<b>\$102,439.00</b>

**Project**

<b>Program Area</b>	<b>Objective</b>	<b>Requested Amount</b>
Chemical & Biological Control	Identify safe, effective fungicides for FHB through evaluation across of wheat and/or barley varieties grown in relevant environments.	\$4,000
Food Safety, Toxicology, Utilization	To develop and improvement of diagnostic tests for vomitoxin.	\$20,000
Chemical & Biological Control	Develop and implement systems for disseminating research information in a timely fashion to producers.	\$1,000
Food Safety, Toxicology, Utilization	To develop sampling and testing protocols to provide reliable estimates of vomitoxin in grain at delivery points in the food processing chain.	\$35,000
Food Safety, Toxicology, Utilization	Develop diagnostic services for DON.	\$45,000
	<b>Requested Total</b>	<b>\$105,000<sup>1</sup></b>

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Principle Investigator

\_\_\_\_\_  
Date

<sup>1</sup> Note: The Requested Total and the Amount Granted are not equal.

**Project 1: Identify safe, effective fungicides for FHB through evaluation across of wheat and/or barley varieties grown in relevant environments.**

2. What major problem or issue is being resolved and how are you resolving it?

The toxin deoxynivalenol is associated with FHB in wheat and barley. Reducing the incidence and severity of FHB should result in a corresponding reduction in deoxynivalenol in infected grain. Uniform fungicide treatment trials will allow evaluation of a set of products and rates for consistency in performance over a wide range of environments. Some treatments will be with products currently registered, others will be with experimentals for future use on wheat and barley.

2. Please provide a comparison of the actual accomplishments with the objectives established.  
Michigan participated in the uniform fungicide trial on winter wheat. Fungicide products and rates of products were evaluated for reducing FHB and deoxynivalenol in replicated treatments. Application timing was also evaluated.

3. What were the reasons established objectives were not met? If applicable.

4. What were the most significant accomplishments this past year?

Varieties may differ in their response to FHB after fungicide treatment. Application timing appeared to be important with greater reductions in FHB and deoxynivalenol when fungicides were applied at GS 10.5 compared to GS 10.1.

**Project 2: To develop and improvement of diagnostic tests for vomitoxin.**

1. What major problem or issue is being resolved and how are you resolving it?

The ability to divert grain to different end uses based on contamination with deoxynivalenol is a critical food safety issue, and also an economic issue for commerce. The development of chemicals that mimic binding properties of toxins, but which are not toxic, and which have a higher affinity for target ligands, may allow for the development of safer tests, and tests with a broader range of sensitivity. Development of new antibody specific for deoxynivalenol may also improve diagnostic capabilities.

2. Please provide a comparison of the actual accomplishments with the objectives established.

A seven amino acid peptide was identified that mimics deoxynivalenol. The peptide had about ten times greater affinity than deoxynivalenol for deosynivalenol specific antibody. A construct expressing soluble protein in *E. coli* was developed linking the peptide to alkaline phosphatase, a marker enzyme used in diagnostics.

3. What were the reasons established objectives were not met? If applicable.
4. What were the most significant accomplishments this past year?

The peptide had properties that suggest it may competitively inhibit the toxic activity of deoxynivalenol. Expressed in plants, the peptide could improve a plants resistance to scab infection since deoxynivalenol has been shown to be a virulence factor in wheat.

**Project 3: Develop and implement systems for disseminating research information in a timely fashion to producers.**

1. What major problem or issue is being resolved and how are you resolving it?

Information gained from fungicide efficacy trials must be disseminated for implementation. Dissemination will be via local field demonstrations, meetings, printed fact sheets, DTN, and web sites.

2. Please provide a comparison of the actual accomplishments with the objectives established.

Data from individual state trials is being collected and will be evaluated on a regional basis prior to dissemination.

3. What were the reasons established objectives were not met? If applicable.

4. What were the most significant accomplishments this past year?

**Project 4: To develop sampling and testing protocols to provide reliable estimates of vomitoxin in grain at delivery points in the food processing chain.**

1. What major problem or issue is being resolved and how are you resolving it?

Reliable estimates of deoxynivalenol in grain are needed at various points in the distribution chain. Truckloads of freshly harvested grain will be probe sampled systematically and then analyzed for deoxynivalenol. Various statistical evaluations will be made to determine if a simplified sampling pattern can be developed for assessing average deoxynivalenol concentrations in a truckload of grain.

2. Please provide a comparison of the actual accomplishments with the objectives established.

Data from Michigan is currently being analyzed statistically. Probe samples from the Midwest have been collected but not yet analyzed for deoxynivalenol.

3. What were the reasons established objectives were not met? If applicable.

4. What were the most significant accomplishments this past year?

**Project 5: Develop diagnostic services for DON.**

1. What major problem or issue is being resolved and how are you resolving it?

The goal of the National wheat and barley scab initiative is to insure that a major food source for the consumer is safe from contamination by naturally occurring trichothecenes, the predominant one being deoxynivalenol. Research projects have not included toxin analysis in their projects because of the cost of analysis. This project was developed to provide DON diagnostic services on a regional basis for researchers involved with scab research, regardless of their affiliation with the scab initiative.

2. Please provide a comparison of the actual accomplishments with the objectives established.

To date in 1999, over 1400 samples submitted to the Michigan diagnostic laboratory by scab researchers in the winter wheat growing area of the U.S. have been tested. A check program was established for all laboratories associated with the scab initiative and currently testing grains for deoxynivalenol. The set of check samples has been tested.

3. What were the reasons established objectives were not met? If applicable.
4. What were the most significant accomplishments this past year?

Protocols were developed to analyze large numbers of samples. The affect of sub sampling large samples (ie. Greater than 500 grams) on variability was determined..

Year: 1999

Progress Report

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Grant: 59-0790-9-041

Include below a list of the publications, presentations, peer reviewed articles, and non-peer reviewed articles written about your work that resulted from all of the projects included in the grant. Please reference each item using an accepted journal format. If you need more space, continue the list on the next page.

NONE.