

**U.S. Wheat and Barley Scab Initiative
Annual Progress Report
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Cover Page

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Year:	FY2000
Grant Number:	59-0790-9-041
Grant Title:	Fusarium Head Blight Research
Amount Granted:	\$105,814.00

Project

Program Area	Objective	Requested Amount
Chemical & Biological Control	Identify safe, effective fungicides for FHB through evaluation across of wheat and/or barley varieties grown in relevant environments.	\$5,814.00
Food Safety, Toxicology, Utilization	Development of sampling and testing protocols to provide reliable estimates of vomitoxin in grain at delivery points in the food processing chain.	\$126,173.00
Food Safety, Toxicology, Utilization	Develop and implement systems for disseminating research information in a timely fashion to producers	
	Requested Total	\$131,987.00¹

Principal Investigator

Date

¹ 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.

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

FHB occurs when the plant pathogen *F. graminearum* invades the wheat head through the plants flowers. Protecting the flowers during the critical infection periods can reduce the incidence and severity of FHB. The goal of this program area is to evaluate fungicides for their effect on incidence and severity of FHB. Interactions between wheat variety FHB reaction and fungicides is a component of the program.

Several fungicides were evaluated for efficacy on three varieties of wheat with different FHB reactions, susceptible, moderately susceptible and moderately resistant. Application timing coincided with early flowering, and varied with variety. To enhance FHB potential the Michigan plots were irrigated.

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

The objective was to differentiate several fungicides effects on reducing the incidence and the severity of FHB. In the Michigan 2000 plots no differences were observed between the untreated controls, and the fungicide treated plots.

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

FHB did not develop at sufficient levels in the plots. Excessive rain and irrigation may have resulted in rapid development of inoculum prior to anthesis.

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

FHB development was poor suggesting that irrigation during excessive rain events should be monitored and adjusted.

Project 2: Development of sampling and testing protocols to provide reliable estimates of vomitoxin in grain at delivery points in the food processing chain. Also, establish a regional diagnostic laboratory to provide vomitoxin diagnostic services for FHB research projects.

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

Vomitoxin contaminated grain used in processing foods for human consumption must stay below established FDA guidelines of 1 ppm in the finished product. Therefore, testing raw grain for vomitoxin contamination is required to insure that contaminated grain is directed toward non-human uses. Sampling is a critical issue because improper sampling may over or under estimated levels of vomitoxin in grain trucks. This project evaluates specific sampling protocols using probe sampling techniques to provide statistically reliable sampling guidelines for buyers and users of wheat and barley grains.

The regional vomitoxin diagnostic laboratory provides individual researchers the opportunity to have grain from their research tested for vomitoxin. By having a single analytical laboratory testing the grain, vomitoxin levels in grain from research in different states can be compared without concern for inter laboratory variability. Vomitoxin testing allows researchers to evaluate their research treatments to compare effects on FHB severity and incidence with levels of vomitoxin. The FHB initiative goal of eliminating vomitoxin as a human food safety issue is addressed directly through vomitoxin testing. The laboratories in the FHB initiative that provide vomitoxin testing also provide a service by comparing the different tests used for vomitoxin analysis. Comparing assays for precision and accuracy allows potential users of these assays to evaluate which ones best meet the their requirements.

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

Probe sampling was used to evaluate and validate a previously developed protocol for collecting grain from trucks. Probe samples were collected from 10-15 trucks during the year 2000 FHB epidemic in Michigan. Grain from individual probes is being analyzed at the regional vomitoxin diagnostic laboratory. Results are not yet available. A preliminary study was initiated to study the variability of vomitoxin across grain fields, and to determine if statistically significant sampling protocols could be developed. A sampling pattern was developed to examine field variability/heterogeneity. This would allow decisions on harvesting and marketing to be made prior to harvest, and also processors to identify areas with potentially high levels of FHB and vomitoxin. Grain from individual groups of plants that were collected at points in the sampling grid is being analyzed at the regional vomitoxin diagnostic laboratory. Results are not yet available.

Approximately 3,000 samples have been submitted to the Michigan State University Vomitoxin Diagnostic Laboratory. About one-half of the samples have been tested for vomitoxin and the results returned to investigators. It is expected the remaining 1,500 samples will be finished in the next two-three weeks.

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

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The objectives are being met.

4. What were the most significant accomplishments this past year?
It's not possible to address this until the vomitoxin analyses are completed in the next two-three weeks.

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?

The issue is developing and implementing systems for disseminating research information in a timely fashion to producers. This has been addressed through various extension related activities. First, a bulletin and web page was developed describing the recommendations from the initial research on sampling grain to test for vomitoxin levels. Second, the Michigan State University IPM program publishes a weekly report during the spring and summer (Crop Advisory Team or CAT) for producers. Information on fungicide recommendations, and FHB potential were published. In addition, a web page was developed that reported the daily rainfall patterns and average flowering times throughout Michigan in the early summer of 2000, and predicted the potential for the development of FHB (<http://www.agweather.geo.msu.edu/Wheat/>). This was followed up with surveys to determine the incidence and severity of FHB in fields throughout Michigan, and closer to harvest with surveys to collect and analyze grain from individual fields. The information on incidence and severity was also published on the web. Third, at growers meeting throughout the state, relevant information is presented on the FHB and vomitoxin issues. For 2000-2001 a series of six IPM regional meetings are planned for Michigan. In addition, three meeting are scheduled to provide information to Michigans agribusiness dealers, and extension agents.

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

We've met our objectives and will continue to provide information to producers as described above.

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

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

Using web pages to alert producers to the FHB potential in Michigan in 2000. This approach will be refined for upcoming years and possibly developed on a regional basis

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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.

Hart, L. P., H. Casper, O. Schabenberger, and P. Ng. 1998. Comparison of Gas Chromatography and Enzyme Linked Immunosorbent Assay for Deoxynivalenol in Milled Fractions of Naturally Contaminated Wheat. *J. Food Protec.* 61:1695-1697.

Hart, L. P. and O. Schabenberger. 1998. Variability of vomitoxin in truckloads of wheat in a wheat scab epidemic year. *Plant Disease* 82: 625 - 630.

Hart, P., and R. Ward. 2000. Management of foliar diseases of wheat. CIPS special bulletin #1.

Hart, P. 1998. Management of foliar wheat diseases. Wheat 2000 notebook chapter.

Hart, P., and O. Schabenberger. 1997. How to sample wheat to accurately determine vomitoxin levels. MSU extension bulletin E-2630.