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

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Year:	**FY2000**
Grant Number:	**59-0790-9-051**
Grant Title:	**Fusarium Head Blight Research**
Amount Granted:	**$71,000.00**

Project

Program Area	Objective	Requested Amount
Epidemiology	To develop a scab forecast system by monitoring the environment and pathogens.	$66,173.00
Epidemiology	Identify safe products that are effective against Fusarium head blight.	$5,000.00
	Requested Total	$71,173.00[1]

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Principal Investigator Date

[1] Note: The Requested Total and the Amount Granted are not equal.

Project 1: To develop a scab forecast system by monitoring the environment and pathogens.

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

   The effect of environmental conditions on the development and severity of a Fusarium Head Blight (FHB) epidemic are not sufficiently defined to enable either a reliable prognosis of disease or recommendations of management activities (timely application of a fungicide or biological control agent). Research monitoring inoculum levels, weather conditions and disease incidence and severity in replicated field plots at two Ohio locations will provide valuable information about disease epidemiology and can be incorporated into a disease forecasting system. In addition to the research plots located near Wooster and Hoytville, Ohio, replicated plots with artificially manipulated moisture and inoculum levels were evaluated during the past year at the Wooster location. All research was done in cooperation with researchers in North Dakota, Indiana, and South Dakota in order to assess the affect of regional variation in cropping practices, tillage and climate on inoculum levels and subsequent disease in other wheat producing regions of the United States.

   A second approach to disease prediction was developed at The Ohio State University during the past year. Historical information about FHB epidemics from three Ohio locations was used to develop a risk assessment model for FHB. Preliminary risk assessment models are able to predict FHB epidemics in Ohio with 86% accuracy. Information from other wheat production regions is currently being incorporated into the models, and we plan to continue validation of the model.

   Replicated growth chamber and field experiments were also initiated during the past year to evaluate the effects of temperature and crop residue moisture status on pathogen development. This research may offer new insights into inoculum levels and the occurrence of FHB epidemics.

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

   All objectives were accomplished or exceeded during the past year.

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

   Additional information is required to continue development and validation of potential forecasting systems for FHB epidemics in Ohio, and other wheat producing regions.

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

   Our most significant accomplishments this past year include: the successful collection of valuable epidemiological information from two Ohio locations, development of risk assessment models based on Ohio historical data, and the development of sensor technology will facilitate future epidemiological studies.

Project 2: Identify safe products that are effective against Fusarium head blight.

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

   Reliable management of FHB has not been possible with the fungicide products that are presently available to wheat producers. Various fungicidal and biological control compounds are being evaluated for effectiveness, and potential contributions to integrated FHB management in Ohio. This project is being conducted in cooperation with researchers in other wheat production regions.

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

   Five fungicides and two biological control agents were evaluated as directed by Dr. M. Mc Mullen of North Dakota State University and Dr. G. Bergstrom of Cornel University. Fungicides included: Folicur, Tilt, Stratego, Quadris, BASF500 00F. Products were evaluated at various rates, and treatments applied at growth stage 10.5.1 (Feekes). Although significant differences in yield were identified among treatments, only low levels of FHB developed in the plots, and yield differences could not be attributed to the successful FHB management. Differences in yield were attributed to management of Stagonospora glume blotch. Folicur, Stratego and BASF500 00F provided the greatest yield response.

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

   Research was carried out as planned, but environmental conditions did not favor development of FHB in Ohio during the past growing season.

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

   Appropriate experimental designs were developed for evaluation of fungicides based on application equipment available to the project. Twin-jet nozzles were successfully adapted to our equipment as requested by project coordinators.

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.

De Wolf, E. D., Lipps, P. E., Francl L. J. and Madden, L. V. 1999. Role of environment and inoculum level in wheat Fusarium head blight development. Pages 87-91 *in*: Proceedings of the 1999 National Fusarium Head Blight Forum, Sioux Falls, SD.

De Wolf, E. D. Madden, L. V. and Lipps, P. E. 2000. Risk assessment models for wheat Fusarium head blight. Phytopathology 90:s19.

Lipps, P. E., Madden, L. V., De Wolf, E. D. Boehm, M. J., Campbell, K. G. and Gupta, A. 1999. NCR-184 Management of Head Scab of Small Grains. 1999 Ohio Report. Pages 212-213 *in*: Proceedings of the 1999 National Fusarium Head Blight Forum, Sioux Falls, SD.

Lipps, P. E. 2000. Wheat growth stage update and disease predictions. Crop Observation and Recommendation Network (C.O.R.N.) 00-12. http://www.ag.ohio-state.edu/~corn/agcrops.html

Lipps, P. E. 2000. Will head scab be important this year? Crop Observation and Recommendation Network (C.O.R.N.) 00-13. http://www.ag.ohio-state.edu/~corn/agcrops.html

Lipps, P. E. 2000. Wheat scab predictions, cool weather is helping us. Crop Observation and Recommendation Network (C.O.R.N.) 00-14. http://www.ag.ohio-state.edu/~corn/agcrops.html

Lipps, P. E. 2000. Head scab at low levels, glume blotch increasing. Crop Observation and Recommendation Network (C.O.R.N.) 00-17. http://www.ag.ohio-state.edu/~corn/agcrops.html

Lipps, P. E. and De Wolf, E. D. 2000. Wheat diseases continue to develop. Crop Observation and Recommendation Network (C.O.R.N.) 00-16. http://www.ag.ohio-state.edu/~corn/agcrops.html