U.S. Wheat and Barley Scab Initiative
FY01 Final Performance Report (approx. May 01 – April 02)
July 15, 2002

Cover Page

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Year:	**FY2001 (approx. May 01 – April 02)**
Grant Number:	**59-0790-9-051**
Grant Title:	**Fusarium Head Blight Research**
FY01 ARS Award Amount:	**$ 61,328**

Project

Program Area	Project Title	Requested Amount
Epid/Dis. Mgt.	Disease Forecasting System for Fusarium Head Blight and Subsequent Fungicide Application	$ 62,000
	Total Amount Requested	**$ 62,000**

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Principal Investigator Date

(Form – FPR01)

Project 1: Disease Forecasting System for Fusarium Head Blight and Subsequent Fungicide Application

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

Wheat producers need a reliable Fusarium head blight (FHB) predictive system on which to base rescue management activities (fungicide or biological control applications) and to have sufficient time to implement harvest and marketing decisions with the prognosis of serious disease levels. We are monitoring inoculum levels, weather conditions and diseases levels in replicated field plots at two Ohio locations to provide needed epidemiological information to develop and validate FHB forecasting systems. This research is being conducted in cooperation with researchers in ND, SD, IN and PA in order to assess the affect of regional variations on inoculum and disease levels.

A disease risk forecasting system developed from historical weather and disease level information was used to predict the risk of FHB in Ohio during 2001. Environmental conditions were monitored using six weather stations and the data was used in three models to predict the disease risk at each location. Disease data taken at multiple locations in the state indicated reasonable correlations with predictions and final FHB levels. This forecasting system will be used in Ohio during 2002 at more locations to improve accuracy of predictions.

The influence of cultivar and planting date on FHB was examined using three cultivars and three planting dates at Wooster, OH. FHB severity varied among cultivars and planting dates where the highest level of disease occurred in the variety Elkhart for the last planting date (Oct 16). There were no differences in yield among the three cultivars across the three planting dates, but there were differences in DON level among cultivars (Elkhart > Hopewell > Patterson).

The spatial pattern of FHB was monitored over time across transects established in two fields near Wooster and two fields near Hoytville, OH. Mean disease incidence per field (p) ranged from 0.018 to 0.693 and p increased with time in each field. For each field the index of dispersion ranged from 0.88 to 4.5. Results indicated that diseased wheat heads were aggregated to highly aggregated within fields.

Fungicides (Folicur, AMS21619 and BAS 505) and biological control agents (TrigoCor 1448 and OH182.9) were tested in inoculated and mist irrigated Elkhart wheat. Only the fungicides AMS21619 and BAS 505 significantly reduced FHB severity and DON and improved yield.

2. What were the most significant accomplishments?

The most significant accomplishments were: the successful collection of environmental and FHB epidemiological data from two locations in the state, development and validation testing of FHB risk assessment models, deployment of FHB risk models for use by growers on the Ohio Field Crop Disease web site (http://www.oardc.ohio-state.edu/ohiofieldcropdisease), documentation of spatial and temporal distribution of FHB in four fields, determination of the effect of cultivar and planting date on FHB severity and the effect of fungicide application on management of FHB.

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.

Publications:

DeWolf, E. D., Madden, L. V., and Lipps, P. E. 2001. Fusarium head blight epidemic prediction and risk assessment. Phytopathology 91:S22 (Abstract).

Lipps, P. E., El-Allaf, S. M., Johnston, A. L. 2001. Evaluation of foliar fungicides for control of Fusarium head blight on winter wheat in Ohio, 2001. Fungicide and Nematicide Tests 57:CF14.

Lipps, P. E., Mills, D., DeWolf, E. D., and Madden, L. V. 2001. Use of head scab risk assessment models in Ohio. Proceedings 2001 National Fusarium Head Blight Forum, Erlanger, KY.

El-Allaf, S. M., Lipps, P. E., Madden, L. V., and Johnston, A. L. 2001 Effect of foliar fungicides and biological control agents on Fusarium head blight development and control in Ohio. Proceedings 2001 National Fusarium Head Blight Forum, Erlanger, KY.

El-Allaf, S. M., Madden, L. V., and Lipps, P. E. 2001. Spatial pattern of scab incidence during Fusarium head blight epidemics on winter wheat in Ohio. Proceedings 2001 National Fusarium Head Blight Forum, Erlanger, KY.

El-Allaf, S. M., Lipps, P. E., and Madden, L. V. 2001. Influence of cultivar and planting date on Fusarium head blight development on winter wheat in Ohio. Proceedings 2001 National Fusarium Head Blight Forum, Erlanger, KY.

DeWolf, E. D., El-Allaf, S. M., Lipps, P. E., Francl, L., and Madden, L. V. 2001. Influence of environment on inoculum level and Fusarium head blight severity. Proceedings 2001 National Fusraium Head Blight Forum, Erlanger, KY.

Dufault, N., DeWolf, E. D., Lipps, P. E., and Madden L. V. 2001 Modificatin of a crop residue moisture sensor for applications in the epidemioology of Fusarium head blight. Proceedings 2001 National Fusarium Head Blight Forum, Erlanger, KY.

Web sites:
Lipps, P. E., and Mills, D. 2001. Foresasting Fusarium head scab of wheat in Ohio. Ohio State University Extension. http://www.oardc.ohio-state.edu/ohiofieldcropdisease/wheat/scab%20forecasting%webpage.htm.

Presentations:
Lipps, P. E. Wheat Disease Update and Wheat Scab Forecasting. Ohio State University Extension Pesticide Applicators Training for Country Agents. Columbus, OH. January 10, 2002

Lipps, P.E. Wheat Research Update and Wheat Scab Forecasting. Ohio Seed Improvement Association Seed School, Columbus, OH. January 11, 2002.

Lipps, P. E. Wheat Head Scab Risk Forecasting. Ohio Wheat Growers Association Annual Meeting, Pemberville, OH. January 30, 2002.