USDA-ARS / USWBSI
FY03 Final Performance Report (approx. May 03 – April 04)
July 15, 2004

Cover Page

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Year:	**FY2003 (approx. May 03 – April 04)**
FY03 ARS Agreement ID:	**59-0790-1-068**
FY03 ARS Agreement Title:	**Role of Inoculum and Environment in the Development of Fusarium Head Blight Epidemics.**
FY03 ARS Award Amount:	**$ 60,000**

USWBSI Individual Project(s)

USWBSI Research Area*	Project Title	ARS Adjusted Award Amount
EDM	Role of Inoculum and Environment in the Development of Fusarium Head Blight Epidemics.	$ 60,000
	Total Amount Recommended	**$ 60,000**

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Principal Investigator Date

* BIO – Biotechnology
CBC – Chemical & Biological Control
EDM – Epidemiology & Disease Management
FSTU – Food Safety, Toxicology, & Utilization
GIE – Germplasm Introduction & Enhancement
VDUN – Variety Development & Uniform Nurseries

Project 1: ***Role of Inoculum and Environment in the Development of Fusarium Head Blight Epidemics.***

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

The goal of this project is to develop and disease forecasting models for Fusarium head blight of wheat and barley. During the past year we have worked as part of the cooperative epidemiology effort to investigate how the presence of corn residue impacts the risk of scab. In the fall of 2003 we established plots of winter wheat at the Russel E. Larson Plant Pathology Research Farm. The experiment was split-plot design with three levels of corn residue as the main plot and varieties and planting date and the sub-plot and sub-sub plot. Weather variables and inoculum was monitored throughout the growing season. Plots were then evaluated for disease and levels of mycotoxin. The results of this experiment are still being processed, but preliminary results indicate differences in the inoculum level and disease observed between treatments.

In early 2003 the producers and extension personnel requested that we improve the accuracy of disease predictions that could be made prior to flowering. This period of crop development was important to producers because it allowed for the timely use of fungicide or biological controls. We responded using the resources collected by the cooperative epidemiology effort and developed a new generation of forecasting models that improved the prediction accuracy from 70 to 80%.

At the beginning of this project the disease forecasting models were deployed in five states with varying levels of complexity and sophistication in methods of information delivery. We have addressed this by working to overcome the obstacles to deployment of the models as part of a unified system that provides disease predictions for 23 states.

2. What were the most significant accomplishments?

During the 2003-2004 project year our most significant accomplishments included the completion of a second field season for experiments evaluating the impact of corn residue on risk for development of Fusarium head blight. This data will be combined with that from other members of the cooperative epidemiology effort and used to refine prediction models in 2004 and 2005. Our efforts to respond to grower requests for more accurate pre-flowering predictions of disease were very successful, and we have now improved the accuracy of these models from 70 to >80%. We also accomplished our goals to deploy the forecasting models at a national level. On April 15, 2004 we launched the National Fusarium Prediction Center that provides disease forecasts for 23 states based on hourly weather data collected through out the region. We will be evaluating the performance of the models and the forecasting system in the coming months and plans are in place to refine the system for the 2005 growing season.

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 you 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., Madden, L.V. and Lipps, P.E. 2003. Risk assessment models for wheat Fusarium head blight epidemics based on within-season weather data. Phytopathology 93:428-435.

De Wolf, E. D. 2003. Fusarium Head Blight of Wheat. The Pennsylvania State University Cooperative Extension, Pub. No. UL208.

De Wolf, E., Molineros, J. Wei, C. Lipps, P., Madden, L. and Francl, L. 2003. Development and Depolyment of the next generation of prediction models for Fusarium head blight. Pages 125-128 in: 2003 National Fusarium Head Blight Forum Proceedings. Bloomington, MN.

Lipps, P., Mills, D., De Wolf, E. and Madden, L. 2003. Fusarium head scab risk forecasting for Ohio, 2002-2003. Page 148 in: 2003 National Fusarium Head Blight Forum Proceedings. Bloomington, MN.

De Wolf, E. D., Lipps, P. E. and Madden, L. V. 2003. Factors affecting the accuracy of disease forecasting models for Fusarium head blight of wheat. Phytopathology 93:S20.

Dufault, N.S., De Wolf, E. D., Lipps. P. E. and Madden, L.V. 2003. Influence of temperature and moisture on *Gibberella zeae* perithecial development on corn residue. Phytopathology 93:S133.

Lipps, P., Mills, D., De Wolf, E. and Madden, L. 2003. Fusarium head blight risk forecasting for wheat in Ohio. Phytopathology 93:S53.

De Wolf, E. D. 2003. Development and deployment of the next generation prediction models for Fusarium head blight. 2003, National Fusarium Head Blight Forum, Dec. 13-15.