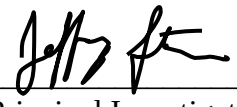
USDA-ARS / USWBSI
FY04 Final Performance Report
July 15, 2005

Cover Page

PI:	**Jeff Stein**
Institution:	**South Dakota State University**
Address:	**Plant Science Department** **Box 2108** **Brookings, SD 57007**
E-mail:	**Jeff.Stein@sdstate.edu**
Phone:	**605-688-5540**
Fax:	**605-688-4024**
Year:	**FY2004** (approx. May 04 – April 05)
FY04 ARS Agreement ID:	**59-0790-4-107**
FY04 ARS Agreement Title:	**FHB Epidemiology on Spring Wheat in South Dakota.**
FY04 ARS Award Amount:	**$ 48,780**

USWBSI Individual Project(s)

USWBSI Research Area*	Project Title	ARS Adjusted Award Amount
EDM	FHB Forecasting, Model Validation and Inoculum Dynamics in South Dakota.	$ 48,780
	Total ARS Award Amount	**$ 48,780**



_____7/13/05_____
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: ***FHB Forecasting, Model Validation and Inoculum Dynamics in South Dakota.***

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

We are addressing the issues related to the epidemiology of scab on spring wheat in South Dakota. The specific objectives addressed were to: 1) examine the effects of crop residues and weather parameters on FHB inoculum and disease levels in order to provide a knowledge base for the development of accurate disease forecasting systems and comprehensive disease management strategies and 2) continue with the validation and ground-truthing of previously developed spring wheat FHB risk assessment/forecast models. Objective 1 was studied in collaboration with researchers at Pennsylvania State University, North Dakota State University, Ohio State University, and Purdue University. Coordinated field plots with varying amounts of corn stubble residue were established to monitor disease development over time, in conjunction with environmental (weather) and inoculum monitoring. Objective 2, also performed in collaboration (ala Objective 1), was addressed through the repeated assessment of numerous spring wheat crop locations for the continued development of a spring wheat scab data set for model development and validation.

2. What were the most significant accomplishments?

For Objective 1 examining the effects of residue and weather parameters on scab severity it was determined that in this instance the latter factor was much more important for disease development and severity than the amount of corn residue. In general, the spring wheat scab severity at this research location was high in 2004 and it is likely that sufficient inoculum from outside of the study was present to initiate and epidemic when conducive environmental conditions were present. Observing this interaction under less conducive environmental conditions is required to further elucidate any interaction. For Objective 2, environmental parameters, airborne inoculum, and disease levels were assessed over a range of planting dates, geographical locations, and from multiple spring wheat varieties in producers' fields in eastern SD. Spore traps were deployed at five locations across the northeast part of South Dakota. Hourly levels of airborne ascospores and *Fusarium*-type conidia were noted over the course of the heading and seed development stages for spring wheat. Weather data from nearby weather stations were also collected. Data from both experiments was shared with collaborators at Pennsylvania and Ohio State Universities. These data will greatly advance the forecasting effort for South Dakota's spring wheat growing areas. Intensive sampling from each location will be highly valuable for validating predictive models and for elucidating new models. Additionally, collaborations were increased with the State Climatologist and additional weather stations and quality control mechanisms were initiated to better serve the producers of South Dakota.

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.

Osborne, L., and **J. Stein**. 2004. Inoculum Distribution and Temporal Dynamics within the Spring Wheat Canopy. Pg 477 in Proc, 2nd International Symposium on Fusarium Head Blight (S.M. Canty, T. Boring, J. Wardwell, and R.W. Ward, eds). Dec. 11-15, Orlando, FL.

Osborne, L., and **J. Stein**. 2004. 2004 FHB Monitoring for Spring Wheat in South Dakota. Pg 480 in Proc, 2nd International Symposium on Fusarium Head Blight (S.M. Canty, T. Boring, J. Wardwell, and R.W. Ward, eds). Dec. 11-15, Orlando, FL.

Todey, D., L. Osborne, **J. Stein** and M. Draper. 2004. Enhancement of the Automated Weather Data Network in South Dakota. Pg 480 in Proc, 2nd International Symposium on Fusarium Head Blight (S.M. Canty, T. Boring, J. Wardwell, and R.W. Ward, eds). Dec. 11-15, Orlando, FL.

Stein, J. and L. Osborne. 2004. Spring wheat disease research report. Plant Science Pamphlet No 19:40, SDSU.