U.S. Wheat and Barley Scab Initiative
FY02 Final Performance Report (approx. May 02 – April 03)
July 15, 2003

Cover Page

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Year:	**FY2002 (approx. May 02 – April 03)**
Grant Number:	**59-0790-2-085**
Grant Title:	**Fusarium Head Blight Research**
FY02 ARS Award Amount:	**$ 7,512**

Project

Program Area	Project Title	USWBSI Recommended Amount
CBC	Controlling a Watering System to Maintain Optimum Moisture Conditions for FHB Field Research.	$7,700
	Total Amount Recommended	**$7,700**

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Principal Investigator Date

Project 1: Controlling a Watering System to Maintain Optimum Moisture Conditions for FHB Field Research.

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

To properly evaluate FHB fungicides each growing season, a favorable microclimate for the growth of FHB must be provided either by nature or artificially. Keeping the grain heads "wet" and/or maintaining a high humidity during the crucial FHB formation period is important for the evaluation of fungicides. During the 2002 growing season, a feedback control system that monitored relative humidity (RH) and temperature at flag-leaf height was installed and used to control the misting system for the Fargo uniform fungicide trial plots. In addition to the active monitoring and control system, six remote RH and temperature monitoring stations were installed, two in the dryland plots and four in the misted plots. Each of these stations had RH and temperatures sensors placed at 6 inches, 18 inches and 30 inches above the ground surface.

2. What were the most significant accomplishments?

The untreated checks in the misted plots had FHB field severity that ranged from 12 to 36 percent with an average of 30%. These levels provided a sufficient infection rate to evaluate fungicide treatments without an overwhelming amount of FHB. To put these infection rates in perspective, the FHB field severity levels in inoculated dryland plots in adjacent research areas south of the misted plots (planted with the same variety of wheat) was about 2%. In other words the controlled watering system created the proper microclimate for the growth of FHB in inoculated plots.

The effectiveness of the misting protocol can be verified by examining the RH data from the four remote monitors in the watered plots and compare that with the RH data from the dryland plots. These results are shown in the following table.

Sensor Location	Percent time the RH was greater than 92% in the watered plots (average of 4 stations)	Percent of time the RH was greater than 92% in the dryland plots (average of 2 stations)
6 inches above ground	80%	47%
18 inches above ground	65%	42%
30 inches above ground	45%	30%

A more telling statistic is the total time the leaf wetness sensors were wet or dry. There were two leaf wetness sensors, one in sprinkler zone 1 and one in sprinkler zone 2. They were wet about 73% of the time and dry about 27% of the time from July 1 to July 20. This indicates that the wheat heads were wet also. Comparing this to our rain gage data and local weather station RH data, the wheat heads in the dryland plots were wet about 10 percent of the time during this same interval. Although an indirect measure, it provides an estimate of the impact of local climate on FHB development.

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.

Technical Papers

Scherer, T.F., V.H. Hofman, S. Halley and M. McMullen, 2000. Design of a Microsprinkler system for Fusarium Head Blight (Scab) research of wheat and barley, Paper RRV00-203, ASAE/CSAE North Central Region Intersectional Mtg, Moorhead, MN, 8 pgs.

Scherer, T.F., D. Kirkpatrick and M.P. McMullen, 2002. "Automated Control of a Watering System for Fusarium Head Blight (Scab) Research", Paper MBSK02-305, North Central Region Intersectional Meeting of the ASAE/CSAE, Saskatoon, SK, 11 pgs.

Presentations

Poster: Automated Control of a Misting System for Scab Research, 2002 National Fusarium Head Blight Forum, Cincinnati, Dec 6-7.