

**U.S. Wheat and Barley Scab Initiative
Annual Progress Report
September 18, 2000**

Cover Page

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Year:	FY2000
Grant Number:	59-0790-9-054
Grant Title:	Fusarium Head Blight Research
Amount Granted:	\$48,000.00

Project

Program Area	Objective	Requested Amount
Chemical & Biological Control	Identify safe, effective fungicides for FHB through evaluation across of wheat and/or barley varieties grown in relevant environments.	\$5,000.00
Variety Development	To enhance variety development of scab resistant varieties.	\$35,000.00
	Requested Total	\$40,000.00¹

Principal Investigator

Date

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

Project 1: Identify safe, effective fungicides for FHB through evaluation across of wheat and/or barley varieties grown in relevant environments.

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

The objective is to identify fungicides and application techniques that are effective against head blight of wheat. To resolve this objective we are participating in the Uniform Wheat Fungicide Evaluation Tests coordinated by Marcia McMullen, including additional fungicide treatments, and analyzing results of the wheat fungicide tests across locations.

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

We used the fungicides and application methods as listed in the protocol, but none of the treatments were effective against head blight.

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

The reasons for poor efficacy are that none of the fungicides tested appear to have a high level of activity against head blight and disease pressure in the test was higher than the target level which may have overwhelmed the treatments.

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

The most significant finding was that strobilurin fungicides appear to significantly increase DON level in the grain.

Project 2: To enhance variety development of scab resistant varieties.

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

The major problem is that nearly all wheat cultivars adapted to the Midsouth are susceptible to head blight, and only a few cultivars have a low level of resistance that is not adequate to protect against head blight. We are attempting to transfer head blight resistance into adapted genotypes using short-term and long-term approaches. The short-term approach is to cross sources of resistance with adapted lines and identify progeny with resistance and good adaptation. The long-term approach is to cross sources of resistance to each of two adapted cultivars with wide adaptation, identify resistant lines, and then, within each of two adapted gene pools, intercross resistant lines. Intercrosses between lines with different genes for resistance should produce progeny with good adaptation and higher levels of resistance. We also screen breeding lines from the uniform scab nursery for resistance in the field and greenhouse.

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

For the short-term approach, this was the first year of yield testing lines (F_7 and F_8) developed using Chinese, Romanian, and South American resistance sources. Although because of a lack of seed these yield trials were non-replicated, results were promising. The top line produced a yield of 84.1 bu/A compared to 63.5 bu/A for the resistant check 'Ernie'. Several other selections also yielded more than the resistant check.

For the long-term approach, 267 F_5 or BCF_4 lines from 22 sources of resistance were selected from 8680 headrows. Selections were made for proper maturity, stripe rust resistance, plant type, yield potential, and visual seed quality after harvest.

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

The objective has not been met yet because breeding is a long process. However, preliminary results are encouraging. Selection for head blight resistance was hampered by low disease pressure in the nurseries, but selection for stripe rust resistance was done to take advantage of a severe stripe rust epidemic. Screening for resistance in the greenhouse was cancelled for the year because the person hired to do the work left at the beginning of the greenhouse season, and a replacement could not be hired until the end of March.

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

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The most significant accomplishment was selecting lines with good agronomic traits and resistances to diseases other than head blight. By reducing the number of lines to a more reasonable number, more extensive and intensive testing will be possible during the coming year on the selected lines.

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.

Milus, E.A., Bacon, R.K., Prom, L.K, and Weight, C.T. 1999. Developing FHB-resistant wheat cultivars for the Midsouth. Page 180 In: Proceedings of the 1999 Fusarium Head Blight Forum.

Milus, E.A., Weight, C.T., and Rohman, P.C. 2000. Accumulating genes for resistance to head blight and foliar diseases in soft red winter wheat. Proceedings of the Durable Resistance Symposium, Wageningen, The Netherlands (November 2000).

McMullen, M., Milus, E.A., and Prom, L.K. 1999. Uniform Fungicide trials to identify products effective against Fusarium head blight in wheat. Pages 64-68 In: Proceedings of the 1999 Fusarium Head Blight Forum.

Prom, L.K., Milus, E.A., and Weight, C.T. 2000. Efficacy of fungicides for control of Fusarium head blight of wheat in Arkansas, 1999. Fungicide and Nematicide Tests (in press)