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

Cover Page

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Year:	**FY2000**
Grant Number:	**59-0790-9-057**
Grant Title:	**Fusarium Head Blight Research**
Amount Granted:	**$75,000.00**

Project

Program Area	Objective	Requested Amount
Variety Development & Uniform Nurseries	Accelerate development of resistant varieties.	$77,765.00
	Requested Total	$77,765.00[1]

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Principal Investigator Date

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

Project 1: Accelerate development of resistant varieties.

1. What major problem or issue is being resolved and how are you resolving it? Wheat production and grain quality losses due to Fusarium head blight have been significant in the US and other wheat growing areas of the world. We are developing winter wheat cultivars that have resistance to this devastating disease.
2. Please provide a comparison of the actual accomplishments with the objectives established. 1) Develop FHB resistant and low FHB incidence wheat cultivars that are adapted to Indiana in an accelerated breeding program. Cultivars Goldfield and INW9853 and other advanced breeding lines that have reduced incidence of FHB compared to other cultivars, have been crossed to plants that have one or more genes for type 2 FHB resistance. Also, resistance genes of two or more sources of type 2 resistance have been combined in various combinations. Early generation populations resulting from these crosses have been grown in the greenhouse, artificially vernalized seedlings transplanted to the field, and/or grown in the southern hemisphere for accelerated generation advance and selection for FHB resistance and other traits. Selection for type 2 FHB resistance has been based on single floret inoculations in the greenhouse, misted populations in the field seeded in disced cornstalks and natural infection in the field in nurseries seeded in disced cornstalks. Until more is learned about selection for low incidence, we will base selection on incidence at several to many locations and repeated testing. Lines showing promise of high levels of FHB resistance are in advanced and regional performance trials and in the Cooperative FHB Winter Wheat nursery in 2000-01.

   2) Determine linkage of FHB resistance genes. Several RI populations are in development: 201R/Patterson, F4:5; Huapei 32-2/Patterson, F4:5; Bizel/Patterson, F4:5; Mironovskaya 808/Patterson, F4:5; N894037/Alondra, F8:9. These populations will be characterized for FHB resistance beginning in F5:6 (March 2001) and markers identified for resistance genes (the N894037/Alondra population will be tested in a third test in November 2000), and markers identified and mapped.

   3) Determine inheritance of FHB low incidence. The Goldfield (low incidence)/Patterson RI population, F7:8, will be characterized for flower opening degree and duration beginning in March 2001 in the greenhouse, and subsequently in field plots for FHB incidence. In preliminary tests, tips of glumes of Goldfield and INW9853 spread 0.5 to 1.1 mm and were open an average of 5 minutes compared to 2.7 mm and 15 minutes for Patterson. Typically, FHB incidence on Goldfield is 1/4 to 1/5 that on Patterson in field tests.

   4) Identify DNA markers for FHB resistance genes. After the RI populations have been repeatedly characterized, markers will be identified and mapped.
3. What were the reasons established objectives were not met? If applicable. To date we have progressed as planned.
4. What were the most significant accomplishments this past year?

We identified adapted advanced wheat lines that repeatedly have shown a high level of type 2 resistance and some lines that probably have low FHB incidence. Excellent progress for generation advance and testing of RI populations for FHB resistance was achieved.

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.

Drake, D.R., and H.W. Ohm. 2000. Fusarium head blight resistance in wheat cultivars Freedom and Ning 7840. Agronomy Abstracts, ASA Annual Meetings, Minneapolis, MN. November.

Shen, X., and H.W. Ohm. 2000. Fusarium head blight resistance of wheat lines N894037 and 201R. Agronomy Abstracts, ASA Annual Meetings, Minneapolis, MN. November.