

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

Cover Page

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Year:	FY2000
Grant Number:	59-0790-9-079
Grant Title:	Fusarium Head Blight Research
Amount Granted:	\$64,390.00

Project

Program Area	Objective	Requested Amount
Variety Development & Uniform Nurseries	Accelerate development of resistant varieties.	\$70,000.00
	Requested Total	\$70,000.00¹

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?

Resistant varieties will be the main component of an integrated strategy to control scab. The use of resistant varieties is the most economical, sustainable, and long lasting means of control. The objective is to use traditional breeding techniques to develop scab resistant hard winter wheat cultivars. Breeding efforts for improved head scab resistance in winter wheat will initially be focused to address:

- i) characterization of scab resistance or tolerance among commercially grown cultivars and elite and preliminary lines from SDSU and regional breeding programs.
- ii) identification of winter wheat germplasm sources that show a high level of scab resistance.
- iii) development of populations segregating for scab resistance and desirable agronomic traits.

Mist-irrigated greenhouse and field screening nurseries will be used to evaluate the material. The winter wheat cultivars and germplasm will be screened for scab resistance in the same field nursery as the spring wheats. They are vernalized in the early spring and then transplanted into the field at the same time the spring wheats are planted.

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

The objective of the project is “to accelerate the development of scab resistant winter wheat varieties for South Dakota.” This objective is being met. Sources of resistance are being identified and populations for selection are being developed.

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

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

- A research assistant was hired to manage the winter wheat scab resistance breeding program.
- The following nurseries were screened for scab resistance in 2000:
 - Northern Regional Performance Nursery
 - Winter Wheat Regional Scab Nursery
 - South Dakota Crop Performance Trials (commercial varieties)
 - SDSU Advanced Hard Red and Hard White Yield Trials
 - SDSU Preliminary Hard Red and Hard White Yield Trials
- Approximately 6000 plants were evaluated for scab resistance during the 1999 season. 1500 of the plants were kept and were planted into the field this fall. Scab resistance sources included in the selected populations included adapted spring wheats from the SDSU breeding program, Sumai 3 derived spring wheat lines, eastern European winter wheat lines, entries from the 1998 regional winter wheat scab nursery, and adapted hard red and hard white breeding lines.

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Progress Report

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.

Rudd, J.C. 2000. Bread-Wheat Breeding in the United States. Presentation at the China National Wheat Breeding Conference, May 11-14, 2000, Jinan, Shandong Province, China.

Devkota, R.N., R.C. Rudd, J.C. Rudd, and Y. Jin. 1999. Diallel analysis of FHB and tombstone kernels in spring wheat evaluated under greenhouse and field conditions. p. 78. In *Agronomy Abstracts*. ASA, Madison, WI.

Devkota, R.N., R.C. Rudd, J.C. Rudd, and Y. Jin. 1999. Diallel analysis of FHB and tombstone kernels in spring wheat evaluated under greenhouse and field conditions. p. 152. In *Proceedings 1999 National Fusarium Head Blight Forum, U.S. Wheat and Barley Scab Initiative*, Sioux Falls, South Dakota, December 5-7, 1999.

Jin, Y., R. Xiang, R. Rudd, J. Rudd. 1999. A point inoculation method for evaluating scab resistance in wheat. p. 128. In *Proceedings 1999 National Fusarium Head Blight Forum, U.S. Wheat and Barley Scab Initiative*, Sioux Falls, South Dakota, December 5-7, 1999.

Rudd, J.C., R.W. Stack, R.D. Horsley and A.L. McKendry. 1999. Host plant resistance genes in wheat, barley, and their relatives: I. Sources, mechanisms, and utility in conventional breeding systems. p. 83. In *Agronomy Abstracts*. ASA, Madison, WI.

Yen, Yang, Denghui Xing, Jackie C. Rudd, and Yue Jin. 1999. Exploring the molecular mechanism of Fusarium head blight resistance and developing breeder-friendly DNA markers to FHB for wheat improvement. p. 40. In *Proceedings 1999 National Fusarium Head Blight Forum, U.S. Wheat and Barley Scab Initiative*, Sioux Falls, South Dakota, December 5-7, 1999.

Zhang, X., Y. Jin, R. Rudd, J. Rudd, and H. Bockelman. 1999. Screening of spring wheat scab resistance from the USDA germplasm collection. p 140. In *Proceedings 1999 National Fusarium Head Blight Forum, U.S. Wheat and Barley Scab Initiative*, Sioux Falls, South Dakota, December 5-7, 1999.