

**U.S. Wheat and Barley Scab Initiative
 FY00 Final Performance Report (approx. May 00 – April 01)
 July 30, 2001**

Cover Page

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Grant Number:	59-0790-0-062
Grant Title:	Fusarium Head Blight Research
2000 ARS Award Amount:	\$42,027

Project

Program Area	Project Title	Requested Amount
Variety Development & Uniform Nurseries	Development of scab resistant wheat cultivars for Kansas.	\$43,078.00
	Requested Total	\$43,078.00¹

Principal Investigator

Date

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

Project 1: Development of scab resistant wheat cultivars for Kansas.

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

Serious Fusarium head blight (scab) epidemics have occurred in Kansas in 1982, 1990, 1993, and 1995 with most of the losses occurring in the eastern quarter of the state. Since 1980, wheat acreage in the eastern quarter of Kansas has declined by two thirds mostly due to farmer aversion to the risk of scab. Scab also has the potential to become more prevalent in central Kansas due to decreasing tillage and increasing cultivation of corn, the main reservoir for inoculum. The best long-term solution to the problem is to produce winter wheat cultivars that have high levels of resistance to scab. Until involvement in the USDA Scab Initiative, there was virtually no effort for identifying sources of resistance in Kansas breeding programs. The Initiative has resulted in the development of greenhouse and field screening nurseries that provided accurate ratings for current cultivars in Kansas, advanced breeding lines, and participation in the Regional Scab Nursery. Respectively, these nurseries allowed dissemination of information to growers on the reaction of current commercial cultivars, selection for scab resistance in breeding lines, and identification of additional sources of resistance from other breeding efforts in the region.

2. What were the most significant accomplishments?

Because of the scab screening efforts, a new column for reaction to Head Scab has been added to the popular extension publication *Wheat Variety Disease and Insect Ratings* for the fall, 2000 issue and will be updated for the 2001 issue. For the first time, this will allow producers in Kansas to use the reaction to scab to help select cultivars for planting. Additionally two commercial cultivars in Kansas (Hondo and Heyne) were identified in 2000 (and confirmed in 2001) as having good levels of resistance (3 and 4 on the 1-9 scale where 1=immune and 9=highly susceptible). During 2001, these cultivars had an average of 12 and 20% scab, respectively compared with over 50% in highly susceptible cultivars. Similarly, the advanced breeding line KS96HW115 (released in August, 2000 as Lakin) showed moderate levels of resistance with 26-34% scab in 2001. Five other commercial cultivars displayed some level of resistance in the 2001 nursery; however, these results need to be confirmed. Therefore, there is scab resistance already present in cultivars adapted to Kansas that can potentially be used in the development of future cultivars. Finally, both KSU wheat breeders and the USDA wheat geneticist have been involved in having their advanced breeding lines evaluated for resistance to scab.

The objective to develop scab resistant cultivars for Kansas has just begun. It normally takes about 10 years to produce a cultivar from initial crosses until release. Even though two Kansas cultivars have been identified with good levels of resistance, five of the six most popular commercial cultivars (Jagger, 2137, TAM 107, Ike, and 2163), representing 70% of the seeded acreage, are susceptible. Clearly, a long-term effort in providing resistance-screening nurseries is needed to help breeders select and release cultivars that have acceptable resistance to scab.

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.

1. Bowden, R. L. and Brooks, H. L. 2000. Wheat Variety Disease and Insect Ratings 2000. Kansas State University Agricultural Experiment Station and Cooperative Extension Service bulletin #MF-991, 4 pp.
2. Bockus, W. W. June 2000. Fusarium head blight nurseries. Demonstration of field plots to participants of the Western Coordinating Committee WCC-97 (*Cereal Diseases*) annual meeting at Manhattan, KS.
3. Bockus, W. W. August 2000. Fusarium head blight. Radio talk for the *Agriculture Today* program on KKSU, AM 580 radio station.
4. Davis, M. A., Bockus, W. W. and Bowden, R. L. 2001. Reaction of selected winter wheat accessions to Fusarium head blight, 2000. *Biol. Cult. Tests Control Plant Dis.* Vol. 16.
5. Bockus, W. W., McKenzie, S. A., and Bowden, R. L. 2001. Reaction of selected Kansas winter wheat cultivars to Fusarium head blight, 2000. *Biol. Cult. Tests Control Plant Dis.* Vol. 16.