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:	**59-0790-9-073**
Grant Title:	**Fusarium Head Blight Research**
FY02 ARS Award Amount:	**$ 38,118**

Project

Program Area	Project Title	USWBSI Recommended Amount
VDUN	Accelerating the Development of FHB-Resistant Soft Red Winter Wheat Varieties.	$39,071
	Total Amount Recommended	**$39,071**

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Principal Investigator Date

Project 1: Accelerating the Development of FHB-Resistant Soft Red Winter Wheat Varieties.

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

The major issue being resolved is the lack of resistance to Fusarium head blight in soft red winter wheat. Most cultivars today are susceptible to FHB. In Kentucky wheat growers are at risk for severe economic losses due to this disease, in part because most of the wheat follows corn which is an inoculum source. Our approach is to characterize existing SRW germplasm and breeding lines as parents in terms of their ability to contribute FHB resistance genes to crosses. We are also evaluating populations that contain Chinese spring wheats at a low frequency so that resistance is maintained without adaptation being compromised. Evaluation of this material occurs through extensive greenhouse and field screening. For the period covered by this grant, we evaluated diallel F2 populations in the field, and three Chinese x adapted populations in the greenhouse. Although we continue to evaluate exotic germplasm, our objective is to rely as completely as possible on adapted material so that we can recover the adapted type much more readily.

2. What were the most significant accomplishments?

• We released 'Allegiance' soft red winter wheat which has moderate resistance to FHB in inoculated nurseries and under natural epidemics.

• One hundred twenty F2 derived F4 lines from three populations segregating for Sumai 3 resistance were evaluated for Type I and Type II resistance in the greenhouse. These lines were also genotyped at the USDA-ARS genotyping center at Manhattan, KS, and characterized for the presence of the Sumai 3 markers. Several lines in each category (plus and minus the marker) showed excellent resistance and were identified for further evaluation in the field this summer. Previous estimates of heritability of resistance in these populations ranged from 0.39 to 0.69 and were thought to reflect, primarily the Sumai 3 resistance. The marker data suggests, however, that other genes are involved. This is important because it is essential that we identify diverse sources of resistance to FHB to avoid genetic vulnerability.

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.

Stewart, A.J. and Dave Van Sanford. 2002. Fusarium Head Blight of Wheat: Breeding for Resistance. Presentation at the 2002 Wheat Science Field Day, May 14, Shelbyville, KY.

Stewart, A.J., B. Kennedy, and D. A. Van Sanford. 2002. Scab Screening Using Frozen Spikes. Proceedings of the 2002 National Fusarium Head Blight Forum, December, 7-9, Cincinnati, OH.

Verges, V.L., B. Kennedy, A.J.Stewart, D. TeKrony and D.A. Van Sanford . 2002. Apparent And Actual Seed Quality In Soft Red Winter Wheat Infected With *Fusarium graminearum*. Proceedings of the 2002 National Fusarium Head Blight Forum, December, 7-9, Cincinnati, OH.

Hall, M.D. and D.A. Van Sanford. 2003. Diallel Analysis of Fusarium Head Blight Resistance in Soft Red Winter Wheat. Crop Science 43 (IN PRESS).