USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY05 Final Performance Report (approx. May 05 – April 06)
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Cover Page

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Fiscal Year:	**2005**
FY05 ARS Agreement ID:	**58-0790-5-078**
Agreement Title:	**Screening and Developing Wheat Germplasm with Resistance to Scab.**
FY05 ARS Award Amount:	**$ 22,288**

USWBSI Individual Project(s)

USWBSI Research Area*	Project Title	ARS Adjusted Award Amount
VDUN	Screening and Developing Wheat Germplasm with Resistance to Scab.	$ 22,288
	Total Award Amount	**$ 22,288**

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Principal Investigator Date

* BIO – Biotechnology
CBC – Chemical & Biological Control
EDM – Epidemiology & Disease Management
FSTU – Food Safety, Toxicology, & Utilization
GIE – Germplasm Introduction & Enhancement
VDUN – Variety Development & Uniform Nurseries

Project 1: *Screening and Developing Wheat Germplasm with Resistance to Scab.*

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

The major problem is addressing the need to develop rapid and effective incorporation of resistance to scab (Fusarium Head Blight) from exotic sources into adapted soft red winter wheat (SRWW) germplasm. The approach to address this problem is to backcross, and to three-way cross the Sumai 3 allele and other exotic resistance alleles into adapted wheat lines and varieties. Marker-assisted selection (MAS) is being used to rapidly incorporate Sumai 3 resistance into SRWW lines such as McCormick, that have wide adaptation in the Southern and Eastern US wheat growing regions and moderate resistance to scab. Over 600 BC-1 seedlings were screened for SSR markers at the USDA in Raleigh (NC) in collaboration with Dr. Gina Brown-Guedira at that National Genotyping Center. Additionally, selected BC-1s were crossed with a wheat line (GA96229-3A41) that has wide adaptation as well as leaf and stripe rust resistance. The BC-2 F1 seeds will be screened with markers in 2006 and the BC2-F2s will be planted in the field towards the end of 2006.

Furthermore, screening of MD (University of Maryland) wheat advanced lines and check varieties was conducted under field conditions in an inoculated nursery at Salisbury (MD). Conditions favorable for disease development were aided with daily misting before and during wheat flowering. The scab inoculum was scabby corn grain spread in the field a month before flowering. The Southern wheat scab and Northern Uniform Scab Screening nurseries that include new experimental lines were also screened for resistance at Salisbury (MD) with artificial inoculation and misting. Data for all nurseries was obtained for scab incidence, scab severity, Fusarium damaged kernels, seed weight, plant height, heading date, and DON levels.

2. List the most important accomplishment and its impact (how is it being used?). Complete all three sections (repeat sections for each major accomplishment):

Accomplishment: Identification of two wheat adapted advanced lines (MV6-82-5 and MV6-82-10) with good field resistance to scab and low DON.

Impact: These lines have good field genetic resistance to scab, are short, head early in the season and have excellent resistance to powdery mildew.

As a result of that accomplishment, what does your particular clientele, the scientific community, and agriculture as a whole have now that they didn't have before?:

The availability of these lines with good field scab resistance coupled with their excellent resistance to powdery mildew, earliness and short height make them a valuable asset as parental lines. Additionally, depending on their grain yield potential, these lines may have potential as new releases for the mid-Atlantic, if leaf and stripe rust are controlled with fungicides.

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.

Scab Screening Of Soft Red Winter Wheat Genotypes in Maryland. Costa, J.M., Gal-Edd, N., Hwang, E.Y., Miller, J., Liberator, K., and Cooper, A. 2005. Fusarium Head Blight Forum, Milwaukee, WI.