USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY05 Final Performance Report (approx. May 05 – April 06)
July 14, 2006

Cover Page

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Fiscal Year:	**2005**
FY05 ARS Agreement ID:	**59-0790-4-108**
Agreement Title:	**Enhancement of Scab Resistant Wheat Cultivars Adapted to the Southeast.**
FY05 ARS Award Amount:	**$ 33,915**

USWBSI Individual Project(s)

USWBSI Research Area*	Project Title	ARS Adjusted Award Amount
VDUN	Enhancement of Scab Resistant Wheat Cultivars Adapted to the Southeast.	$ 33,915
	Total Award Amount	**$ 33,915**

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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

FY05 (approx. May 05 – April 06) FY05 Final Performance Report
PI: Johnson, Jerry
ARS Agreement #: 59-0790-4-108

Project 1: *Enhancement of Scab Resistant Wheat Cultivars Adapted to the Southeast.*

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

Fusarium head blight (FHB) epidemics have occurred in Georgia and the Southeast that resulted in marketing difficulty of grain due to high DON concentrations. Presently, scab resistant cultivars with resistance to other diseases such as leaf rust and stripe rust are not available in adequate numbers. The goal is to enhance soft red winter wheat cultivars with Fusarium head blight resistance and improved yield potential for commercial use in the lower Southeastern United States. The objectives are to identify, incorporate, and pyramid resistance to FHB in elite lines and to marker-assisted selection to pyramid FHB resistance. Both native and exotic sources of scab resistance are being identified and incorporated into elite lines. Marker Assisted Selection is also being employed to accelerate the development of adapted FHB resistant cultivars by the assistance in the selections within populations containing 3BS and 5AS. Wheat breeding lines from the southern uniform scab nurseries are being evaluated for resistance and adaptation under field conditions in the Southeast**.**

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:

Scab resistant cultivars that have combined resistance to leaf and stripe rust have been lacking in the Southeast. Several wheat germplasm from both native and exotic sources with FHB resistance have been transferred into elite lines that are adapted to the Southeast. Three breeding lines have been identified with native scab resistance that is equal to or better than Ernie. These three lines are being increase with the intention for release in 2008. About 120 wheat elite lines, 146 populations (F2-F5) and the uniform southern FHB nurseries were evaluated for Type II resistance to FHB. Six lines from our elite nursery were identified in 2006 with good FHB resistance. Based upon the field disease severity, selections were obtained from these populations for generation advance. Numerous crosses of single, backcross, and topcross have been made with high yielding scab germplasm from both native and exotic resistance with our elite lines. MAS with SSR markers were used to accelerate the development of scab resistance from 3BS and 5AS into elite lines.

Impact
New improved sources of scab resistance with resistant to other foliar diseases are being made available for incorporation into elite breeding lines adapted to the Southeast. Three lines, GA941523E21, GA 991109-6A7 and GA 991109-6E8 (Ernie derived**)** are being increase with the intention for release in 2008 Both native and exotic sources of scab resistance are also being incorporated into adapted lines with good agronomic performance.

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?:

Cultivars and elite lines are being made available with moderate resistance to resistance to Fusarium head blight adapted to southeast. Millers should be able to obtain grain with acceptable quality.

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.

Zhenbang Chen, Jerry Johnson, James Buck, Lilian Miranda1, and Mingli Wang. 2006.Evaluation of Elite Breeding Lines for Fusarium Head Blight (FHB) Resistance. 2006 National FHB Forum, Raleigh, NC.