

**USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY06 Final Performance Report (approx. May 06 – April 07)
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Cover Page

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Fiscal Year:	2006
USDA-ARS Agreement ID:	59-0790-4-092
USDA-ARS Agreement Title:	To Enhance Variety Development of Scab Resistant Hard Winter Wheat Varieties.
FY06 ARS Award Amount:	\$ 42,072

USWBSI Individual Project(s)

USWBSI Research Area*	Project Title	ARS Award Amount
VDUN	To Enhance Variety Development of Scab Resistant Hard Winter Wheat Varieties.	\$ 42,072
	Total Award Amount	\$ 42,072

Principal Investigator

Date

* CBCC – Chemical, Biological & Cultural Control
 EEDF – Etiology, Epidemiology & Disease Forecasting
 FSTU – Food Safety, Toxicology, & Utilization of Mycotoxin-contaminated Grain
 GET – Genetic Engineering & Transformation
 HGR – Host Genetics Resources
 HGG – Host Genetics & Genomics
 PGG – Pathogen Genetics & Genomics
 VDUN – Variety Development & Uniform Nurseries

Project 1: *To Enhance Variety Development of Scab Resistant Hard Winter Wheat Varieties.*

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

The major problem that we have been addressing is the development of new cultivars that have an enhanced level of tolerance to Fusarium head blight (FHB). The difficulty has been that we have had multiple years of drought, which has made our field screening for resistance very difficult, and most of sources were “native” sources, thus did not have known molecular markers. In 2006-2007, we added a new screening nursery (we now have two screening locations) to have a better chance of having at least one location be successful, as well as, increased the number of replications, hence the space needed for screening. In cooperation with Dr. Guihua Bai, we received a number of BC₂F₃ lines having the 3BS QTL (*Fhb1*) from Sumai 3 (or related lines) in Wesley, Trego, and Harding. Hence we now have excellent parental sources for the use with molecular markers. These lines will mesh well with our F7 lines that also carry the *Fhb1* gene from earlier crosses. Finally, we continue our kernel sorting experiments with Dr. Floyd Dowell so that we can quickly eliminate the soft wheat kernel segregants from the (hard x soft) x hard crosses that we have been making to take advantage of the excellent germplasm being developed in the Eastern wheat region.

**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:

Our most important accomplishment has been the release of NE01643 (which will be sold as Husker Genetics brand Overland). The line has exceptional yield and it was the highest yielding line in the NRPN each year that it was tested in that nursery and is the highest yielding line in three years of testing in eastern to southwestern Nebraska (the region where FHB is most likely to occur). In addition to FHB tolerance, this line has excellent leaf, stem, and stripe rust, leaf blotch, and BYDV resistance. This line was co-released in South Dakota.

Impact:

In 2006, 540 units of foundation seed were produced and all were sold with the majority of the seed being sold in eastern Nebraska and approximately 100 units sold in South Dakota. We expect approximately 35,000 units of certified seed will be sold in 2007-2008. Its acreage should increase for a number of years thereafter.

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?

Nebraska and South Dakota wheat producers will have a new cultivar with exceptional yield capabilities with very good native resistance to FHB that is also resistant to the major disease commonly found in the region where FHB is expected to be most commonly found. Our strategy is to put FHB tolerance in lines that would be grown whether FHB is present or not, so that when FHB is present the producer is protected.

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.

Guihua B., A. Paul St, I. Amir, P. S. Baenziger, B. Bockus, and A. Fritz. 2006. Transfer of a QTL for FHB Resistance into Hard Winter Wheat using Marker-assisted Backcross. 2006 National Fusarium Head Blight (NFHB) Forum, 2006. (Poster #42) pp. 82.

F.E. Dowell, E.B. Maghirang and P.S. Baenziger. 2006. Single Kernel Sorting Technology for Enhancing Scab Resistance and Grain Quality. 2006 National Fusarium Head Blight (NFHB) Forum, 2006. (Poster #53) pp. 96

Mengistu N., P.S. Baenziger, S. Wegulo, J. Breathnach, J. Counsell, G. Bai, and F. Dowell. 2006 Breeding for Fusarium Head Blight Tolerance: Incorporating Technology. 2006 National Fusarium Head Blight (NFHB) Forum, 2006. (Poster #62) pp. 112.

Thro A.M., P.S. Baenziger, C. Brummer, M. Carena, W.R. Coffman, M.E. Smith, J. Hancock, J. Navazio, L. Pollak, S. Smith, T. Stalker, D. Stuthman, W.F. Tracy, G. Waines, L. Wessel-Beaver and G. Whiteaker. 2006. Plant Breeding and Variety Development: A Vital Capacity for U.S. National Goals. 2006 National Fusarium Head Blight (NFHB) Forum, 2006. (Poster #70) pp. 126.

NE01643 has been approved for sale in the U.S. by AOSCA. A registration article has been submitted to the Journal of Plant Registrations and the PVP application has been submitted.