

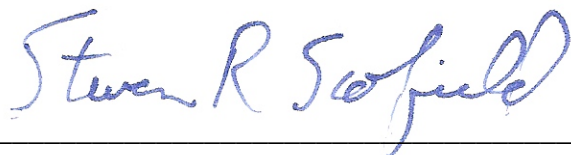
**USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY06 Final Performance Report (approx. May 06 – April 07)
July 16, 2007**

Cover Page

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Fiscal Year:	2006
USDA-ARS Agreement ID:	NA
USDA-ARS Agreement Title:	Fusarium Head Blight Research.
FY06 ARS Award Amount:	\$ 53,906

USWBSI Individual Project(s)

USWBSI Research Area*	Project Title	ARS Award Amount
HGG	Development of a Virus-Induced Gene Silencing System for the Identification of Genes Contributing to Fusarium Head Blight Resistance.	\$ 53,906
	Total Award Amount	\$ 53,906



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: *Development of a Virus-Induced Gene Silencing System for the Identification of Genes Contributing to Fusarium Head Blight Resistance.*

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

We are developing a rapid method to identify genes that contribute to wheat's resistance and susceptibility to Fusarium head blight (FHB). Until our work, identification of genes involved in resistance to FHB has been very difficult for two major reasons. First, wheat has six copies of most genes, so conventional mutagenesis cannot reveal the affect of the loss of gene function, because there are always other functional copies present that mask the mutation. Second, it is very difficult to transform wheat so T-DNA mutations or T-DNAs expressing RNAi constructs are not feasible. Our approach utilizes virus-induced gene silencing (VIGS) to strongly down-regulated all copies of chosen genes simultaneously. As virus infection of wheat is very rapid, the results of VIGS experiments can be observed with one month of inoculating the plant with the VIGS construct.

**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:

With our FY06 funding, we have developed the first VIGS functional assay for genes involved in wheat's resistance to FHB. In the course of this work we have demonstrated that the induction of expression of chitinase genes makes a significant contribution to wheat's resistance to FHB.

Impact:

The identification of chitinase activity being important in FHB resistance is highly important for FHB researchers. It suggests that engineering overexpression of chitinase or selecting germplasm with higher chitinase expression will be useful in improving FHB resistance.

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?

Prior to our work, there was no rapid method to assess the function of genes in FHB resistance. Development of a VIGS assay will greatly facilitate FHB research. We have already hosted a scientist from Gary Muehlbauer's laboratory so that they can learn the process and practice VIGS in their FHB research.

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.

“Silencing wheat and barley scab” an article on the ARS New Service May 26, 2006.

Wheat journal “Researchers Wage War on Scab” AgWeb.com 2/2/2007

http://www.agweb.com/get_article.aspx?pageid=134088&src=fswht

“VIGS System Promises to Hasten Development of Varieties Resistant to Fusarium Head Blight” USWBSI website http://www.scabusa.org/pdfs/vigs_article_6-06.pdf

“A New Weapon in Fight Against Fusarium” Top Crop Manager November 2006