

**USDA-ARS / USWBSI
FY04 Final Performance Report
July 15, 2005**

Cover Page

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Year:	FY2004 (approx. May 04 – April 05)
FY04 ARS Agreement ID:	59-0790-4-124
FY04 ARS Agreement Title:	Development of Fusarium Head Blight Resistant Wheat Varieties - Cornell
FY04 ARS Award Amount:	\$ 14,154

USWBSI Individual Project(s)

USWBSI Research Area*	Project Title	ARS Adjusted Award Amount
VDUN	Fusarium Head Blight Resistant Wheat Variety Development - Cornell.	\$ 14,154
	Total ARS Award Amount	\$ 14,154

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: *Fusarium Head Blight Resistant Wheat Variety Development - Cornell.*

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

Our sprinkler irrigation schedule combined with our improved irrigation system increased the rate of infection and reduced the variation in our Fusarium Head Blight Evaluation nursery last year. However, the use of a spray inoculum rather than the corn spawn resulted in a much higher rate of infection than in previous years and better differentiated varieties and lines in the trial. This coming year we hope to get the infection rates high enough to select single plants in early generations. Lodging was not a problem this past year with a reduced plant density compared to last year. Other diseases such as Septoria Glume Blotch were not a problem this year for some reason. Because of the variation in tiller number for different varieties, we have to count all of the spikes in each plot to get percent infection. The plot density is not very uniform so we cannot just count part of the plot. This can be extremely time consuming and it would be useful to find ways to reduce the need for this activity.

2. What were the most significant accomplishments?

New FHB resistant genotypes that come through the program are quite valuable and our goal is to pyramid the disease resistance into new varieties. We are seeing increasing frequencies of tolerance/resistance in our advanced lines because we continue to add sources of germplasm from the other cooperating programs in our crossing program. We are releasing a new soft white variety this year that has much better resistance than previous varieties but not as good as Truman. Our irrigation system is now quite reliable and adequate for screening all of our advanced lines as well as the uniform cooperative nursery. We now have a reasonably reliable protocol for estimating resistance to FHB for current varieties and experimental lines.

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 your grant. Please reference each item using an accepted journal format. If you need more space, continue the list on the next page.

Field Days

2004-5 Small Grains Management Field Day

2004-5 Plant Breeding Field Day

Informal Publications

2004 Cornell Small Grains Variety Trial Results

2004 Cornell Guide for Integrated Field Crop Management

Most important accomplishment and its impact (how is it being used?):

Accomplishment: We have advanced several early generation populations and breeding lines that are segregating for diverse sources of FHB resistance. By gradually increasing the frequency of FHB resistance genes in our breeding populations, the frequency of resistant genotypes that have good agronomic performance will continue to increase.

Impact: This project has provided us with the resources necessary to implement an effective evaluation program for FHB. Evaluation of breeding lines and varieties is labor intensive and requires well designed protocols. Communication and sharing of materials from this project has been instrumental in advancing our knowledge of how to minimize the economic impact on wheat production in the US.

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 scientific and agricultural community now has multiple sources of resistance to FHB as well as improved cultivars that reduce crop losses due to this disease. In addition, a base of resistant germplasm has been established in breeding programs throughout the regions affected by FHB.