

**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:	59-0790-4-124
Agreement Title:	Fusarium Head Blight Resistant Wheat Variety Development - Cornell.
FY05 ARS Award Amount:	\$ 16,483

USWBSI Individual Project(s)

USWBSI Research Area*	Project Title	ARS Adjusted Award Amount
VDUN	Fusarium Head Blight Resistant Wheat Variety Development - Cornell.	\$ 16,483
	Total Award Amount	\$ 16,483



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?**

In past years, although our trial accurately ranked varieties according to their known level of resistance, low infection rates reduced the incidence and severity of FHB to the point where it was sometimes difficult to assess the level of resistance in new lines. This past year, we purchased a backpack CO₂ sprayer to apply a spore suspension with excellent results. Infection levels clearly differentiated resistant and susceptible varieties scores were very consistent across replications. Also, we modified the sprinkler irrigation schedule to apply less water and this, combined with our improved irrigation system, increased the rate of infection and reduced the variation in both of our FHB Evaluation nurseries. Reduced seeding rates have solved our lodging problem and to some extent reduced the problems with other diseases such as Septoria Glume Blotch. We still count all the tillers in a plot because the variation in tiller number for different varieties must be taken into account in order to get accurate estimates of percent infection. This can be extremely time consuming and it would be useful to find ways to reduce the need for this activity. Because of the improved evaluation methods we have established, we were able to improve the consistency across replicates. This has allowed us to reduce our replication from 6 to 5 and use the remaining space for single replicate screening of the progeny from our marker assisted selection program. However, more rapid and accurate screening and evaluation methods are still needed. Our early generation bulk populations now consist mostly of tolerance/resistance sources in the pedigrees.

**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 this year was the release of another. new soft white winter wheat variety that has much better resistance than our previous varieties. The resistance level of this new release is approaching that of Truman.

Impact:

While the area of wheat production in New York is only 125,000 acres, the impact of a FHB soft white winter wheat variety could well extend beyond New York to Michigan and Ontario where several of our varieties have been grown before. Also, the availability of FHB resistant soft white wheat germplasm is useful to white wheat breeders in their hybridization program. A local source of high quality soft white wheat is critical for the smaller milling and baking companies in this region. Buyers pay a premium for white wheat bran but unfortunately that is where the vomitoxin accumulates, thus increasing the value of resistant white wheat varieties.

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?:

This is the first high yielding, soft white winter wheat adapted to this region that has a useable level of resistance to FHB.

Accomplishment:

A second accomplishment this year was the advancement of several marker-assisted selection products to our regional trials. These soft white winter wheat selections are similar to our successful variety Caledonia but should have better FHB resistance. They are being evaluated in our CU FHB replicated trial this spring.

Impact:

These selections represent the first products of our marker-assisted selection program for FHB resistance and there is likely to be a steady flow of FHB resistant materials entering our testing program from now on. FHB resistant high quality soft white wheat varieties are very important for local milling and baking companies..

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?:

In the past, very few varieties had any useable level of FHB resistance but now there is the likelihood that there will be a continuous supply of high yielding, FHB resistant soft white winter wheat varieties.

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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.

Field Days

2005 Small Grains Management Field Day

2005 Plant Breeding Field Day

Informal Publications

2005 Cornell Small Grains Variety Trial Results

2005 Cornell Guide for Integrated Field Crop Management