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

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Fiscal Year:	**2005**
FY05 ARS Agreement ID:	**59-0790-4-105**
Agreement Title:	**Diagnostic Services for DON and Regional Uniform Fungicide Trial.**
FY05 ARS Award Amount:	**$ 90,787**

USWBSI Individual Project(s)

USWBSI Research Area*	Project Title	ARS Adjusted Award Amount
CBC	Chemical Management of FHB in Wheat.	$ 8,414
FSTU	Regional Diagnostic Laboratory Providing DON Analytical Services for Regional FHB Research Projects.	$ 82,373
	Total Award Amount	**$ 90,787**

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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

Project 1: *Chemical Management of FHB in Wheat.*

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

The research objective is the testing of products that may be registered in the future. Test results will be provided to producers nationwide on what products are providing the greatest disease control and improvement in yield and quality, plus this information is used in applications for federal or special registrations of new materials

2. List the most important accomplishments and its impact (how is it being used?). Complete all three sections (repeat sections for each major accomplishment):

FHB was less severe in 2005 when compared to 2004. Fungicide field trials across two varieties did not show enough infection to validate any one fungicide or cultivar as effective in managing FHB. Unfortunately, promising fungicides, 2006 JAU6476 480SC 5.0 fl. oz +0.125% Induce, and V-10116 1.81 FL @ 6 fl oz/A + 0.125% Induce, will need to be tested again in 2006. The two varieties (Hopewell and Cedar) were different than those tested in 2005, but it is not thought this played a role in reducing FHB.

Past results suggest that DON levels can be reduced by using specific combinations of wheat variety and fungicides. However, because of the lack of FHB in the plots in 2005, that could not be validated. These types of weather-related variables (mild to severe infections) are one of the reasons that field testing needs to be performed for several years.

Impact: Plots will be tested again in 2006

Accomplishment: No FHB was observed in the test plots and it follows that DON levels were extremely low or undetectable.

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?:
We hypothesize, based on previous studies, that FHB and DON levels can be managed by a combination of chemical sprays and genetics of the wheat. However, there was not enough FHB or DON in the test plots in 2005 due to the drought in the state to validate this hypothesis in 2005

Project 2: *Regional Diagnostic Laboratory Providing DON Analytical Services for Regional FHB Research Projects.*

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

In order to provide uniformity, continuity and accuracy to DON analyses and to reduce the costs associated with analyzing wheat samples, centralized diagnostic services are being offered to the FHB (scab) research community free of charge. It is also of great benefit to be able to compare the results of DON analysis between research laboratories because all of the analyses were centrally performed here at Michigan State University. The number of samples analyzed at Michigan State has increased yearly from approximately 2,200 in 1999, to over 7,000 in 2005. States submitting samples to the MSU DON Diagnostic Laboratory include Michigan, New York, Maryland, Virginia, West Virginia, Kentucky, Arkansas, Indiana, Missouri, Ohio, and Illinois, with the majority of samples coming from outside Michigan. Samples were submitted throughout the year with the largest number submitted between August and January. Our laboratory uses an ELISA test to evaluate the samples, and collaborates with the other three laboratories who use a different procedure in a check sample program to insure that the different methods used to analyze wheat and barley for DON provide comparable results. The wheat/DON check sample program is run by Michigan State University

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:
Over 7,000 samples of wheat grain primarily from breeding program advanced lines were analyzed for DON in 2005. This information is reported back to the breeder who can make decisions as to wheather or not advance the lines further based on performance over several years.

Impact:
Breeders select lines and make informed decisions as to whether a breeding line is too susceptible to advance or whether it is tolerant or resistant and should be kept in the nursery. Using this diagnostic test, wheat breeders can determine the heritability of FHB and/or DON resistance genes.

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?:

Consumers will have healthier food supply, growers will have less dockage and elevators will have better quality wheat.

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.

Hart, L.P., Catal, M. and Wang, Z. 2005. Microarray analysis of Fusarium head blight toxin deoxynivalenol (DON) regulated genes of Arabidopsis thaliana. Proceedings 2005 Fusarium Head Blight Forum, pp. 36-40.