U.S. Wheat and Barley Scab Initiative
FY02 Final Performance Report (approx. May 02 – April 04)
July 15, 2004

Cover Page

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Year:	**FY2002 (approx. May 02 – April 04)**
Grant Number:	**59-0790-1-075**
Grant Title:	**Fusarium Head Blight Research**
FY02 ARS Award Amount:	**$ 14,634**

Project

Program Area	Project Title	USWBSI Recommended Amount
EDM	Fusarium graminearum and DON levels in single seeds following greenhouse point inoculation.	$15,000
	Total Amount Recommended	**$15,000**

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Principal Investigator Date

(Form – FPR02)

Project 1: Fusarium graminearum and DON levels in single seeds following greenhouse point inoculation.

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

The single floret inoculation system is commonly used to screen wheat cultivars and germ plasm for FHB Type II resistance in the greenhouse by a visual rating of the spread of fungal hyphae in the spike and spikelets. Evaluation of this system in our laboratory across a wide range of germ plasm has shown that the visual ratings of greenhouse spikelet infection are poorly associated with the *Fusaraium graminearum* (Schwabe) infection occurring in the seed, rachis and other floral components the same spikelets. The objective of this research was to use the single floret inoculation system to relate visual ratings of spikelet infection in the greenhouse to *F. graminearum* infection and deoxynivalenol (DON) levels in seeds of adjoining florets in all individual spikelets on each inoculated spike. The movement of fungal hyphae and DON into the various components of the spike was evaluated following point inoculation (PI) of a floret at a upper, middle and lower location of spikes for two susceptible (P 2555 and VA 96W-326) and two resistant (P 25R18, Roane) cultivars.

2. What were the most significant accomplishments?

These results of movement of *F. graminearum* and DON into adjoining seeds following greenhouse point inoculation of a middle spikelet support early studies in our laboratory. Although high levels of spikelet infection occurred in the susceptible cultivars (P 2555, VA 96W-326) in the greenhouse, the fungal movement in the spike occurred primarily in two ways; localization around the PI and movement down the spike from the PI. Thus, severity of infection of spikelets of susceptible cultivars in the greenhouse overestimated *F. graminearum* seed infection and DON presence in seeds of the same spikelets especially at spikelet locations above the PI. In resistant cultivars greenhouse spikelet infection underestimated *F. graminearum* seed infection, but was more closely related to the presence of DON. There was generally a close relationship between the presence of *F. graminearum* in seed from the left floret and the presence of DON in seed from the right floret for all spikelets of P2555, VA 96W-326 and Roane, but not P 25R18 where DON occurred primarily near the point of inoculation. Although DON was present in some seed of resistant cultivars the levels were much lower than in susceptible cultivars and often did not exceed 1 PPM (except within the adjoining spikelets above and below the PI). Point inoculations at a top or bottom spikelet location of the same cultivars in the greenhouse were unsuccessful because they resulted in much lower levels of spikelet infection than inoculation of a middle spikelet across all cultivars.

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.

TeKrony, Dennis, David Van Sanford, Cheryl Edge, Marcy Rucker and Yanhong Dong. 2002. *Fusarium graminearum* and DON in single seeds following greenhouse point inoculation. Proceedings of the 2002 National Fusarium Head Blight Forum, Erlanger, KY, December 7-9, 2002.

Argyris, Jason. 2002. "Effect of Fusarium graminearum infection on wheat seed quality" Master of Science Thesis, University of Kentucky, Lexington, KY

Argyris, J., D. VanSanford and D. TeKrony. 2003. Fusarium graminearum infection during wheat seed development and its effect on seed quality. Crop Science 43: 1-7.

Argyris, Jason, Dennis TeKrony, Don Hershman, David Van Sanford, Marla Hall, Brenda Kennedy, Marcy Rucker and Cheryl Edge. 2004. Fusarium head blight severity in the greenhouse compared to movement of *Fusarium graminearum* in inoculated wheat. Crop Science. (In Press).