U.S. Wheat and Barley Scab Initiative
Annual Progress Report
September 18, 2000

Cover Page

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Year:	**FY2000**
Grant Number:	**59-0790-9-063**
Grant Title:	**Fusarium Head Blight Research**
Amount Granted:	**$100,994.00**

Project

Program Area	Objective	Requested Amount
Food Safety, Toxicology, Utilization	Diagnostic services for DON.	$59,364.00
Food Safety, Toxicology, Utilization	Investigate utilization of contaminated grain.	$41,630.00
	Requested Total	$100,994.00

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Principal Investigator Date

(Form – PR1)

Project 1: Diagnostic services for DON.

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

   DON analytical services are provided to seven collaborating researchers at three barley varietal development programs. Approximately 5,000 samples are received and analyzed each year. The major issue is to provide the DON analytical services in a cost effective, timely and accurate manner. Funds provided by the US Wheat and Barley scab initiative have allowed us to hire additional personnel, and to subsidize the cost of analysis.

2. Please provide a comparison of the actual accomplishments with the objectives established.

   The objective of providing timely and accurate, as well as economical analyses has largely been met. Approximately 5,200 samples were analyzed during the 1999-2000.

3. What were the reasons established objectives were not met? If applicable.

4. What were the most significant accomplishments this past year?

   Adoption of new quality control measures should increase confidence in reported results. An inter-laboratory barley DON check sample service was instituted in August 2000.

Project 2: Investigate utilization of contaminated grain.

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

   The primary objectives were to (1) evaluate the relationship between *Fusarium* infection levels and grain quality damage, and (2) to investigate control strategies for limiting the growth of *Fusarium* during the malting process.

   Samples collected as part of regional barley quality surveys (1995-1999) have been micro-malted as part of objective 1. All samples were of the same variety, were from the same growing regions, and had known levels of *Fusarium* (% infected kernels) and DON (0 to 9.5 mg/kg). The samples will be analyzed for malt quality and fungal biomass (ergosterol). Statistical analysis of the data will be used to determine possible relationships between markers of infection (% kernels infected with *Fusarium*, ergosterol, and DON) and malt quality. The results of this analysis may indicate the minimal infection levels at which quality decreases can be detected.

   Objective two involves the investigation of physical, biological and chemical control strategies intended to limit the growth of *Fusarium*, and production of DON during the malting process. Evaluation of treatments first involves the identification of barley samples with viable *Fusarium*, that will produce DON during processing, or the development of inoculation techniques for the evaluation of treatments during malting.

   Physical methods are currently being screened for effectiveness at reducing Fusarim infection rates without decreased germination rates. This screening is being done using barley from the 1999 growing season. Mold viability is checked in the control samples. Methods being screened are dry heat, moist heat, microwaving, electron beam irradiation, UV irradiation and UV irradiation combined with ozone production. Analysis includes measurement of mold infection rates and germination rates.

2. Please provide a comparison of the actual accomplishments with the objectives established.

   Actual accomplishments are six months behind those stated in the objectives. Samples from the 1995-99 crop have been micro-malted as part of objective 2. Samples from the 2000 crop are being screened for DON production as part of objective 2. Of the physical treatments tested, all but dry heat seem to show some promise and will be further optimized.

3. What were the reasons established objectives were not met? If applicable.

   Staffing and equipment difficulties have caused major delays. Technical support position for this project was not filled until August 2000. In addition, the two Chemists involved in the DON

analytical services resigned their positions in May and June 2000. These were not filled until July and September 2000.

Pilot-malting equipment purchased with Scab Initiative funds was received in January 2000. The unit was damaged in shipment and as September 2000 still has not been fully repaired.

4. What were the most significant accomplishments this past year?

The primary accomplishment was the micro-malting of 93 samples for objective 1. Physical methods to control Fusarium growth during malting were screened. Of the methods screened, moist heat, electron beam irradiation, UV irradiation with ozone and microwaving show some promise. The methods of treatment still need to be optimized in order to get the most effective reduction in Fusarium growth without harming germination rates.

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.