

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

**Cover Page**

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<b>Year:</b>	<b>FY2000</b>
<b>Grant Number:</b>	
<b>Grant Title:</b>	<b>Fusarium Head Blight Research</b>
<b>Amount Granted:</b>	<b>\$25,000.00</b>

**Project**

<b>Program Area</b>	<b>Objective</b>	<b>Requested Amount</b>
Epidemiology	Determine level of pathogenic variation in the fungus responsible for causing Fusarium head blight (scab) on wheat and barley	\$44,000.00
	<b>Requested Total</b>	\$44,000.00 <sup>1</sup>

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Principal Investigator

Date

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<sup>1</sup> Note: The Requested Total and the Amount Granted are not equal.

**Project 1: Determine level of pathogenic variation in the fungus responsible for causing Fusarium head blight (scab) on wheat and barley**

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

The major problem being addressed by this project is the level of genetic variation in the Fusarium head blight pathogen of wheat and barley with respect to its capability to cause disease on these crops. To address this issue, we are testing for disease-causing ability in genetically distinct members of a world-wide collection of the fungal species *Fusarium graminearum* (teleomorph: *Gibberella zaeae*) as well as for strains in the United States collected by the Cereal Disease Laboratory during its annual pathogen surveys. This knowledge will be useful to assure that screens of resistant plant varieties adequately account for the range of variation in the pathogen species.

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

We have successfully accomplished the initial stages of this study and have published the results (see below). Specifically, we have completed our survey on a worldwide collection of naturally occurring strains from grains and a variety of non-grain hosts and found that they vary greatly in their ability to cause disease on wheat and barley. We also have made solid progress in our analysis of naturally occurring pathogenic diversity in strains derived from pathogen surveys of wheat and barley in the United States and China. We hope to expand this screening to more barley cultivars, especially those that seem to be displaying different disease reactions between field plots in China and the US.

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

Not applicable.

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

The major accomplishment of FY2000 has been to determine that the Fusarium head blight pathogen represents at least eight genetically distinct lineages. This finding indicates that the pathogen is genetically more diverse than previously recognized and may require greater effort on the part of FHB workers to account for this diversity. The other major accomplishment has been to determine that strains of the pathogen vary greatly in their ability to spread within susceptible wheat varieties and this may lead to clues on how to prevent the dissemination of disease.

Year: 2000  
PI: H. Corby Kistler  
Grant:

Progress Report

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.

Articles written about my work.

Kurtzman, C.P. 2000. Microbial Genomes: Unraveling Their Potential. Agricultural Research 48 (8): 2.

Hardin, B. 2000. DNA Profiling: Guarding Against a Plant Disease Epidemic. Agricultural Research 48 (8):4 – 7 (cover story).

Publications:

O'Donnell, K., H.C. Kistler, B.K. Tacke, and H.H. Casper. 2000. Gene genealogies reveal global phylogeographic structure and reproductive isolation among lineages of *Fusarium graminearum*, the fungus causing wheat scab. Proc. Natl. Acad. Sci. USA 97:7905-7910. (The support of the U.S. Wheat and Barley Scab Initiative was acknowledged in this paper).