

**U.S. Wheat and Barley Scab Initiative  
 FY00 Final Performance Report (approx. May 00 – April 01)  
 July 30, 2001**

**Cover Page**

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<b>Grant Title:</b>	<b>Fusarium Head Blight Research</b>
<b>2000 ARS Award Amount:</b>	<b>\$32,139</b>

**Project**

<b>Program Area</b>	<b>Project Title</b>	<b>Requested Amount</b>
Epidemiology & Disease Management	Spatial and temporal aspects of genetic diversity in <i>G. zeae</i> .	\$32,942.00
	<b>Requested Total</b>	<b>\$32,942.00<sup>1</sup></b>

\_\_\_\_\_  
Principal Investigator

\_\_\_\_\_  
Date

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

**Project 1: Spatial and temporal aspects of genetic diversity in *G. zeae*.**

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

One of the continuing problems with wheat scab is the uncertainty about the source of inoculum that causes disease. We are using molecular markers to determine the source(s) of spores causing head scab of wheat. The work is proceeding in three phases. 1. Assess the amount of genetic variability at the field level. 2. Determine if *G. zeae* populations from corn and wheat stubble differ genetically. 3. If *G. zeae* populations from corn and wheat stubble do differ, then assess which stubble population acts as the major inoculum source for scab.

Samples were collected from 11 "target areas" in four states. Each target area consisted of a wheat field that was immediately adjacent to one field containing wheat stubble and another with corn stubble. Samples were collected from the stubble fields at the time of wheat anthesis, and infected wheat heads were collected approximately three weeks later. Isolates from four targets, one from Michigan, two from North Dakota and one from Minnesota, are being characterized using AFLP techniques.

Small-scale population structure will be analyzed by comparing isolates from the stubble fields surrounding each target wheat field to determine the level diversity. Since corn and wheat stubble represent the local inoculum source, the population structure of *G. zeae* causing disease in the target wheat field will be compared to *G. zeae* populations obtained from these adjacent corn and wheat stubble fields. If the stubble populations differ in structure, we will use AFLP bands that are found in one stubble population and not the other to identify which stubble population is the more important inoculum source. Further, long-distance dispersal into an area will be estimated from the presence of AFLP bands that are not found in adjacent inoculum source populations.

## 2. What were the most significant accomplishments?

*G. zeae* populations are highly variable at the field level. Most isolates have a unique genotype indicating that they are derived from ascospore infection. Thirteen of 20 bands scored for the selective primer combination EcoR1-AA and MseI-CAT were found to be variable across the four target populations characterized to date. For variable loci, allele frequencies for band presence ranged from 0.08 to 0.96. Corn and wheat stubble populations do not differ genetically with the exception of a 77BP band. This band is found at a much higher frequency in wheat stubble. We are processing additional samples to confirm this pattern. Our data also suggest some slight spatial patterning of genetic variability with target areas differing in the overall frequency of variable loci. However, the lack of a clear correlation between distance and genetic relatedness suggests that the pattern of variability does not follow an isolation by distance model.

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.

Poster Presentations:

Jarosz, A.M., J. Schaupp & N. Kieu. 2000. Local genetic diversity of *Gibberella zeae* populations from corn stubble, wheat stubble, and infected wheat heads. P. 156. 2000 National Fusarium Head Blight Forum., Erlanger KY.

Schaupp, J. & A.M. Jarosz. 1998. Identifying wheat scab inoculum sources using molecular markers. The 1998 National Fusarium Head Blight Forum, East Lansing MI.