

**U.S. Wheat and Barley Scab Initiative
Annual Progress Report
September 15, 1999**

Cover Page

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Grant Number:	59-0790-9-044
Grant Title:	Fusarium Head Blight Research
Amount Granted:	\$19,512.00

Project

Program Area	Objective	Requested Amount
Epidemiology	Study the spatial and temporal aspects of genetic diversity in <i>G. zeae</i> .	\$20,000
	Requested Total	\$20,000¹

Principle Investigator

Date

¹ Note: The Requested Total and the Amount Granted are not equal.

Project 1: Study the 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?

The small-scale pattern of genetic diversity is being determined for *Gibberella zeae* populations. This information will be used to determine whether local *G. zeae* populations residing on corn and wheat stubble differ. The data will also be used to estimate the degree of outcrossing within these populations. Outcrossing rates will, in turn, be used to estimate the importance of conidia (asexual spores) relative to ascospores (sexually produced spores) as an inoculum source. Finally, we will also use the data as a forensic tool to determine whether spores from corn or wheat stubble are the major source of inoculum for wheat scab.

The problem is being addressed by sampling around a series of target wheat fields in four states, Michigan, Minnesota, North and South Dakota. Each target field has wheat growing in it and the field is adjacent to at least one field with corn stubble AND another with wheat stubble from the previous year. Samples of *G. zeae* were obtained from infected wheat heads growing in the target field and from the corn and wheat stubble of the adjacent fields. Collections were made from three target fields in Michigan, Minnesota and North Dakota and two from South Dakota. The genetic structure of each population will be determined using a series of RAPD primers developed by Angela Schilling. Once the RAPD data are in hand, standard population genetics procedures will be used to assess population structure and outcrossing rates. Identification of the predominant inoculum source will depend on the pattern of variation found in the corn and wheat stubble populations surrounding a target field. If sufficient variation is found among the stubble populations, then bands that are unique to one or the other stubble population will be used to assess the relative importance of corn versus wheat stubble as a source of inoculum.

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

Currently, we are on track to accomplish our stated objectives. All necessary samples were collected this past growing season and isolation of *G. zeae* is proceeding (see #4).

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

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

The project is dependent on collection of isolates around target fields where the wheat eventually becomes infected. In past years, wheat scab has been sporadic disease occurring in some areas and not others. To insure that we get some target wheat fields with disease, we collected in four states to increase the likelihood that some of the target wheat fields would be infected. Incidence was rather high and widespread in 1999, and all target fields contained enough disease to allow us to proceed with the isolations from all locations. Currently, *G. zeae* is being isolated from our collections. To date, we have obtained 95 isolates from 2 target populations. We anticipate that another six to ten weeks will be needed to obtain the necessary isolates from two target population areas in Michigan, Minnesota and North Dakota. Our preliminary work indicates that *G. zeae* populations are much larger on corn stubble relative to wheat stubble. Early in 2000, we will begin to assess isolates for RAPD banding pattern, and we anticipate having all necessary data in hand by the autumn of 2000. Final analysis and publication of the results should be accomplished by early in 2001.

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.

Schaupp, J. and A. M. Jarosz. 1998. Identifying wheat scab inoculum sources using molecular markers. Poster presentation at: The 1998 National Fusarium Head Blight Forum.