

**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>59-0790-9-058</b>
<b>Grant Title:</b>	<b>Fusarium Head Blight Research</b>
<b>Amount Granted:</b>	<b>\$9,756.00</b>

**Project**

<b>Program Area</b>	<b>Objective</b>	<b>Requested Amount</b>
Chemical & Biological Control	To identify application technologies that will maximize fungicide coverage and efficacy against FHB.	\$19,854
	<b>Requested Total</b>	<b>\$19,854<sup>1</sup></b>

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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: To identify application technologies that will maximize fungicide coverage and efficacy against FHB.**

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

The overall objective of this project is to identify and develop application technologies that will maximize fungicide coverage and efficacy against FHB (Scab).

One of the important focus of this project is to develop computer imaging technology- based objective and consistent technique for quantifying the fungicide coverage on wheat & barley heads. Through this project, we are developing & validating improved algorithms to quantify spray coverage on wheat and barley heads. At present, we have developed a hybrid optimized algorithm (based on combination of two segmentation techniques) that provided an error of only 2%, tested on 530 sprayed images. We are in the process of evaluating other morphological image processing techniques to compare its effectiveness too.

Another task is to determine the optimum concentration of fluorescent dye, to be used for obtaining higher quality images of sprayed wheat and barley heads. Two separate experimental trials have been completed for this task. Results are being analyzed.

The third focus is to develop prototype air-assisted fungicide application system for improved fungicide coverage and control against FHB. A number of spray application trials have been completed in the greenhouse with spring wheat, durum and barley plants. Flat fan spray nozzles with forward and backward configuration have been tried. A prototype was built with dual air assist configuration and was tested in the greenhouse. This was found to produce an increase in spray coverage over the forward and backward configuration of the flat fan nozzles.

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

The progress made so far is satisfactory.

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

The difficulty in hiring graduate student (with appropriate background) is causing problem. One of the key person (research technician), from our collaborator's (Dr. Marcia McMullen) group left and it has hampered our research progress. This situation of course is temporary and is expected to improve soon.

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

An optimized algorithm has been developed for objective quantification of spray coverage of sprayed wheat/barley heads. This work has been presented in International ASAE summer meeting (2000), in Milwaukee, WI. The modified dual-air assist sprayer configuration shows promises for increased spray coverage on targets. Extension reports have been published covering these findings.

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.

V. Hofman, M. McMullen, T. Gregoire, J. Lukach, S. Halley, J. Pederson, J. Moos, S. Panigrahi, D. Gu. *Application of Fungicides for Suppression of Fusarium Head Blight (Scab)*. May 2000. NDSU Extension Service Publication AE-1148. NDSU. Fargo.

S. Panigrahi, H. Gu, V. Hofman, M. McMullen, S. Halley. "*SCES*": *An objective fungicide coverage evaluation system for control of Fusarium head blight*. 1999 National Fusarium Head Blight Forum. Sioux Falls, SD.

S. Panigrahi, H. Gu, V. Hofman, M. McMullen, S. Halley. "*SCES*": *An objective fungicide coverage evaluation system for control of Fusarium head blight*. ASAE Paper No. 001115. ASAE Annual International Meeting (2000), Milwaukee, WI.

H. Gu, S. Panigrahi, V. Hofman. *Evaluation of Image Processing Techniques for Spray Coverage Evaluation for Scab Disease*. ASAE Paper No. MBSK99-131. 1999. North Central Regional ASAE/CASE Conference. Winnipeg, Manitoba, Canada.

V. Hofman, M. McMullen, S. Panigrahi, T. Gregorie, H. Gu. *Application Equipment for the Control of Fusarium Head Blight (Scab)*. ASAE Paper No. MBSK99-119. North Central Regional ASAE/CASE Conference. Winnipeg, Manitoba, Canada.

M. Mullen, S. Halley, J. Pederson, V. Hofman, J. Moos, S. Panigrahi, D. Gu, T. Gregoire. *Improved Fungicide Spraying for Wheat/Barley Head Scab Control*. 1999. NDSU Extension Report 56. NDSU. Fargo.