

**USDA-ARS/  
U.S. Wheat and Barley Scab Initiative  
FY05 Final Performance Report (approx. May 05 – April 06)  
July 14, 2006**

**Cover Page**

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<b>Fiscal Year:</b>	<b>2005</b>
<b>FY05 ARS Agreement ID:</b>	<b>59-0790-3-079</b>
<b>Agreement Title:</b>	<b>Aerial and Ground Spray Application Technology for Enhanced Fungicide Efficacy for Control of FHB.</b>
<b>FY05 ARS Award Amount:</b>	<b>\$ 55,512</b>

**USWBSI Individual Project(s)**

<b>USWBSI Research Area*</b>	<b>Project Title</b>	<b>ARS Adjusted Award Amount</b>
CBC	Aerial Spray Application Technology for Enhanced Fungicide Efficacy for Control of FHB on Barley.	\$ 10,468
CBC	Spray Application Technology for Enhanced Fungicide Efficacy for Control of FHB.	\$ 45,044
	<b>Total Award Amount</b>	<b>\$ 55,512</b>

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Principal Investigator

\_\_\_\_\_  
Date

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\* BIO – Biotechnology  
CBC – Chemical & Biological Control  
EDM – Epidemiology & Disease Management  
FSTU – Food Safety, Toxicology, & Utilization  
GIE – Germplasm Introduction & Enhancement  
VDUN – Variety Development & Uniform Nurseries

(Form – FPR05)

**Project 1:** *Aerial Spray Application Technology for Enhanced Fungicide Efficacy for Control of FHB on Barley.*

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

Fungicide has reduced losses from Fusarium head blight (FHB) in small grains by half. Approximate 50% of the fungicide applied to small grain is applied by aerial application. After timing, spray application technology improvements offer the fastest and least expensive method for growers to enhance FHB control in small grain. Study of aerial application technology to wheat has shown that a small- medium drop size is the most effective drop size on spring wheat. The architecture of the barley plant is different from the wheat plant and no aerial application study has been reported.

**2. List the most important accomplishment and its impact (how is it being used?).  
Complete all three sections (repeat sections for each major accomplishment):**

**Accomplishment:**

A study was initiated in 2005 and will be repeated in 2006 to evaluate three spray volumes (3, 5, and 7 gpa) and two drop sizes (large-fine and small-medium) for improved control of FHB. Fungicide efficacy will be determined by disease incidence, field severity, and deoxynivalenol accumulation. Grain head coverage will be measured by a method that uses absorbance determined with a photo spectrometer following a head wash with alcohol to remove a dye included with the fungicide. Disease levels were extreme in 2005. The procedure selected to determine head coverage used an insufficient amount of dye to determine differences among treatments.

**Impact:**

Procedures will be modified in 2006 to include a increased amount of dye to determine coverage differences. The inability of the fungicide to control FHB under the extremely good growing conditions for FHB suggests that an additional fungicide application may be warranted for barley in some instances.

**As a result of that accomplishment, what does your particular clientele, the scientific community, and agriculture as a whole have now that they didn't have before?:**

The first aerial study on barley was reported. Results were inconclusive. A repeat of the study is planned for 2006.

**Project 2:** *Spray Application Technology for Enhanced Fungicide Efficacy for Control of FHB.*

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

A new fungicide (Proline) is expected to be approved for application in fall 2006. The fungicide is reported to improve control of FHB by an additional 10% over existing options. Applying fungicide that maximizes efficacy and spray application efficiency will likely offer improvement over the 50% control standard by 10%. The costs to apply these technologies will be a one time investment and will be minimal compared to annual fungicide costs.

**2. List the most important accomplishment and its impact (how is it being used?).  
Complete all three sections (repeat sections for each major accomplishment):**

**Accomplishment:**

A series of studies were conducted that evaluated spray volume, drop size, and orifice orientations for improved control of FHB on small grain with fungicide. As a result of these and other studies specific application techniques have been suggested to applicators that improve the consistency of fungicide application and improve efficiencies of application. An extension publication, AE-1314 Ground Application of Fungicide for the Suppression of Fusarium Head Blight in Small Grains, from the North Dakota Extension Service has been distributed in the North and South Dakota and Minnesota region.

**Impact:**

The recommendations will increase spray efficiencies by reducing spray volume and lowering initial equipment costs and improve fungicide efficacy for control of FHB.

**As a result of that accomplishment, what does your particular clientele, the scientific community, and agriculture as a whole have now that they didn't have before?:**

The producers and scientists that utilize these recommendations will improve fungicide efficacy and improve application efficiencies.

**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.**

1. Hofman, V., Halley, S., Van Ee, G., Draper, M., McMullen, M. and C. Hollingsworth. May 2006. Ground Application of Fungicide for the Suppression of Fusarium Head Blight. Agriculture Experiment Station Publication AE-1314. North Dakota State University Fargo.
2. Halley, S. and V. Hofman. 2005 Aerial application of fungicide on barley. Proceedings of the 2005 National Fusarium Head Blight Forum. U.S. Wheat and Barley Scab Initiative. Milwaukee, Wisconsin. Abstract.
3. Halley, S., Van Ee, G. and Vern Hofman. 2005. Effect of nozzles on fungicide efficacy for control of Fusarium head blight on barley. Proceedings of the 2005 National Fusarium Head Blight Forum. U.S. Wheat and Barley Scab Initiative. Milwaukee, Wisconsin. P. 194-197.