USDA-ARS / USWBSI
FY04 Final Performance Report
July 15, 2005

Cover Page

PI:	**Charla R. Hollingsworth**
Institution:	**University of Minnesota**
Address:	**Department of Plant Pathology** **2900 University Avenue** **Crookston, MN 56716**
E-mail:	**holli030@umn.edu**
Phone:	**218-281-8627**
Fax:	**218-281-8603**
Year:	**FY2004** (approx. May 04 – April 05)
FY04 ARS Agreement ID:	**59-0790-3-080**
FY04 ARS Agreement Title:	**Investigating Fungicide and Application Strategies for Increased FHB Control.**
FY04 ARS Award Amount:	**$ 30,277**

USWBSI Individual Project(s)

USWBSI Research Area*	Project Title	ARS Adjusted Award Amount
CBC	FHB Uniform Fungicide Trials on Wheat and Barley in Minnesota.	$ 14,010
CBC	Integrated Project - Ground and Aerial Application of Fungicides for Improved FHB Control.	$ 16,267
	Total ARS Award Amount	**$ 30,277**

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Principal Investigator Date

* 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 – FPR04)

Project 1: ***FHB Uniform Fungicide Trials on Wheat and Barley in Minnesota.***

1. What major problem or issue is being resolved and how are you resolving it?
Fusarium head blight (FHB) disease development is dependent on environmental conditions prior to, and during the period when wheat and barley are in a susceptible growth stage. Commercially available wheat varieties have low to moderate levels of resistance, while malting barley varieties are susceptible. In some environments, moderate disease suppression has been achieved from application of Folicur (tebuconazole) at Feekes 10.51 (early flowering stage). Ongoing research focused on disease control efficacy of experimental fungicides is being conducted.

This project tested disease control efficacies of different rates of two experimental chemical products when applied singularly or mixed with tebuconazole on hard red spring wheat and spring barley in northwest Minnesota. Cooperatively, results across years from the multi-state uniform fungicide trial effort indicated those fungicide compounds most effective in reducing disease severity on small grains across diverse environments and under various disease pressures.

2. What were the most significant accomplishments?

Accomplishment
This project tested disease control efficacies of different rates of two experimental chemical products when applied singularly or mixed with tebuconazole on hard red spring wheat and spring barley in northwest Minnesota. Cooperatively, results across years from the multi-state uniform fungicide trial effort indicated those fungicide compounds most effective in reducing disease severity on small grains across diverse environments and under various disease pressures.

Impact
I achieved an increased level of FHB disease control on spring wheat and barley by applications of fungicides, even though the environment supported disease development. During 2004, the tested products provided increased protection against grain yield and quality losses during a year when FHB incidence and severity was at epiphytotic levels.

Outcome of research for clientele
Overall, results from this experiment illustrate that increased FHB control on hard red spring wheat and barley can be expected in Minnesota during years of moderate FHB disease pressure. If further development of these active ingredients is supported by chemical companies, data from this test may be used to support EPA emergency exemptions for Section 18 applications on wheat and barley to control FHB.

Project 2: ***Integrated Project - Ground and Aerial Application of Fungicides for Improved FHB Control.***

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

New fungicide chemistries offering greater FHB disease control are limited in the marketplace, making it imperative that existing fungicides be used in such a manner as to achieve maximum disease control. This project was conducted to investigate disease control efficacy by exploring applications of fungicide with alternative aerial application technologies in large-scale test plots in commercial fields of hard red spring wheat. This research addresses how fungicide delivery methods can determine active ingredient deposition and placement on plant heads as well as resulting disease control.

This three-state, interdisciplinary research effort focused on disease control effects of different droplet sizes and water gallonages of an aerially-applied fungicide (Folicur) on wheat. While the overall cooperative effort included ground application experiments in North Dakota, the University of Minnesota was involved with the aerial experiments. Experimental sites included one each commercial field of hard red spring wheat near Crookston, MN; St. Thomas, ND; and Hunter, ND. Field environments were not modified to increase the level of disease.

2. What were the most significant accomplishments?

Accomplishment

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Impact

Across all test sites, data showed that fungicide treatment decreased FHB and increased yield. Data indicated that differences across experimental site locations, droplet sizes, location*gallonage interactions, and location*gallonage*droplet size interactions exist. Trends were apparent from first year data, but conclusions cannot be made until the effort is repeated.

This field scale, interdisciplinary research effort brought together a number of scientists and technologies to accomplish a critically important objective. We investigated aerial fungicide application technologies and how they can be modified to more effectively manage for FHB.

Outcome of research for clientele

This information is critical in determining the most efficacious fungicide application technology available for spring wheat producers when managing FHB. Information on the aerial application of fungicides has been scarce in the past. This research effort will provide the information needed to make aerial application of fungicides as effective in controlling FHB as are current ground-based fungicide applications.

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 you grant. Please reference each item using an accepted journal format. If you need more space, continue the list on the next page.

Hollingsworth, C. 2005. Evaluating fungicides for controlling FHB. Prairie Grains 69:34-35.

McMullen, M., S. Halley, C. Hollingsworth, V. Hofman, B.K. Fritz, I.W. Kirk, W.C. Hoffmann, and D.E. Martin. 2004. Integrated study of aerial application parameters to improve control of FHB with fungicides. Pages 350-351 in: Proc. 2nd Intl. Symposium on FHB. 11-15 Dec. 2004, Orlando, FL.

Hollingsworth, C.R. and C.D. Motteberg. 2004. Uniform fungicide trial on FHB of hard red spring wheat in Minnesota. Pages 324-326 in: Proc. 2nd Intl. Symposium on FHB. 11-15 Dec. 2004, Orlando, FL.

Hollingsworth, C.R. and C.D. Motteberg. 2004. Uniform fungicide trial on FHB of spring barley in Minnesota. Pages 327-329 in: Proc. 2nd Intl. Symposium on FHB. 11-15 Dec. 2004, Orlando, FL.

Hollingsworth, C.R. and C.D. Motteberg. 2005. Efficacy of fungicides in controlling Fusarium head blight on spring wheat in Minnesota, 2004. Fungic. Nematicide Tests 60:CF002.

Hollingsworth, C.R. and C.D. Motteberg. 2005. Efficacy of fungicides in controlling Fusarium head blight on spring barley in Minnesota, 2004. Fungic. Nematicide Tests 60:CF003.

PowerPoint Presentation:

Moorhead, MN on 3 Feb. 2005 at the “Best of the Best” wheat workshop