U.S. Wheat and Barley Scab Initiative
FY02 Preliminary Final Performance Report (approx. May 02 – April 03)
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Cover Page

PI:	**Jochum Wiersma**
Institution:	**University of Minnesota**
Address:	**Northwest Research and Outreach Center** **2900 University Ave.** **Crookston, MN 56716**
E-mail:	**weirs002@maroon.tc.umn.edu**
Phone:	**218-281-8629**
Fax:	**218-281-8603**
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Grant Title:	**Fusarium Head Blight Research**
FY02 ARS Award Amount:	**$ 19,512**

Project

Program Area	Project Title	USWBSI Recommended Amount
CBC	Evaluation of varietal responses to different fungicide management strategies in spring wheat.	$20,000
	Total Amount Recommended	**$20,000**

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Principal Investigator Date

Project 1: Evaluation of varietal responses to different fungicide management strategies in spring wheat.

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

Cultivars of hard red spring wheat differ genetically in their response to one or more of the economic important fungal pathogens. Broad spectrum, systemic fungicides like tebuconazole or propiconazole, can provide excellent control of the residue born, foliar as well as provide suppression of fusarium head blight. The tools available to assist HRSW producers in Minnesota and North Dakota to make fungicide decisions include a decision support system and a spore sampling network and disease forecasting system that predicts the likelihood of an infection of the economic important foliar pathogens and quantifies the presence of Fusarium graminearum spores. These decision aids do not take into account the genetic differences in resistance to one or more of the economic important diseases. Previous research has shown that significant cultivar by fungicide interactions exist. The objectives of this research are to: 1) Evaluate whether cultivars can be grouped in classes such that fungicide management decisions can be made to optimize economic returns of the application of one and 2) Evaluate which fungicide management strategy is most economic given a cultivars' characteristics.

The experiment uses a factorial design with the first factor the grouping of cultivars and as the second factor, the different fungicide management strategies was conducted in 2001 and 2002. It will be repeated for a third and final year this summer The grouping of cultivars is as follows: Susceptible to both foliar diseases and FHB, Susceptible to FHB but resistant to foliar diseases, Susceptible to foliar diseases but resistant to FHB, and Resistant to both FHB and foliar diseases. The fungicide management approaches used are: No fungicides applied, One application at Feekes 5, One application at Feekes 10.51, One application at Feekes 5 and one at Feekes 10.51, and one or two applications based on the available decision support systems. The fungicides were applied at recommended rates and volumes using a backpack sprayer. Variables measured included disease ratings for foliar diseases and FHB at 21 days after heading, grain yield, test weight, and grain protein. Economic returns were calculated using figures based upon Minnesota Farm Business Management Education's cost estimates.

2. What were the most significant accomplishments?

In 2001, the experiment was planted on May 18 and initial growth and development were excellent. The growing season started cool and dry. Some light pressure of tan spot was evident early. An early application at Feekes 5.0 was made with a half of the labeled rate of 'Stratego' on June 14th for both fungicide treatments 4 and 5. Quickly thereafter, temperatures soared in the high eighties and low nineties by the end of the month of June, pushing the development of crop along fast. The application of 'Folicur' at Feekes 8 was made on June 29th. Conditions for disease development were rated unfavorable for the leaf diseases and few or no FHB spores were detected by the closest sampling point of the disease forecasting system throughout the later part of June and the first two weeks of July. A final application of 'Folicur' at 4 fl oz. at Feekes 10.5.1 was made on July 7th.

The data from 2001 indicate that the grouping of cultivars worked as the groups sorted out as expected based on their disease ratings. The fungicide treatments showed significant differences for average severity observed at Feekes 11.0, with treatment 4 showing the least amount of leaf diseases. Initially, the disease pressure for the leaf disease was very light but an outbreak of the leaf diseases occurred after Feekes 10.5.1. This late outbreak was favored by frequent rain events and high relative humidity in the later part of July as indicated by the disease forecasting system. No significant differences were found for field severity of FHB, as the overall disease pressure of FHB was light with field severities not exceeding 10%.

In 2002, the experiment was planted on May 14 and initial growth and development were excellent. Due to excess rain and subsequent flooding in early June, one whole and part of a second block were lost. An early application at Feekes 5.0 was made with half the labeled rate of 'Stratego' on June 18. The application of 'Folicur' at Feekes 8 was made on July 1. Conditions for disease development were rated favorable for the leaf diseases moderate levels of FHB spores were detected on several days by the closest sampling point of the disease forecasting system. A final application of 'Folicur' at 4 fl oz. at Feekes 10.5.1 was made on between July 5 and 11 depending on the heading dates of the individual cultivars.

The data from 2002 indicate that the grouping of cultivars sorted out based on their disease ratings. The groups respective differed for the total amount of leaf diseases and/or resistance to FHB. Significant differences were detected for grain yield, with the combination of an early application of Stratego in combination with a heading application gave on average a 34% increase in grain yield over the untreated checks. The combination of FHB susceptible cultivars in combination with an early application of Stratego at half the labeled rate and an application of Folicur at the labeled rate at Feekes 10.51 tended to yield the most per acre, but no significant group by cultivar interaction could be detected for relative grain yield or grain yield.

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.

None at this point of time. Results of the third and final year will be included in the results before any data will be published.