USDA-ARS / USWBSI
FY04 Final Performance Report
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Cover Page

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Year:	**FY2004** (approx. May 04 – April 05)
FY04 ARS Agreement ID:	**59-0790-3-079**
FY04 ARS Agreement Title:	**Integrated Project - Ground and Aerial Application of Fungicides for Improved FHB Control.**
FY04 ARS Award Amount:	**$ 36,744**

USWBSI Individual Project(s)

USWBSI Research Area*	Project Title	ARS Adjusted Award Amount
CBC	Integrated Project - Ground and Aerial Application of Fungicides for Improved FHB Control.	$ 36,744
	Total ARS Award Amount	**$ 36,744**

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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

Project 1: ***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?

Control of FHB through fungicide application appears to have limitations that are not related to the fungicide but to the application techniques of the fungicide. Study of spray application technologies to maximize fungicide performance may provide more consistent results when fungicide application is necessary to protect the crop from widespread losses. Approximately 50% of the fungicide is applied by both ground and aerial spray applicators with shifts to one type of applicator occurring depending on weather. The aerial applicator apply more in years when ground application equipment can not perform due to wet conditions. The ground applications are more often performed by farmers than aerial application technique. Limited quantities of research have been done with aerial application techniques to apply fungicide to small grains.

2. What were the most significant accomplishments?

Grain test weights were reduced by smaller drop size aerial spray applications. Fusarium head blight incidence and field severities by spray volumes were different among locations. Ground application studies identified limitations of several techniques used to qualify the coverage one would obtain with various spray technologies as they apply to spraying the grain spike. An NDSU system utilizing a fluorescent dye to determine coverage worked well on barley and durum but not as well on hard red spring wheat. Cards placed in the canopy documented the coverage associated with wind but were not an effective deposition measurement system when spray volumes were greater than 10 GPA. Results showed the forward/backward nozzle configuration with an XR8001 nozzle to be a very excellent system when travels speeds were in the walking range of 3 to 4 mph. As travel speeds increased, a forward oriented nozzle was as effective as the forward/ backward configuration. Growers would typically travel at greater speeds than 4 mph. A drop size study showed that greater quantities of fungicide were deposited on the spike with an XR8002 nozzle @ 40psi (large/ fine drop size)* than an XR8001nozzle @ 40psi (medium/ fine drop size) or an XR8003 @ 20psi nozzle (large/ medium drop size). The two air assisted type spray systems tested produce droplets smaller than the XR8001 nozzle and both sprayers had difficulty depositing the drops on the crop spikes. Further testing needs to be done to identify the appropriate drop size and air speed to improve spray deposition on the spike. The water sensitive cards were not effective with air assist sprayers as they did not simulate the same movement of the spike as the sprayer passes over the canopy.

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*Droplet size classifications are based on BCPC specifications and are in accordance with ASAE Standard S-573.

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.

Halley, S., Hofman, V., Panigrahi, S., and H. Gu. 2005. Aerial fungicide application technology to enhance Folicur efficacy for Fusarium head blight (FHB). Proceedings of the 2nd International Symposium on Fusarium Head Blight Incorporating the 8th European Fusarium Seminar. p. 300-305.

Halley, S., Van Ee, G., Hofman, V., Panigrahi, S., and H.Gu. 2005. Effect of application technology parameters spray volume and drop size on fungicide efficacy for control of Fusarium head blight. Proceedings of the 2nd International Symposium on Fusarium Head Blight Incorporating the 8th European Fusarium Seminar. p. 306-310.

McMullen, M., Halley, S., Hollingsworth, C., Hofman, V., Fritz, B.K., Kirk, I.W., Hoffmann, W.C., and D.E. Martin. 2005. Integrated study of aerial application parameters to improve control of FHB with fungicides. Poster # 146 presented at the International Symposium on Fusarium Head Blight Incorporating the 8th European Fusarium Seminar. Orlando, Florida.

Van Ee, G., Halley, S., and V. Hofman. 2005. Significant accomplishments and future endeavors in chemical application. Invited talk at the International Symposium on Fusarium Head Blight Incorporating the 8th European Fusarium Seminar. Orlando, Florida.