USDA-ARS / USWBSI
FY03 Final Performance Report (approx. May 03 – April 04)
July 15, 2004

Cover Page

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Year:	**FY2003 (approx. May 03 – April 04)**
FY03 ARS Agreement ID:	**NA**
FY03 ARS Agreement Title:	**FY03 USWBSI Aerial Application Methodology for Improved Spray Deposition on Wheat Heads.**
FY03 ARS Award Amount:	**$ 56,585**

USWBSI Individual Project(s)

USWBSI Research Area*	Project Title	ARS Adjusted Award Amount
CBC	Aerial Application Methodology for Improved Spray Deposition on Wheat Heads.	$ 56,585
	Total Amount Recommended	**$ 56,585**

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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: ***Aerial Application Methodology for Improved Spray Deposition on Wheat Heads.***

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

Development and evaluation of aerial application technologies to increase spray deposits on wheat heads with standard aerial spray rates is the issue and objective of this research. The goals of the effort were to: 1) Identify the capability of conventional aerial application practice to deposit sprays on wheat heads and determine the properties of those spray deposits; 2) Determine if the amount of spray deposits on wheat heads can be enhanced through the use of very fine sprays produced by rotary atomizers, and characterize those spray deposits; and 3) Determine if aerial sprays applied from two directions would increase deposits on wheat heads, and characterize those spray deposits. Three large-acreage aerial spray studies were conducted to achieve these project goals. Treatments were applied in randomized blocks with three replications. Multiple sub-samples of wheat heads and artificial collectors were collected and analyzed to characterize spray deposits from the specified treatments. Fluorometry and image analyses were used to quantitate and characterize spray deposits on wheat heads and artificial collectors.

2. What were the most significant accomplishments?

Medium droplet spectrum sprays with conventional aerial systems and practice gave the lowest tracer dye deposits on wheat heads regardless of spray rates between 2 and 10 gallons per acre. Fine droplet spectrum sprays applied with rotary atomizers gave the highest dye deposits on both wheat heads and artificial samplers. Preliminary aerial studies with vertical cylindrical water sensitive paper samplers indicated that application of aerial sprays in two directions over the same swath tended to deposit on all directional surfaces of the samplers only when wind velocities were less than 3 mph. Aerial spray deposits were predominantly on the upwind side of the cylindrical samplers when wind velocities were greater than 5 mph regardless of flight direction relative to ambient wind direction. The field treatment of two spray passes over the same swath in quartering wind direction did not give improved overall spray deposits. Results from these studies on optimizing aerial spray deposits will be implemented in disease control studies to provide guidance for aerial fungicide applications for control of Fusarium head blight.

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.

Kirk, I. W., B. K. Fritz, and W. C. Hoffmann. 2003. Alternatives to increase aerial spray deposits for FHB control. 2003 National Fusarium Head Blight Forum Proceedings. December 13-15, 2003, Bloomington, Minnesota.

Kirk, I. W., B. K. Fritz, and W. C. Hoffmann. 2004. Aerial Methods for Increasing Spray Deposits on Wheat Heads. ASAE Paper No. 041029. St. Joseph, Mich.: ASAE.