U.S. Wheat and Barley Scab Initiative
FY02 Final Performance Report (approx. May 02 – April 03)
July 15, 2003

Cover Page

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Year:	**FY2002 (approx. May 02 – April 03)**
Grant Number:	**59-0790-9-068**
Grant Title:	**Fusarium Head Blight Research**
FY02 ARS Award Amount:	**$ 5,854**

Project

Program Area	Project Title	USWBSI Recommended Amount
CBC	Evaluation of fungicides and biological agents for control for FHB in Virginia.	$6,000
	Total Amount Recommended	**$6,000**

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Principal Investigator Date

Project 1: Evaluation of fungicides and biological agents for control for FHB in Virginia.

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

Uniform fungicide treatment trials for FHB control were established in the spring wheat/barley regions and in winter wheat regions of the United States, including Virginia. The establishment of a core set of treatments across a number of states permitted the evaluation of products and methods for consistency in performance over a wide number of environments and across grain types affected by FHB. Also, because FHB does not occur every year in every location, regardless of attempts to ensure infection through added inoculum or misting systems, having the trials across environments increases the chance of favorable disease levels for evaluation across multiple sites. One strobilurin fungicide, Quadris 2.08 SC, recently (summer 1999) received federal registration, one triazole fungicide, Folicur 3.6F, was granted special exemptions for use in 1999, and one triazole fungicide, Tilt 3.6E, was granted state labels for use against FHB.

Two biological agents were also evaluated in the Virginia evaluations. Results in locations with FHB indicated favorable control with many of the tested products. In 2002, experimental products that may soon be on the market will be tested once more across environments, to get additional information on their efficacy and performance consistency. In addition, treatments with these compounds were applied using spray nozzles directed at an angle towards the grain heads, to substantiate that improvements in application techniques can be made across environments. For Virginia all treatments (fungicides and biological agents) provided a statistically significant ($P \leq 0.05$) reduction severity over the non-treated control, but only the fungicide treatments, including the Folicur 3.6F + Trigo Cor 1448 combination, provided a statistically significant ($P \leq 0.05$) reduction in incidence of fusarium head blight. All treatments had low levels of vomitoxin (DON), but none were statistically significantly ($P \leq 0.05$) lower than the non-treated control. All treatments increased grain yields over the non-treated control (1.2-8.5), but only the AMS 21619A 480SC + Folicur 3.6F was statistically significantly ($P \leq 0.05$) greater. No phytotoxicity was observed for any fungicide treatment.

2. What were the most significant accomplishments?

In Virginia a 9 treatment fusarium head blight plot was seeded no-tillage into corn stubble in mid-October, 2001. The cultivar was the soft red winter wheat 'Roane'. Treatment units were 6 feet wide and 25 feet long. Treatments consisted of a non-treated control, one bacterial isolate, Trigo Cor 1448 (biological agent provided by Gary Bergstrom, Cornell University), one yeast isolate, OH 182.9 (biological agent provided by Dave Schissler, USDA, ARS) and 5 different fungicide treatments (either combinations, rates or timing). The table below indicates the 9 treatments and Zadaks' growth stage at application, harvest moisture, and grain yield (bu/acre and kg/ha) at a standard 13.5% moisture.

Treatment and product/A[z]	Fusarium head blight[y] 22 May GS 85 Incidence	Fusarium head blight[y] 22 May GS 85 Severity	DON[x] in ppm	Grain[w] % H_2O 20 Jun	Bu wt[v] in lbs 20 Jun	1000 K[u] in g 11 Jul	Yield[t] Bu/A 20 Jun
Non-treated	15.8	28.8	0.1	11.4	54.3	36.8	95.2[s]
Folicur 3.6F 4.0 fl. oz. . . . . + Induce 0.125 v/v	9.8	15.5	0.1	11.6	53.9	29.2	100.2
AMS 21619A 480SC 5.7 fl. oz. . . . . + Induce 0.125 v/v	6.3	15.0	0.3	11.7	54.0	30.5	100.9
BAS 505F 50 WG 6.4 oz. . . . . + Induce 0.125 v/v	7.0	13.3	0.4	11.7	54.4	30.5	96.4
OH 182.9	11.0	12.0	0.2	11.4	53.6	27.5	97.0
Trigo Cor 1448	14.0	13.8	0.2	11.4	53.6	29.1	96.5
Trigo Cor 1448 . . . . . + Folicur 3.6F 4.0 + Induce 0.125 v/v	10.3	12.8	0.3	11.8	54.0	29.3	101.9
AMS 21619A 480SC 3.6 fl. oz. . . . . + Folicur 3.6F 4.0 + Induce 0.125 v/v	7.5	6.5	0.4	11.6	54.4	30.0	103.6
Stratego 250E 10.0 fl. oz.	8.0	12.5	0.4	11.4	53.7	29.5	99.8
Least Significant Difference ($P \leq 0.05$) =	5.1	7.9	0.3	0.4	0.8	7.3	6.8
Standard Deviation =	3.52	5.42	0.19	0.26	0.53	4.97	4.65
Coefficient of Variation =	35.36	37.50	71.34	2.25	0.98	16.41	4.69

[z]Treatments were applied at anthesis (Zadoks' Growth Stage 61) with rates in formulated product per A; the biological agents were applied in a suspension of distilled water at 625 ml/plot.

[y]Fusarium head blight incidence = mean percentage of diseased wheat heads out of one hundred heads per plot with 4 replications; severity = mean percentage of diseased spikes per head from one hundred heads per plot with 4 replications.

[x]DON = mean ppm deoxynivalenol (vomitoxin) concentration per plot from 4 replications as determined by Dr. Pat Hart, Michigan State University.

[w]Grain moisture at harvest in mean % H_2O per plot with 4 replications.

[v]Bushel weight in mean lb per plot with 4 replications.

[u]Mean 1000 kernel weight in grams per plot with 4 replications.

[t]Grain yield expressed in mean bushels at a standard 13.5% moisture per plots with 4 replications.

[s]Means differ significantly ($P \leq 0.05$) by Fischer's LSD.

The fusarium head blight plots were shown to farmers as part of the Eastern Virginia Agriculture Research and Extension, Warsaw, Virginia's Small Grains Field Day. Plots were seen by nearly 400 farmers, agribusiness personnel, crop consultants, and extension agents.

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.

Stromberg, E.L. and L.E. Flinchum. 2003. Evaluation of selected fungicides and biological agents for the control of fusarium head blight in Sisson soft red winter wheat in Virginia, 2002. Fungicide and Nematicides Tests Report No. 58:CF005.

Report No. 58:CF005
Wheat, soft red Winter, cultivar Sisson: *Triticum aestivum*
Fusarium head blight: *Fusarium graminearum*

Evaluation of selected fungicides and biological agents for the control of fusarium head blight in Sisson soft red winter wheat in Virginia, 2002.

VIEW/PRINT REPORT

E. L. Stromberg, L. E. Flinchum

Section: Cereal and Forage Crops

Keyword(s): No-tillage; corn residues; vomitoxin; DON; 1000 kernel weight; incidence; severity; yield; bushel weight

Geographical location: Virginia, United States

Products Tested: AMS 21619A; BAS 505F; Folicur; OH 182.9; Stratego; Trigo Cor 1448

Active chemical(s): prothioconazole; dimoxystrobin; tebuconazole; Cryptococcus nodaensis; 11.4% propiconazole; 11.4% trifloxystrobin; Bacillus subtilus isolate

Manufacturer(s): Bayer CropScience; BASF Corporation; USDA, Peoria, IL; Cornell University