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

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Year:	**FY2002 (approx. May 02 – April 03)**
Grant Number:	**59-0790-1-079**
Grant Title:	**Fusarium Head Blight Research**
FY02 ARS Award Amount:	**$ 15,317**

Project

Program Area	Project Title	USWBSI Recommended Amount
CBC	Biocontrol of Fusarium head blight.	$15,700
	Total Amount Recommended	**$15,700**

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Principal Investigator Date

Project 1: Biocontrol of Fusarium head blight.

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

A bacterial strain, *Lysobacter enzymogenes* C3, was found to reduce the severity of Fusarium head blight (FHB) on wheat in greenhouse tests conducted as part of the 2001-2002 USWBSI project. The issues addressed in this project were:

- Whether or not the biological control agent *Lysobacter enzymogenes* C3 could be efficacious when applied under a variety of field conditions
- Whether or not C3 would be effective when used on different spring wheat cultivars

To resolve the first issue, a series of field experiments was conducted: 2 in Nebraska, 1 each in Ohio and New York, all using winter wheats; and 3 in South Dakota, 2 being in spring wheat, 1 in barley. Experiments conducted outside of Nebraska were performed in collaboration with cooperators in those states. Other biocontrol agents being developed in those states were evaluated as well in every experiment except one in South Dakota; all experiments included the fungicide Folicur for comparison. Misting was provided in some locations.To resolve the second issue, one of the South Dakota field experiments described above was planted with four cultivars of spring wheat: Russ, Ingot, Alsen and Norm. Because the first two cultivars flowered earlier than the second two, the two sets were treated and inoculated with *Fusarium* on different dates to coincide with flowering. Misting was provided. A series of greenhouse experiments were conducted in which 11 spring wheat cultivars were treated with C3 or the water control and then inoculated with *Fusarium*.

2. What were the most significant accomplishments?

- Potential for *Lysobacter enzymogenes* C3 to be effective under field conditions was found.
- Efficacy of biocontrol by C3 may vary depending upon the wheat cultivar.

Disease levels in all field sites but one were too low to show treatment effects. The exception was the South Dakota experiment involving 4 spring wheat cultivars. Very low disease levels occurred in Alsen and Norm; neither C3 nor Folicur had any affect. Folicur reduced scab severity in Russ and Ingot; C3 reduced severity only in Russ. There was no effect of either treatment on DON levels in harvested kernels.

Greenhouse experiments confirmed that C3 is effective in reducing scab development in some cultivars but not others. Differences among cultivars were not related to reported FHB resistance levels or to differential colonization of wheat heads by C3. Because C3 was found to function in part by induced resistance, the cultivar effect may be related to differences among cultivars in their ability to respond to the elicitor in C3 or to express effective resistance mechanisms.

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.

Yuen, G.Y and Jochum, C.C. 2002. Report of induced resistance and field biological control of Fusarium head blight By *Lysobacter enzymogenes* strain C3. 2002 National Fusarium Head Blight Forum Proceedings page 127.