USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY11 Final Performance Report
July 13, 2012

Cover Page

PI:	Christina Cowger
Institution:	USDA-ARS
Address:	Plant Science Research Unit 3409 Gardner Hall Box 7616 Raleigh, NC 27695-7616
E-mail:	christina_cowger@ncsu.edu
Phone:	919-513-7388
Fax:	919-856-4816
Fiscal Year:	FY11
USDA-ARS Agreement ID:	NA
USDA-ARS Agreement Title:	Epidemiology of Late FHB Infections in Wheat and Barley.
FY11 USDA-ARS Award Amount:	$ 18,000

USWBSI Individual Project(s)

USWBSI Research Category*	**Project Title**	**ARS Award Amount**
MGMT	Epidemiology of Late FHB Infections in Wheat.	$ 18,000
	Total ARS Award Amount	**$ 18,000**

_____

Principal Investigator Date

* MGMT – FHB Management
FSTU – Food Safety, Toxicology, & Utilization of Mycotoxin-contaminated Grain
GDER – Gene Discovery & Engineering Resistance
PBG – Pathogen Biology & Genetics
BAR-CP – Barley Coordinated Project
DUR-CP – Durum Coordinated Project
HWW-CP – Hard Winter Wheat Coordinated Project
VDHR – Variety Development & Uniform Nurseries – Sub categories are below:
SPR – Spring Wheat Region
NWW – Northern Soft Winter Wheat Region
SWW – Southern Soft Red Winter Wheat Region

Project 1: *Epidemiology of Late FHB Infections in Wheat.*

1. **What major problem or issue is being resolved relevant to Fusarium head blight (scab) and how are you resolving it?**

   Our work is clarifying the environmental factors that determine levels of DON in wheat grain. As one aspect of that, we are identifying the factors that give rise to healthy-looking grain with over-threshold DON concentrations. We are also more precisely identifying the period when wheat is maximally susceptible to FHB infection, which is important in order to protect the crop during that entire period. We are determining the effects of post-anthesis moisture on disease symptoms, kernel damage, and DON. Our findings will be useful in efforts to forecast disease and DON. They will also help growers and their advisors determine when conditions may be conducive to late infection and/or elevated disease and DON levels resulting from post-flowering rainfall.

2. **List the most important accomplishment and its impact (i.e. how is it being used) to minimize the threat of Fusarium head blight or to reduce mycotoxins. Complete both sections (repeat sections for each major accomplishment):**

   Accomplishment:

   North Carolinians were well-represented among those subscribing to receive scab alerts by email or text-message in 2011. This was the result of promotion by Drs. Cowger and Weisz to North Carolina extension agents, growers, and seed producers.

   For the scab community, our research has led to a better understanding of the epidemiology of FHB that allows us to more accurately forecast DON risk. We have shown that "late" infection is an important factor leading to grain with low FDK but excessive DON content. We have shown that rain soon after anthesis likely also favors the low-symptom, high-DON scenario.

   Impact:

   Our results and our outreach are giving growers and their advisors a clearer picture of what gives rise to FHB risk and how to manage that risk. We have more clearly established when wheat is susceptible to FHB attack. If an FHB epidemic develops, knowing how DON varies in response to post-flowering moisture helps us more accurately forecast DON risk. Knowing which conditions most favor asymptomatic grain with high DON will put us on the alert for that scenario.

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.

Extension and outreach publications

Weisz, R., and Cowger, C. 2012. 2012 Wheat Variety Performance & Recommendations. No. 30, July 2012, SmartGrains: The Small Grains Fact Sheet, North Carolina State University, Raleigh.

Peer-reviewed article

Cowger, C., and Arellano, C. 201_. *Fusarium graminearum* infection and deoxynivalenol concentrations during development of wheat spikes. Phytopathology, accepted pending revision.

Presentation

"Organic Management of Wheat Mycotoxins," The Carolina Organic Commodities & Livestock Conference, Jan. 12, Rocky Mount, NC.