

**USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY10 Final Performance Report
July 15, 2011**

Cover Page

PI:	Ivan Rayment
Institution:	University of Wisconsin
Address:	Department of Biochemistry 433 Babcock Drive Madison, WI 53706-1544
E-mail:	ivan_rayment@biochem.wisc.edu
Phone:	608-262-0437
Fax:	608-262-1319
Fiscal Year:	FY10
USDA-ARS Agreement ID:	59-0790-6-066
USDA-ARS Agreement Title:	Structural and Functional Studies of Trichothecene Biosynthetic Enzymes.
FY10 USDA-ARS Award Amount:	\$ 34,224

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
PBG	Development and Testing of Improved Enzymes for Transgenic Control of FHB.	\$ 34,224
	Total ARS Award Amount	\$ 34,224


Principal Investigator

July 15th 2011
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: *Development and Testing of Improved Enzymes for Transgenic Control of FHB.*

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

This project is directed towards developing improved enzymes that can mitigate or inactivate the trichothecene mycotoxins. These enzymes will be introduced first into barley and then into wheat to demonstrate if they can reduce the impact of Fusarium Head Blight.

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:

The major accomplishment is the development of a more stable version of trichothecene 3-*O*-acetylase (TRI101) which is known to be ~70 times more active towards DON than enzymes that have previously been introduced into wheat and barley. This enzyme is being transferred into barley for in vivo testing of its efficacy.

Impact:

This approach may establish the feasibility of generating GM barley and wheat that are resistant to FHB

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.

Bioprospecting for Trichothecene 3-*O*-Acetyltransferases in the Fungal Genus *Fusarium* Yields Functional Enzymes that Vary in their Ability to Modify the Mycotoxin Deoxynivalenol. (2010), Khatibi, P. A., Newmister, S. A., Rayment, I., McCormick, S. P., Alexander, N. J., and Schmale, D. G. III, *Appl. Environ. Microbiol.* **77**, 1162-1170. PMCID: PMC3067217.