USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY05 Final Performance Report (approx. May 05 – April 06)
July 14, 2006

Cover Page

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Fiscal Year:	**2005**
FY05 ARS Agreement ID:	**59-0790-5-080**
Agreement Title:	**Detoxification of the Mycotoxin, Deoxynivalenol, by Expressing UDP-Glucosyltransferase in Barley.**
FY05 ARS Award Amount:	**$ 36,069**

USWBSI Individual Project(s)

USWBSI Research Area*	Project Title	ARS Adjusted Award Amount
BIO	Detoxification of the Mycotoxin, Deoxynivalenol, by Expressing UDP-Glucosyltransferase in Barley.	$ 36,069
	Total Award Amount	**$ 36,069**

May 30, 2006

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: *Detoxification of the Mycotoxin, Deoxynivalenol, by Expressing UDP-Glucosyltransferase in Barley.*

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

Fusarium head blight (FHB) in barley is a major disease of devastating economic impact. The fungus produces the mycotoxin deoxynivalenol (DON) in infected grains which poses safety concerns for human and livestock. Currently, there are no reports of barley genotypes that are resistant to FHB. Resistant sources to FHB in barley are limited with only a few sources providing partial resistance. Our goal is to produce transgenic barley expressing an anti-toxin gene, DOGT1 encoding UDP-glucosyltransferase. DOGT1 may detoxify DON and limit FHB infection. The transgenic plants are being developed through *Agrobacterium*-mediated transformation for the commercial cultivar Conlon.

2. List the most important accomplishment and its impact (how is it being used?). Complete all three sections (repeat sections for each major accomplishment):

Accomplishment:

1. The binary vector containing deoxynivalenol-glucosyltransferase, pBP1319 obtained from Dr. Gerhard Adams, was modified for Conlon transformation. The selectable marker, *gent* (gentamycin resistance) was replaced by *bar* (bialaphos-resistant) gene in the vector.
2. Sixteen putative transgenic plants were regenerated after extensive selection on the bialaphos medium. The regenerated plants are being tested for the presence and expression of the introduced gene.

Impact:

Detoxification of DON through DOGT1 is a novel strategy for reducing DON and improving resistance to FHB. The regenerated putative transgenic plants, if confirmed, will be useful to barley breeders for germplasm enhancement.

As a result of that accomplishment, what does your particular clientele, the scientific community, and agriculture as a whole have now that they didn't have before?:

Currently, only model cultivars such as Golden Promise were successfully transformed using *Agrobacterium*. Ours is the first effort to transform a commercial barley cultivar, Conlon, adapted to Midwestern barley production.

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.

No publication at this time.