USDA-ARS/
U.S. Wheat and Barley Scab Initiative
FY10 Final Performance Report
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Cover Page

PI:	Senay Simsek
Institution:	North Dakota State University
Address:	Department of Plant Sciences NDSU Dept # 7670 Box 6050 Fargo, ND 58108-6050
E-mail:	senay.simsek@ndsu.edu
Phone:	701-231-7737
Fax:	
Fiscal Year:	FY10
USDA-ARS Agreement ID:	59-0206-0-073
USDA-ARS Agreement Title:	Effect of FHB on Wheat Quality.
FY10 USDA-ARS Award Amount:	$ 16,882

USWBSI Individual Project(s)

USWBSI Research Category*	Project Title	ARS Award Amount
VDHR-SPR	Determination of the Relationship between FHB and Spring Wheat Quality.	$ 16,882
	Total ARS Award Amount	**$ 16,882**

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: *Determination of the Relationship between FHB and Spring Wheat Quality.*

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

   The effect of Deoxynivalenol (DON) on quality characteristics of a hard red spring wheat cultivar was investigated in this study. DON levels were controlled by using various fungicidal treatments on wheat.

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:

   Test weight showed a negative correlation with DON. Protein content of flour showed a positive correlation and flour color (L value) showed a negative correlation. *Fusarium* damage had a significant impact on gluten quality that is evident from lower gluten index. Extensigraph curves showed that *Fusarium* decreased the resistance to extension and area under the curve and increased the extensibility. Alveograph curves also exhibited similar trend. Baking characteristics such as mixing time and dough handling also showed negative correlations with DON. These observations suggest that proteases from *Fusarium* act on gluten proteins especially the fractions responsible for dough strength thereby reducing the overall dough quality.

   Impact:

   Studies have shown the detrimental effect of Fusarium head blight on various qualities using different wheat varieties. However, it is important to gain thorough understanding of how the disease and its associated mycotoxin DON impacts a single wheat variety from one location so that the genetic and environmental differences are eliminated. The objective of this research is to determine how different levels of DON impacts the yield, kernel parameters, rheological properties and bread baking quality of a hard red spring wheat cultivar.

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.

Whitney, K., Halley, S., Ohm, J., and **Simsek, S.** 2010. Effect of Fusarium Head Blight on Spring Wheat Quality. NC213 Grain Quality Annual Meeting. Kansas City, MO.

Whitney, K., Halley, S., Ohm, J., and **Simsek, S**. 2010. Effect of Fusarium head blight on hard red spring wheat quality and correlation with accumulation deoxynivalenol in grain after fungicide treatment. AACC International Meeting. Savannah, GA. Cereal Foods World 55:A75