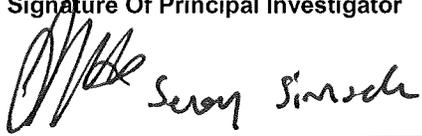


Minnesota Wheat Research and Promotion Council

RESEARCH PROPOSAL GRANT APPLICATION

1. NAME AND ADDRESS OF ORGANIZATION TO WHICH AWARD SHOULD BE MADE Name: North Dakota State University Address: Office of Sponsored Programs Administration Dept. 4000 P.O. Box 6050 Fargo, ND 58108-6050		
2. TITLE OF PROPOSAL Analysis of Bound DON in Hard Red Spring Wheat		
3. PRINCIPAL INVESTIGATOR(S) Dr. Senay Simsek PI# 2 Name: Dr. Mohamed Mergoum	4. PI #1 BUSINESS ADDRESS Department of Plant Sciences Harris Hall Room 209 North Dakota State University, Fargo, ND 58105	
5. PROPOSED PROJECT DATES (calendar years) 03/01/2012 to 02/28/2013 Note: Research Reports are Due November 15th of Each Year	6. TOTAL PROJECT COST \$15,000	7. PI #1 PHONE NO. 701-231-7737
8. RESEARCH OBJECTIVES: (List objectives to be accomplished by research grant) The objectives of this one year project are to (1) determine the prevalence of bound DON in commercial samples of wheat (2) determine bound and native DON in <i>Fusarium graminearum</i> infected wheat samples Attach a 2-page detailed discussion of importance of the proposal to wheat profitability; how study complements previous research in area; procedures to be used; and competency of the research group in achieving research objectives. (Please keep the proposal concise, only 2 pages will be provided reviewers).		
Signature Of Principal Investigator 	Date December 20, 2011	Phone Number 701-231-7737
Signature Of Authorized Representative 	Title Assistant Director V.P. Sponsored Programs Admin.	Date 12/27/11
Address Of Authorized Representative NDSU Dept. 4000 P.O. Box 6050 Fargo, ND 58108-6050		Phone Number 701-231-9876

Minnesota Wheat Research and Promotion Council

RESEARCH PROPOSAL GRANT APPLICATION

(2-pages maximum)

Description of the proposal:

Fusarium head blight (FHB), also called scab, is a major fungal disease affecting several gramineous hosts including wheat (*Triticum aestivum* L.). Scab occurs during the flowering and early kernel development stages of the plant under conditions of rain and elevated humidities. Depending on the year, Hard Red Spring (HRS) wheats of the Northern Great Plains of the United States and western prairie provinces of Canada are susceptible to scab (such as in 1993), as are the soft red winter wheat growing regions in the eastern United States.

FHB are able to produce a number of trichothecene mycotoxins including deoxynivalenol (DON) and nivalenol (NIV), as well as zearalenone (ZEA) and moniliformin (MON), all of which have a range of toxicity to animals. The most common mycotoxin produced by *Fusarium* in cereals is deoxynivalenol (DON). The U.S. Food and Drug Administration (FDA) has set advisory DON levels for wheat-based foods and feeds of no more than 1 µg/g in finished human foods, 10 µg/g in poultry and ruminant feed, and 5 µg/g in other animal feeds. Plants can “detoxify” mycotoxins such as DON by chemically modifying and/or including them in the plant matrix. These modified versions of the toxins are called as “bound mycotoxins” also known as masked deoxynivalenol (DON). Recent studies showed that masked DON in wheat is a cause for concern, and escapes detection by the routine analytical methods. The evidence that suggests masked DON may be released into the free form under some food processing conditions, through enzymolysis in dough processing, or in digestion raises concerns that the potential toxicity of samples is being underestimated.

The objectives of this one year project are to

- (1) determine the prevalence of bound DON in commercial samples of wheat
- (2) determine bound and native DON in *Fusarium graminearum* infected wheat samples

Materials and Methods:

Free DON will be determined using the official procedure of solvent extraction and analysis by GC-ECD, which is available in Dr. Simsek’s Laboratories. Bound DON will be determined using LC-QTOF system, which is being ordered by Dr. Simsek and will be available in March 2012. Samples for objective 1 are to be obtained from a regional wheat quality survey, while those for objective 2 will be obtained from the North American Wheat Scab Evaluation Nursery (collaboration with Dr. Jim Anderson and Mohamed Mergoum).

Outcome and Benefit to Minnesota Growers:

According to the Council for Agricultural Science and Technology the annual cost to the United States because of the DON corruption of food crops is \$637 million in 2003. In another research, direct losses to wheat producers in United States owing to *Fusarium* Head Blight is approximated as about \$260 million in a year and total economic losses for all small grains in period of 1998-2000 is \$ 2.7 billion.

There is a very limited research on masked DON analysis of HRS wheat in our region. The proposed research is the first of its kind in linking the masked DON level in FHB-infected HRS wheat and the quality defects in wheat kernels and end-products. As such, the research results will be helpful in quantifying the extent of FHB damage to wheat quality and hence its marketability. Thus, our research results will be directly helpful to wheat growers and wheat processors in both understanding the actual impact of FHB in terms if the severity of the damage and its direct economic consequence. Furthermore, state and federal regulatory agencies will be able to use the research results in establishing guidelines for both domestic and international marketing of the HRS wheat.

Budget and Project Duration:

Duration of the project is 1 year. The budget of the project is \$15,000, which would be used for operation cost (\$12,800) – includes chemicals, solvents and test tubes. – and salaries (\$2,200) which includes salary of an undergraduate researcher. Fringe benefits are calculated at 10%.

Research Group:

Primary Investigator (PI): Dr. Senay Simsek
Department of Plant Sciences
North Dakota State University, Fargo, ND
E-mail: senay.simsek@ndsu.edu

Co-PIs: Dr. James Anderson
Department of Agronomy and Plant Genetics
University of Minnesota, St. Paul, MN
E-mail: ander319@umn.edu

Dr. Mohamed Mergoum
Department of Plant Sciences
North Dakota State University
E-mail: mohamed.mergoum@ndsu.edu

Minnesota Wheat Research and Promotion Council

RESEARCH PROPOSAL BUDGET

ORGANIZATION AND ADDRESS			
Name: North Dakota State University Address: Office of Sponsored Programs Administration Dept. 4000 P.O. Box 6050 Fargo, ND 58108-6050			
Principal Investigator(s) / Project Directors(s)	Funds Requested For		
	Year 1 (2012)	Year 2 (2013)	Year 3 (2014)
A. Salaries and Wages		\$	\$
1. Co-principal Investigator(s)			
2. Senior Associates			
3. Research Associates - Post Doctorate			
4. Other Professionals			
5. Graduate Students			
6. Prebaccalaureate Students	\$2,000		
7. Secretarial - Clerical			
8. Technical, Shop and Other			
B. Fringe Benefits	\$200		
C. Nonexpendable Equipment (Planting and harvesting equipment use)			
D. Materials and Supplies	\$12,800		
E. Travel			
F. Publication Costs			
G. Computer Costs			
H. All Other Direct Costs (Attach supporting data)			
I. TOTAL AMOUNT OF THIS REQUEST (per year)	\$15,000	\$	\$

UNIVERSITY OF MINNESOTA

Twin Cities Campus

***Department of Agronomy and
Plant Genetics***

*College of Food, Agricultural,
and Natural Resource Sciences*

*411 Borlaug Hall
1991 Upper Buford Circle
St. Paul, MN 55108-6026*

*Office: 612-625-7773
Fax: 612-625-1268*

December 21, 2011

Dr. Senay Simsek
Dept. of Plant Sciences
North Dakota State University

Dear Senay:

I support your proposal to the Minnesota Wheat Research and Promotion Council to analyze bound DON in hard red spring wheat. I am willing to provide grain samples from our scab nurseries and other yield trials that you may find useful in your analysis.

Sincerely,



James A. Anderson
Professor