


**FOR ADMINISTRATIVE USE**  
**Program Area Code    Proposal Code**

## Minnesota Wheat Research and Promotion Council

### RESEARCH PROPOSAL GRANT APPLICATION

<b>1. NAME AND ADDRESS OF ORGANIZATION TO WHICH AWARD SHOULD BE MADE</b>  <b>Name:</b> South Dakota State University <b>Address:</b> PO Box 2201, SAD 124 Brookings, SD 57007		
<b>2. TITLE OF PROPOSAL</b> Accelerated Breeding for Fusarium Head Blight Resistance in Spring Wheat		
<b>3. PRINCIPAL INVESTIGATOR(S)</b> Karl D. Glover  <hr/> PI# 2 Name:  <hr/> PI# 3 Name:	<b>4. PI #1 BUSINESS ADDRESS</b> Agronomy, Horticulture, and Plant Science Department NPB 247 Box 2140-C South Dakota State University Brookings, SD 57007	
<b>5. PROPOSED PROJECT DATES (calendar years)</b> January 1, 2022 – December 31, 2024  <small>Note: Research Reports are Due November 15th of Each Year</small>	<b>6. TOTAL PROJECT COST</b> \$51,000	<b>7. PI #1 PHONE NO.</b> (605) 688-4769
<b>8. RESEARCH OBJECTIVES:</b> (List objectives to be accomplished by research grant)  The objective of this proposal is to use traditional plant breeding and selection methods to assist in developing Fusarium Head Blight resistant cultivars within our spring wheat breeding program.   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).		
<b>Signature of Principal Investigator</b>  	<b>Date</b> 12/5/2021	<b>Phone Number</b> (605) 688-4769
<b>Signature of Authorized Representative</b> <small>DocuSigned by:</small> 	<b>Title</b> Interim Director of Sponsorship Development	<b>Date</b> 12/13/2021 11:41 CST
<b>Address of Authorized Representative</b>  Box 2201 SAD 200 1015 Campanile Ave Brookings SD 57007-0001		<b>Phone Number</b> 605.688.6696

# Minnesota Wheat Research and Promotion Council

## RESEARCH PROPOSAL

### (2-pages maximum)

**Project Title:**

Accelerated Breeding for Fusarium Head Blight Resistance in Spring Wheat

**Importance of this project to the profitability of wheat producers:**

Complete resistance to Fusarium head blight (FHB) is currently not attainable. Host plant resistance is therefore the most economical and environmentally benign means of disease control. This proposed work aims to increase FHB resistance levels in regionally adapted hard red spring wheat cultivars and breeding lines through traditional plant breeding methods. For the foreseeable future, this will be the most practical and beneficial means to help alleviate large potential losses when growing conditions are optimal for FHB development.

**Procedures:**

The FHB screening and germplasm development component within our program is fashioned so that FHB screening procedures begin with F<sub>2</sub> populations that have been selected as desirable from the standpoint of agronomic potential. Each fall we screen approximately 100 of these F<sub>2:3</sub> populations in our greenhouse which is equipped with a mist-irrigation system. Ten hills of each population are screened in each greenhouse cycle. In the following spring greenhouse cycle, F<sub>3:4</sub> lines are derived from plants within the top twenty to thirty percent of the hills based on their resistance phenotype. Similarly, F<sub>4:5</sub> lines are derived from each of the hills within the spring greenhouse to confirm their resistance phenotype. Each selected line is then sown as a row in our mist-irrigated field nursery. In both the greenhouse and field settings, infested corn kernels and a conidial suspension of several Fusarium isolates serve as inoculum sources. Along with screening early-generation breeding materials in greenhouse and field nurseries, more advanced experimental breeding lines are also evaluated at several stages along the road to potential release so that multiple observations can be analyzed prior to large-scale seed advancement. As a portion of the summer field screening cycle, we also evaluate experimental entries submitted to the Uniform Regional Spring Wheat Nursery (URN), the Uniform Regional Scab Nursery for Spring Wheat Parents (URSN), and Crop Performance Testing trials comprised of commercially available cultivars.

**Regional linkages to other research activities:**

We regularly participate with testing of Uniform Regional Nurseries and freely exchange germplasm with other public wheat breeders and researchers.

**List current or potential other sources of funding for this project:**

Funds will be used to augment those from the US Wheat & Barley Scab Initiative as well as SD Wheat Commission and SD Ag Experiment Station.

**Research Group:**

Screening germplasm for FHB resistance is a routine activity in the breeding program, though if difficulties arise, Dr. Shaukat Ali, the SDSU Small Grains Pathologist can be approached for assistance and/or troubleshooting.

**Relationship to past projects:**

This proposed three-year collaboration is a continuation of several previously funded arrangements that have involved contributions from MWRPC, SDWC, and SDAES. Operational procedures and techniques have not been altered significantly.

**Estimate the budget requirements:**

Through the years, MWRPC has provided \$17,000 to this project on an annual basis, though the proposal, submitted every third year, has always been for \$51,000. At this point, the total request will remain \$51,000 (\$17,000 / year). The proposed budget will include contractual costs (i.e., greenhouse rental, field space rental, supplies, etc) along with hourly labor.

**References:**

## Minnesota Wheat Research and Promotion Council

### RESEARCH PROJECT PROPOSAL BUDGET

<b>Project Title:</b> Accelerated Breeding for Fusarium Head Blight Resistance in Spring Wheat			
Principal Investigator(s) / Project Director(s)  Karl D Glover	Funds Requested For		
	Year 1 (2021)	Year 2 (2022)	Year 3 (2023)
A. Salaries and Wages	\$6,666	\$6,866	\$7,072
1. Co-principal Investigator(s)			
2. Senior Associates			
3. Research Associates – Post Doctorate			
4. Other Professionals			
5. Graduate Students			
6. Prebaccalaureate Students	6,600	6,798	7,002
7. Secretarial - Clerical			
8. Technical, Shop and Other			
B. Fringe Benefits	66	68	70
C. Consulting and Professional Services			
D. Supplies and Services	10,334	10,134	9,928
E. Travel			
F. Sub-Contracts			
G. Repairs & Maintenance			
H. Rentals & Lease			
I. Other Expenses			
<b>TOTAL AMOUNT OF THIS REQUEST (per year)</b>	<b>\$ 17,000</b>	<b>\$ 17,000</b>	<b>\$ 17,000</b>