FOR ADMINISTRATIVE USE
Program Area Code Proposal Code

Minnesota Wheat Research and Promotion Council

RESEARCH PROPOSAL GRANT APPLICATION

1. NAME AND ADDRESS OF ORGANIZATION TO WHICH AWARD SHOULD BE MADE

Name: Regents of the University of Minnesota
Address: Sponsored Projects Administration
454 McNamara Alumni Center, 200 Oak Street SE
Minneapolis, MN 55455-2070

2. TITLE OF PROPOSAL
Wheat Stem Sawfly Resistance Screening

3. PRINCIPAL INVESTIGATOR(S)	**4. PI #1 BUSINESS ADDRESS**
J.J. Wiersma	Northwest Research & Outreach Center 2900 University Avenue Crookston, MN 56716
PI# 2 Name: J.A. Anderson	
PI# 3 Name:	

5. PROPOSED PROJECT DATES (calendar years)	**6. TOTAL PROJECT COST**	**7. PI #1 PHONE NO.**
January 1, 2021 – December 31, 2021 Note: Research Reports are Due November 15th of Each Year		+1 (218) 281-8629

8. RESEARCH OBJECTIVES: (List objectives to be accomplished by research grant)

1) Evaluation of current, adapted HRSW varieties for resistance to stem cutting by WSS.

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**	**Phone Number**
	12/23/2020	+1 (218) 281-8629

Signature Of Authorized Representative	**Title**	**Date**
	Principal Grants Administrator	1/7/2021

Address Of Authorized Representative	**Phone Number**
Derek Krogstad, Principal Grant Administrator, Office of Sponsored Projects Administration, 450 McNamara Alumni Center, 200 Oak Street SE, Minneapolis, MN 55455-2070	612-624-5599

Minnesota Wheat Research and Promotion Council
RESEARCH PROJECT PROPOSAL
(2-pages maximum)

Project Title: Wheat Stem Sawfly Resistance Screening

Importance of this project to the profitability of wheat producers: Wheat stem sawfly (WSS) is an insect pest that has caused concern in recent years, especially in NW MN where populations have had a significant economic impact on some fields. The only known approach to combat this insect is the use of WSS resistant varieties. Presence of stem pith, whether partial or complete, has long been considered the bellwether of resistance to WSS. More recently, other disruptors to successful ovipositioning and/or larval development have been suggested as a means to avoid WSS infestations as differences in WSS infestation rates among hollow-stem have been observed.

Procedures: A duplicate of the HRSW variety performance evaluation trial will be seeded on the Northwest Research & Outreach Center near Crookston, MN. The standard check varieties (Marshall, Glenn, and Knudson) are replaced with WSS check varieties that differ in stem solidness (WB Gunnison, , and Duclair). The field in which the trial will be located will have been continuous wheat for the past three years. Wheat Stem Sawfly emergence will be monitored in the trial using soil emergence traps (BugDorm Model BT2003, BioQuip Products, CA 90220). The collection bottle will be filled with approximately 50 ml of pre-diluted automotive antifreeze/coolant solution (SuperTech Extended Life Antifreeze/Coolant, WalMart, AR 72716).

The number of adult male or female WSS will be counted every Monday, Wednesday and Friday for six weeks starting in late May, 2021. To aid identification and counting of WSS male and female specimens, the collection bottle will be removed from individual emergence traps and the contents will be emptied on a piece of white cheesecloth held over a 200 ml glass beaker with a sink strainer. The collected antifreeze solution will be recycled and poured back into the sample collection bottle. Additional antifreeze solution will be added to the bottles when necessary and before sample collection bottles are placed back in the emergence traps. The insects caught on the cheesecloth are separated and individual WSS are identified and counted.

Stem solidness will be scored on twenty randomly selected stems at Feekes growth stage 6 or 7 by determining the presence of a pith using a transverse cut in the middle of the first and second above-ground node. Stem clipping will be scored just prior to the trial being harvest ripe. All stems from three linear feet of row will be harvested by hand and fifty randomly selected stems from each hand-harvested sample will dissected longitudinally to determine presence of frass on or near the bottom of the first and second above ground nodes to evaluate whether WSS oviposition was successful. The incidence of parasitism by *Bracon cephi* (Gahan) and other parasitoids will scored by determining the percentage of WSS-infested stems that had an emergence hole in the stem or a parasitized WSS cocoon.

Regional linkage to other research activities: Andrew Green, NDSU spring wheat breeder, used the screening nursery in 2020 as a local site to have greenhouse raised novel sources of WSS resistance in cone-tainers get infested with WSS. He has indicated that he would like to continue to use the WSS nursery at the NWROC for future screening of breeding material and germplasm because of the proximity of the nursery compared to wester n North Dakota or Montana.

List current or potential other funding sources for this project: None. This project is exploratory in nature and there is no clear need to fully integrate screening for resistance to WSS into the breeding program at present. Therefore, we prefer to keep the funding of this activity separate from the funding for the HRSW breeding program.

Research Group: J.J. Wiersma, J.A. Anderson, and H. Lindell

Relationship to past projects: This project is the continuation of the WSS screening over the past two growing seasons.

Estimate the budget requirements: $ 5000.-

References: Sherman, J.D., Weaver, D.K., Hofland, M.L., Sing, S.E., Buteler, M., Lanning, S.P., Naruoka, Y., Crutcher, F., Blake, N.K., Martin, J.M., Lamb, P.F., Carlson, G.R. and Talbert, L.E. 2010, Identification of Novel QTL for Sawfly Resistance in Wheat. Crop Sci., 50: 73-86. https://doi.org/10.2135/cropsci2009.03.0145.