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Research Area: VDUN

Project Title: Development of hard red spring wheat cultivars resistant to scab.

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PROJECT 1 ABSTRACT

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The development and use of genetically resistant cultivars is the best strategy for an efficient, economical, and safe control of Fusarium head blight (FHB) in hard red spring wheat (HRSW) produced in North Dakota while protecting our environment. The long-term goals of this project are to:

- 1) develop improved HRSW cultivars with resistance to FHB that are adapted to ND production and have acceptable bread-making quality; and**
- 2) identify and introgress FHB resistance from diverse germplasm sources into the germplasm base of the HRSW breeding program.**

Selected improved parents will be used to develop segregating populations for early generation selection and advancement of lines that combine FHB resistance with desired agronomic and quality characters. Elite advanced lines will be tested in multiple site field trials in ND to identify FHB resistant genotypes that meet the desired adaptation, agronomic and quality criteria for cultivar release.

The complex inheritance of FHB resistance in wheat requires a continuous search of new sources of resistance and the employment of appropriate breeding strategies and selection methodologies to deal with a diverse germplasm base and very large breeding populations. The techniques for field and greenhouse evaluation for FHB resistance have been developed but need to be continuously tuned and improved for increased selection efficiency and to combine several types of resistance to FHB with other economical-value traits.

The utilization of an off-season nursery in New Zealand will accelerate generation advance and seed increase for ND trials. Selection for traits such as maturity, height, lodging resistance and shattering may well be accomplished in NZ off-season.

The introgression of diverse germplasm sources of FHB resistance will provide the germplasm base for selection of enhanced and combined types of FHB resistance. This project accelerates the successful development of improved HRSW cultivars with resistance to FHB as a control measure to minimize the effect of FHB on the production, export, processing and consumption of HRSW.