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**Project Title:** Determining FHB Susceptibility in Barley Cultivars in the Western US

### PROJECT 1 ABSTRACT

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FHB damage in spring barley continues to increase in southern and eastern Idaho. In 2015, fields of barley were damaged, and many spring wheat fields tested at >5 ppm DON, even after appropriate treatments with fungicides. In 2018, one Rupert grower had 30-40,000 bushels of barley rejected due to high DON levels. The majority of the barley varieties that are available to growers in the area are susceptible to FHB. Growers need information on FHB susceptibility of the newly released varieties and those that are currently being grown. Breeders need information on advanced lines and breeding material to release selections with reduced vulnerability to FHB damage and DON accumulation. Screening from 2014-2020 has allowed us to rank currently grown barley lines for relative FHB susceptibility. However, the majority of the varieties in production are susceptible and remain vulnerable under the highly conducive environment that frequently occurs under irrigated production. Continuing the screening project will allow us to characterize new releases and identify resistance within breeding populations and advanced lines. A screening nursery has been developed with an irrigation system to meet the irrigation needs of the crop. A supplemental misting system was installed in addition the irrigation in order to provide appropriate moisture to facilitate disease development. Inoculation with *Fusarium graminearum* (*Fg*) colonized corn spawn resulted in excellent development of disease in spring wheat but not in barley. Therefore, barley was also inoculated with a spore suspension of *Fg* macroconidia, resulting in excellent symptom expression, but required increased development capacity of inoculum (e.g. bioreactor generated macroconidia) and appropriate timing of spray inoculation. Identification of the most susceptible barleys and the selection of resistance in breeding material occurs after ranking varieties against those with known resistance and susceptible germplasm and cultivars. An additional nursery was developed in Kimberly, ID where we began testing of winter material as well as established a second nursery for spring cereals. Reduction of FHB, FDK and DON in the harvested grain must start with selection of appropriate varieties that also meet the need of the industry for yield and end-use quality. This nursery allows us to do that by calculating the Fusarium disease index and testing harvested material for DON in conjunction with the USWBSI supported DON testing at the University of Minnesota. Finally, the impact of regionally derived fungal isolates on nursery results have not been thoroughly tested and may change decisions of how nurseries are utilized by breeding programs. Testing isolates used in US nurseries in a controlled environment growth chamber against a standard panel of barley lines will evaluate line by isolate interactions to determine the influence isolates may have on resistance and the need to expand sources of fungal isolates in the testing program.