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PROJECT 1 ABSTRACT
(1 Page Limit)

Fusarium head blight (FHB) disease causes yield loss, low test weights, low seed germination, and mycotoxin contamination of grain. The vomitoxin deoxynivalenol (DON) is the primary mycotoxin associated with FHB and is subject to regulatory limits by the U.S. Food and Drug Administration (FDA). Malting barley must have < 0.5 ppm DON to be accepted by the industry. Therefore, FHB disease resistance is a critical trait for malting barley. FHB historically has not been a problem in Idaho, presumably because of the uniquely dry environmental conditions and lack of FHB inoculum in the barley producing areas of the state. These favorable conditions for barley production have made Idaho a top supplier of high-quality malting barley. However, sporadic FHB infection has occurred in Idaho barley fields in past a few years and is an alarming sign of possible future production problems in the state. To secure the supply of high-quality barley for the malting industry, it is essential to develop FHB-resistant cultivars. Breeding FHB-resistant varieties necessitates incorporating better FHB resistance into current adapted varieties. Therefore, the best approach is to evaluate FHB resistance of the local breeding lines to identify possible FHB resistance.

The long term goal of the ARS barley breeding program at Aberdeen, Idaho is to develop FHB resistant barley cultivars.

The objectives of this proposal are: 1) to screen 300-400 F5 and advanced breeding materials for FHB resistance and DON content to identify the best for use in barley cultivar development; and 2) to introgress FHB resistance and lower DON into locally adapted lines by making at least 50 crosses that include at least one parent with FHB resistance.

Expected outcome: Data for FHB severity and DON content will be collected for at least 200-300 lines from screening nurseries in Aberdeen and two ND locations, I added the test location in Minnesota supervised by Dr. Ruth Dill-Macky for additional data points. We also expect to have F1 seeds of 50 crosses including FHB resistance and low DON parent and advance the materials into F2 in the first year.

We will continue to work closely with our Aberdeen FHB nursery collaboration team members (Dr. Juliet Marshall and Dr. Phil Bregitzer) to improve the nursery infection efficiency. In addition, we will test our materials in North Dakota in cooperation with the replacement of Dr. Jack Rasmussen's position and Dr. Rich Horsley at North Dakota State University.

Mutual benefits: Our work should provide new FHB resistance germplasm lines that are better adapted in the Intermountain West. The new germplasm lines identified for FHB resistance and DON level will likely benefit other barley breeding programs as well. FHB resistant and lower DON cultivars will benefit the stakeholders in the region.