

FY16 USWBSI PROJECT ABSTRACT

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Project Title: Evaluation of Aberdeen Barley Germplasm Lines on their FHB Resistance.

PROJECT 1 ABSTRACT

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Fusarium head blight (FHB) disease causes yield loss, low test weights, low seed germination, and contamination of grain with mycotoxins. A vomitoxin called deoxynivalenol (DON) is considered 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 is a critical factor for malting barley. FHB historically is not a problem in Idaho because of the uniquely dry environmental conditions and lack of FHB inoculums 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 infections of FHB plants have appeared in Idaho barley fields in past a few years is an alarming signal for possible future production problems in the state. To secure the supply of high-quality barley for the malting industry, it is essential to take the alarming signal seriously and start developing FHB-resistant cultivars. Breeding FHB-resistant varieties necessitates incorporating better FHB resistance into current adapted varieties. Therefore it is the best approach to evaluate FHB resistance of the local breeding Lines to identify the possible FHB resistance.

We received the first year-evaluation data of infections and DON content for our 100 elite breeding lines from NDSU in collaboration with Dr. Robert Brueggeman. In two locations and four replicates tested for infection and DON measurements from two locations, some Aberdeen breeding lines showed resistance to infection and low DON content that are comparable to the 2-row resistance check of Colon. Preliminary data in 2015 showed clear disease infection, indicating that the Aberdeen nursery starts functioning. However Aberdeen is a new nursery and needs multiple years testing to assure its reliability and resistance of Aberdeen elite lines needs multiple year data to draw a reliable conclusion.

The goal of this proposed research is to continue the evaluation of barley breeding lines from Idaho and introduced lines for FHB resistance. The specific objective in the first year is to optimize the Aberdeen nursery conditions for reliable infection by working with the Co-Investigators, Dr. Juliet Marshall and Dr. Jianli Chen, of University of Idaho; Dr. Robert Brueggeman of NDSU. The first objective also includes using NDSU nursery to get more data for our 100 lines. The second year will further validate the results from the previous years, we will make crosses with and /or distribute resistance lines.