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**Project ID:** FY20-BA-015

**ARS Agreement #:** 59-0206-0-163

**Research Category:** BAR-CP

**Duration of Award:** 1 Year

**Project Title:** Identification, Characterization, & Development of Widely-adapted FHB-resistant Germplasm

### PROJECT 3 ABSTRACT

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This project will help broaden the adaptability of Aberdeen, Idaho barley germplasm by producing elite spring and winter germplasm with broad spectrum disease resistance with an emphasis on Fusarium head blight resistance. To accomplish this, we will identify resistant lines in elite winter germplasm; cross FHB resistant spring lines to malting germplasm carrying broad-spectrum disease resistance; and investigate fungal biomass estimated qPCR as a screening tool for selection of low-DON lines.

Evaluation within Aberdeen winter germplasm was initiated in FYs 18 and 19. Ongoing testing is necessary to verify these data, and to provide data on recently-developed, untested breeding lines. Testing of winter lines will be conducted in two Idaho locations (Kimberly and Aberdeen); at Mount Holly, VA; and at Ithaca, NY. Concurrent with these efforts to identify resistance within the winter population, spring germplasm identified with resistance to DON accumulation will be crossed to FHB-susceptible germplasm to create mapping populations with the eventual goal of mapping the architecture of resistance in Aberdeen germplasm. These crosses will also bring in alleles for resistance to scald, net blotch, and spot blotch. Seed increases of recombinant inbred lines or DH lines will be conducted in 2020, with field tests of selected materials to begin in 2021 at Aberdeen and Kimberly, ID; and at Fargo and Langdon, ND. As reliable data becomes available that identifies lines with superior FHB reactions, we will identify lines with suitable quality characteristics to include as parents in the Aberdeen, Idaho crossing program. Seed from all trials will be screened via qPCR to estimate fungal biomass, and these data will be compared to DON data.

Identifying and incorporating resistance to FHB and other diseases will facilitate the deployment of FHB resistance in cultivars adapted to the Intermountain West. In addition, characterization of FHB resistance and improved foliar disease resistance will increase the utility of this germplasm nationally. The result will be easier incorporation of this germplasm into breeding programs in the Midwest and Eastern U. S. The beneficiaries will be other breeders, growers, and users of barley in the Intermountain West as areas where Aberdeen germplasm has fared poorly because of insufficient disease resistance.