PI: Patrick Hayes
PI's E-mail: patrick.m.hayes@oregonstate.edu
Project ID: FY20-BA-010
ARS Agreement #: *59-0206-0-165*
Research Category: BAR-CP
Duration of Award: 1 Year
Project Title: Barley Doubled Haploid Production for Resistance to FHB and DON Accumulation

PROJECT 1 ABSTRACT
(1 Page Limit)

Our overall project goal is to continue to assist researchers in increasing the efficiency with which researchers they identify and deploy genes and QTLs that contribute to reduction in the losses caused by Fusarium head blight (FHB). This can be achieved by developing doubled haploid (DH) germplasm from the F1s of cross combinations identified by collaborating breeders. DH's - being complete homozygotes – are immortal reference genetic stocks (IGSs) that provide unequivocal genotyping and phenotyping data. We will also implement speed breeding as an alternative path for achieving a rapid approach to homozygosity, when germplasm is recalcitrant in the DH production process and/or when marker-assisted selection will be useful in segregating generations.

Our project objectives are to:

1. Produce ~ 1,666 plantlets from the F1 donor plants.
2. Based on past experience, this will generate ~1,334 transplants, which in turn will produce ~1,000 DH plants.
3. Submit lyophilized tissue from these DH to the USDA-ARS Western Regional Small Grains Genotyping Laboratory (USDA-ARS WRSGGL) at Pullman, WA for genotyping.
4. Produce seed from the DH and ship seed to cooperators, who will then be empowered by accessing DH-IGSs and with real-time genotype data.
5. Complete the development of a pilot speed breeding population of recombinant inbred lines (RILs), via single seed descent, through the F4 generation.
6. Follow up with additional speed breeding populations.

Our plan to accomplish goals is:

1. Receive F1 seed no later than June 1 from the collaborating research group(s) identified by the CP Steering Committee (CPSC) as having the greatest potential to have economic impact and to contribute to the fundamental body of knowledge.
2. Grow F1 donor plants.
3. Produce ~ 1,666 plantlets from the F1 donor plants.
4. Produce ~ 1,000 DHs.
5. Lyophilize leaf tissue from the DHs and send to the USDA-ARS WRSGGL for genotyping.
6. Ship DH and/or seed of RILs to cooperators.

Statement of mutual interest: DH-IGS production from targeted crosses will increase the efficiency of variety development and genetic analysis for all participating researchers, stakeholders, and end-users.