FY20 USWBSI Project Abstract

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PROJECT 1 ABSTRACT
(1 Page Limit)

The efficiency of breeding and genetically analyzing self-pollinated plants for complex traits - such as FHB resistance – is enhanced when the biological materials are homozygous. Doubled haploids (DHs) are 100% homozygous and therefore a useful tool for FHB resistance breeding and genetics. DH production requires skill and a feeling for the organism – therefore, it is cost-prohibitive for most programs to establish and maintain their own DH facilities. To facilitate access to DH, we offer a centralized resource for USWBSI collaborators. This resource differs from a conventional service lab in that the DH production is a truly collaborative enterprise. Furthermore, starting with this fiscal year, we leverage support from the Small Grains Genomics Initiative (SGGI) to provide an integrated DH production and genotyping system. Genotyping will be provided by USDA-ARS Western Regional Small Grains Genotyping Laboratory (USDA-ARS WRSGGL) at Pullman, WA. At OSU, we will sample leaf tissue for DNA extraction during DH propagation, lyophilize this tissue, and send to the USDA-ARS WRSGGL for genotyping. Collaborators will thus receive DH seed and genotype data on the DHs. 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 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 F_1's 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.