Project FY24-HW-003: Early generation screening for FHB resistance using aerial-phenomic approaches

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1. **What are the major goals and objectives of the research project?**

   The major goal of the project is to identify breeding lines with adequate FHB resistance and adaptation to Montana growing conditions. The specific objective of the project is to initiate early generation screening of winter wheat breeding lines for FHB resistance.

2. **What was accomplished under these goals or objectives?** *(For each major goal/objective, address these three items below.)*

   What were the major activities?

   A trial consisting of 100 experimental lines with known FHB resistant sources in background were sown in two replications at the Southern Agricultural Research Center, Huntley, MT in October 2024. Lines were genotyped for the presence of *FHB1* at the USDA Small grain genotyping lab at Kansas
   Aerial phenotyping utilizing drones fitted with multi-spectral cameras was also initiated to evaluate the potential of estimating disease severity using remote technologies.
   Thirty new cross combinations were made in March 2025 with FHb1 sources in the Montana germplasm. The F1s are currently in vernalization and will be sown in greenhouse for advancing and backcrossing in August.

   What were the significant results?

   The trial is still growing. The trial was inoculated with corn spawn inoculum and misting system is functioning to facilitate disease development

   List key outcomes or other achievements.

   2024-2025 field crop cycle is ongoing. Crosses were harvested and F1's were sown and currently in vernalization.
   Data from aerial phenotyping will be extracted at the end of the field cycle

3. **What opportunities for training and professional development has the project provided?**

   A graduate student has been involved in the project specifically with conducting aerial phenotyping activity and conducting crosses. The graduate student was supported to attend 2024 NFHB Forum in Austin, Texas, 3-5 Dec,2024 and Hands-on training in high-throughput phenotyping, Tampa, Florida, 25 – 27 April 2025.

4. How have the results been disseminated to communities of interest?

In 2024, annual field day at Southern The annual field day at Southern Agricultural Research Center was cancelled due to thunderstorms.

5. What do you plan to do during the next reporting period to accomplish the goals and objectives?

The plan is to continue with the activities of this field cycle 2024-25, harvest and evaluate severity and DON in the breeding lines.
New experimental breeding lines will be planted and evaluated in 2025-26 for FHB resistance. New crosses will be conducted as part of the FHB breeding pipeline and plan is to reinitiate genotyping for FHB at MSU.