Project FY22-DU-007: Developing FHB Resistant Durum Varieties for Montana

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1. **What are the major goals and objectives of the research project?**
   Creating, advancing, and testing durum populations that are more Fhb resistant than current varieties.

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

   What were the major activities?

   Making crosses in the greenhouse to move Fhb1/Fhb5 genes into adapted germplasm. Advancing populations in the field and greenhouse. Screening populations with specific markers to ensure they contain the disease resistance genes. Hill plots of new populations and disease resistance screening under controlled field conditions. Sending in harvested seed for DON testing. FHB susceptibility and DON results are correlated. Lines are advanced in our variety release program.

   What were the significant results?

   Created populations segregating for Fhb1/Fhb5. Advanced by single seed descent to hill plot trials under controlled conditions after screening for the known resistance genes. Correlated with DON and disease levels. Identified best lines to use in the breeding program.

   List key outcomes or other achievements.

   Created and advanced populations toward varietal release. Tested under field conditions. The Fhb1/Fhb5 genes incorporation into durum genotypes will be a better source of resistance than any currently available.

3. **What opportunities for training and professional development has the project provided?**
   One graduate student works on this project and he has trained two undergraduate students in various aspects. That includes crossing, marker screening, and field trials.

4. **How have the results been disseminated to communities of interest?**
   Presentations at field days at the main trial location at the Eastern Research Station of Montana State University located in Sydney, MT. This location is the center of durum production in Montana.

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

   New crosses with lines showing best field FHB resistance to MT adapted durum parents. Continue marker screening on all populations. New populations started by crossing with Fhb1/Fhb5 positive lines. Yield testing of all lines at multiple locations.
   Selection of head rows based on both the presence of Sumai 3 derived resistance genes as well as resistance, height, flowering time, maturity, and yield.
   Best lines will be selected for further yield testing in Bozeman and Sidney.
   We will continue to backcross and select for FHB resistance markers followed by field-based screening.