Project FY22-IM-008: Evaluation of Fungicides and Integrated Strategies for Management of FHB & DON in ND

---

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

   The first goal of this research was to quantify and compare the efficacies of single or sequential applications (with and without genetic resistance) of Prosaro Pro, Sphaerex, Prosaro and Miravis Ace on Fusarium head blight (FHB) and deoxynivalenol (DON). To do this, multi-location field experiments were established and categorized as (1) uniform fungicide trials (UFT) - assess efficacy of a fungicide on FHB and DON on a susceptible variety and (2) integrated management (IM) trials - assess the impact of fungicide and varietal resistance on FHB and DON. The second goal was to communicate results from the experiments to growers, county agents, crop consultants, agronomists, crop advisors, and other agriculturists.

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 total of six UFT experiments (one on spring barley, two on spring durum and three hard spring wheat) were conducted across four research locations (Fargo, Langdon, Minot and Williston). Moderate levels of FHB and low levels of DON developed in the spring barley (BAR) trial and two hard red spring wheat (HRSW) trials. High levels of FHB and DON developed in both spring durum (DUR) trials. No FHB and DON developed in one HRSW trial.

   A total of five IM experiments (one on BAR, one on DUR and three on HRSW) were conducted across four research locations (Carrington, Hettinger, Langdon, and Williston). High levels of FHB and DON occurred in the BAR trial and DUR trial. In the HRSW trials, moderate to high levels of FHB and DON occurred in two trials. No FHB and DON were reported from the trial placed in Hettinger.

   Data summaries and information was delivered at several Extension events (reported below) and a virtual walk-through highlighting the UFT in HRSW at Fargo was created (link provided in results).

   What were the significant results?

   The data from 2024 was combined with 2022 and 2023 and combined analyses were performed. Results of the UFT indicated that both Prosaro Pro and Sphaerex were similar in FHB efficacy to Prosaro and Miravis Ace. The results also indicated applying Sphaerex 3 to 7 days after early-flowering (or full-head in BAR) was similar in reducing FHB and DON when compared to the application of Sphaerex at early-flowering (full-head in BAR). This suggests there is at least one week of opportunity to manage FHB and DON with a fungicide in HRSW, DUR and BAR. The treatments including sequential application timings of a fungicide showed greater disease reduction than applications applied at either early-flower (DUR and

HRSW) or full-head (BAR). However, yield values were similar among the treatments suggesting the most economic decision is one well-timed fungicide application. Genetic resistance is still a cornerstone of FHB management as the least susceptible varieties had lower FHB and DON.

Summary tables and slide sets of the USWBSI UFT and IM data were presented several times at field days, winter Extension events, and County Crop Improvement Meetings.

List key outcomes or other achievements.

Field experiments are now established at five NDSU Research Extension Centers, and provide a significant opportunity to generate local data and subsequently communicate results to the agricultural community at field days.

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

The field experiments are used as a learning opportunity for graduate students and undergraduate students. Topics I cover with students include understanding *Fusarium graminearum* biology, importance of genetic resistance, and information pertaining to fungicide timing and selection. The plots are also a focal point for a field day where we invite students from 2-year agriculture schools (Bismarck State College and North Dakota State College of Science).

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

Several methods are used to disseminate the results to the agricultural communities in North Dakota and surrounding states. This includes field days, large winter Extension event, County Crop Improvement meetings, industry updates, etc. Additionally, results are often summarized and reported in the NDSU Crop and Pest Reports and during radio interviews.

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

We will continue to conduct the field experiments at all of the previous locations. This will build upon the previous three years of data and will be used in analyses conducted locally and nationally (Dr. Pierce Paul Lab). Given the robust collaborative effort, I will be presenting field day presentations at all locations (except one). This will give me the opportunity to showcase the USWBSI funded research, while compiling audience questions that could be used for future research projects.