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

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

   Field trials were conducted to assess the efficacy of Prosaro Pro and Sphaerex, and compare efficacy to Prosaro, Caramba, and Miravis Ace. This was accomplished using (1) uniform fungicide trials (UFT) to assess efficacy of a fungicide on Fusarium head blight (FHB) and deoxynivalenol (DON) on a susceptible variety and (2) integrated management (IM) trials to assess the impact of fungicide and varietal resistance on FHB and DON. The second objective was to communicate research findings at meetings and other Extension tools.

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 (two each on spring barley, spring durum and hard spring wheat) were conducted across five research locations (Davenport, Fargo, Langdon, Minot and Williston). Moderate to high levels of FHB and elevated DON levels developed in two spring barley (BAR) trials and two hard red spring wheat (HRSW) trials. High levels of FHB developed in one spring durum (DUR) trial (DON not obtained due to hail), while no FHB developed in another durum trial.

   A total of six IM experiments (two each on BAR, DUR and HRSW) were conducted across four research locations (Fargo, Langdon, Prosper and Williston). Moderate to high levels of Fusarium head blight were observed in two BAR trials, one DUR trial and one HRSW trial. Low levels of FHB were observed in one DUR trial and one HRSW trial.

   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?

   Results from the UFT trials suggest that both Prosaro Pro and Sphaerex were similar in efficacy to Prosaro, Caramba and Miravis Ace when applied at the early flowering growth stage (Feekes 10.51) in HRSW and DUR or full-head (Feekes 10.5) in BAR. The “late” application of Sphaerex (single application 4 to 7 days after Feekes 10.51 in HRSW and DUR or Feekes 10.5 in BAR) was equally efficacious as the Feekes 10.51 timing in HRSW and DUR or Feekes 10.5 in BAR. The use of two fungicide applications (one at Feekes 10.51 or Feekes 10.5 and again 4 to 7 days later) provided the highest amount of suppression of FHB and DON. Results from the IM trials indicated that the use of a less susceptible HRSW or DUR variety combined with a well-timed fungicide provided the most amount of DON suppression and protection of yield. In BAR, differences in barley susceptible wasn’t as apparent, yet a well-timed fungicide application was still effective in reducing FHB and DON.

List key outcomes or other achievements.

One of the greatest achievements with these trials is the collaboration that exists in North Dakota. My Co-PIs and I are able to generate a very diverse and robust set of data that is heavily relied upon when making FHB management decisions. Having trials positioned across the state provides local data and allows for a robust summary of ND data. During this performance period, a 360 walkthrough video was developed to showcase both summary results and a site specific tour of the Fargo HRSW trial. The walkthrough can be accessed at https://tours.bemorecolorful.com/v/OAzAWZgoqQp.

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. I offer the opportunity for students to partake in a learning session to understand Fusarium graminearum biology, the Fusarium head blight disease cycle, importance of host resistance, fungicide efficacy and fungicide timing. The plots are also used to educate students from 2-year agriculture schools that make an annual visit to NDSU.

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

Information and data generated from these trials are regularly showcased at Extension events including winter Extension meetings, commodity group updates, Crop Improvement updates, and field days. Additionally, results are often summarized and referenced when writing Crop and Pest Reports and conducting media interviews (radio, tv and print).

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

The collaborative statewide research project has expanded to include two more sites (Hettinger and Carrington) to generate more data and be tour stop at NDSU Research Extension Field Days. The addition of more locations will provide an even bigger data set for North Dakota and arguably make it the most robust state research effort for the IM and UFT effort. There are several Extension events that often occur at the REC and the USWBSI trials will be a point of interest for agricultural professionals.