Project FY22-IM-015: Integrated Management of FHB and DON in Soft Winter Wheat and Winter Barley in MI

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

1) Evaluate the integrated effects of fungicide treatment and genetic resistance on FHB and DON in all major grain classes, with emphasis on new combination fungicides, Prosaro Pro and Sphaerex.
2) Compare the efficacy of Prosaro Pro and Sphaerex to that of Prosaro, Caramba, and Miravis Ace.
3) Generate data to further quantify the economic benefit of FHB and DON management programs.
4) Generate data to validate and advance the development of FHB risk prediction models.

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

What were the major activities?

Wheat and barley head scab trials were implemented for the 2024 and 2025 season, including fungicide applications, head scab ratings, harvest, sample preparation for DON analysis of 2024 samples, communication of data with Dr. Pierce Paul for further analysis and use in refining FHB risk prediction models. The project findings were summarized and used in extension meetings and field meetings to improve head scab management. The 2025 crop was planted in the fall of 2024, including two wheat and two barley varieties for trials to address the four objectives listed above.

What were the significant results?

Despite relatively low levels of head scab due to dry conditions across the state, we were able to "push disease" by inoculating with grain spawn and supplemental moisture with a lateral irrigation system resulting in treatment differences. The figure below demonstrate data from one of the trials examining head scab and/or DON suppression of "new and old" fungicide products, and two pass fungicide programs. The data demonstrates that newer products such as A23751C, Sphaerex and Prosaro Pro are working as well as the older products. The lowest DON was found in the two pass program. Although we didn't get as much separation between treatments as desired, this trial coupled with multiple others that we have conducted and those from other states provide the basis for disease management recommendations. This data from Michigan will has been highly valuable in discussing disease management locally and nationally. Additionally, this data will be amalgamated with multistate data to provide a robust assessment of these fungicide products and timing strategies.

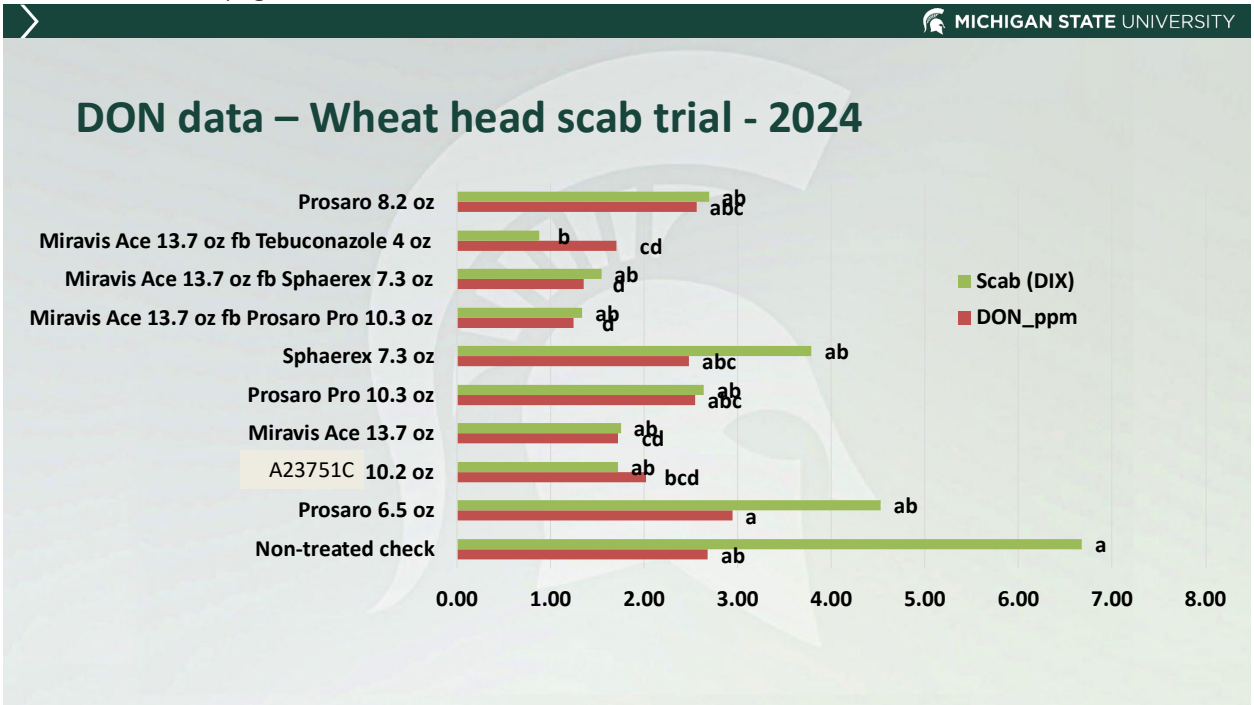

Figure: 2024 field trial data demonstrating suppression of DON from evaluated fungicide treatments.

List key outcomes or other achievements.

This data and data from the USWBSI collective were invaluable in discussions with farmers and agribusiness personnel around head scab management.

Expected Outcome: Regional product performance for the effects of fungicide treatment and genetic resistance on FHB and DON, with emphasis on new combination fungicides, Prosaro Pro, Sphaerex and a new soon to market product coded at A23751C.
Actual Outcome: Data on new combination fungicides was generated and shared at winter meetings.

Expected Outcome: Regional performance on efficacy of A23751C, Prosaro Pro and Sphaerex to that of Prosaro, Caramba, and Miravis Ace.
Actual Outcome: Data on Products were assessed in a moderate disease environment and observations were added to national dataset.

Expected Outcome: Contribute data to further quantify the economic benefit of FHB and DON management programs.
Actual Outcome: Data was contributed to a pooled data set for continued economic analysis.

Expected Outcome: Contribute data to validate and advance the development of FHB risk prediction models.
Actual Outcome: Data was contributed which will be used to help improve model development.

3. What opportunities for training and professional development has the project provided?
The entire lab participates in head scab trial inoculation and rating. This provides an opportunity for undergraduate, graduate students and postdocs to become familiar with the project. We discuss treatments and why the trial is conducted, and what we can learn from the trials. Additionally, weekly lab meetings incorporate discussion of field trials including these head scab management trials.

4. How have the results been disseminated to communities of interest?
As detailed below in the list of extension outputs the research results from the trials conducted at Michigan State University and from the USWBSI collective are presented at field days and winter extension meetings to improve farmer and agribusiness understanding of head scab management, including the importance integrated disease management of variety resistance and judicious fungicide use, as well as product performance and best practices and use of the head scab risk prediction model.

Wheat fungicide efficacy information is updated annually through a national fungicide efficacy chart and discussions with members of the NCERA-184 group and published through the Crop Protection Network. I regularly share this guide with farmers and industry: https://cropprotectionnetwork.org/publications/fungicide-efficacy-for-control-of-wheat-diseases

5. What do you plan to do during the next reporting period to accomplish the goals and objectives?
We plan to repeat the trial to strengthen the data set, with the possibility of revisions to the field protocols, depending on availability of new products. This season we also conducted a trial to examine additional products including copper products that industry has had questions about. We also ran an off-label trial to highlight potential downsides of strobilurin fungicide applications, and how they may exacerbate mycotoxin accumulation. This trial was run in response to stripe rust management in 2024, which may have seen some folk pushing fungicide label limits in attempt to manage the stripe rust epidemic.