

**ANNUAL PROGRESS REPORT  
TO  
NORTH CAROLINA SMALL GRAIN GROWERS ASSOCIATION, INC.**

**TITLE:** Identifying Economically Beneficial Disease Management Strategies in North Carolina Wheat – 2022-2023 (Year 3)

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**DEPARTMENT(S):** NC Cooperative Extension,<sup>1</sup> Entomology and Plant Pathology,<sup>2</sup> and USDA ARS Plant Sciences Research Unit<sup>3</sup>

**REPORT:**

**PROJECT STATUS SUMMARY:**

The field research was completed as proposed. We are in the stages of performing grain quality analysis and writing the breakeven formulas for the economic data. All of the data will be statistically analyzed and summarized for the final report. The funding level for the project was appropriate and spending is on target.

**OBJECTIVES**

- 1) Evaluate efficacy of mode-of-action combinations and application timing on wheat yield and quality given different levels of fungal disease pressure
- 2) Determine the overall economic benefit of the disease management options when weighing input costs against fungicidal treatments

**PROJECT UPDATE**

Research plots were planted at the NCDA Caswell Research Station in Kinston, NC on 25-Oct-2022 and harvested on 6-Jun-2023. In contrast to the previous two years of the experiment at the Piedmont Research Station, where no fungal disease occurred, powdery mildew, SNB and leaf rust were observed and disease severity was documented for each plot on 23-Feb-2023, 21-Mar-2023, 12-Apr-2023 and 09-May-2023. Wheat samples were submitted to a wheat quality testing lab for falling number and protein. Although no FHB was visible in the experiment, samples were submitted to the University of Minnesota for DON testing on 28-Jun-2023.

The replicated small plot research examines the effects of the following treatment factors in a split-split plot design including non-treated controls:

- 1) Varieties Croplan 9606 and USG 3536 which are susceptible and moderately resistant, respectively, to common wheat fungal diseases in NC
- 2) Fungicide 1 (propiconazole), Fungicide 2 (propiconazole+pydiflumetofen), Check (no fungicide)
- 3) Application timings at top-dress (GS 29), flowering (GS 65) and top-dress & flowering (both GS 29 and GS 65)

Our next step is to perform the data analysis. The effects of these treatments and interactions between treatments will be compared against the economic input data on: 1) Yield, 2) Quality, 3) Input costs, including fungicide product and application costs, 4) Average market price range earned for feed wheat and milling wheat.

The project’s previous results were presented this year at extension educational meetings (2 field days) and scientific presentations. The scientific poster won second place in the graduate student competition at the Commodity Conference in Durham in January 2023. It also won first place for research poster at the NC Association of County Agricultural Agents annual meeting in Hickory in June 2023. It is a national finalist and will be presented at the National Association of County Agricultural Agents Annual Meeting in Des Moines, IA in August 2023. The final results of this project will be presented in the project report and a small grains portal blog post.

**Budget / Financial Status Update:**

**\$9,040** was awarded for this funding cycle. Some transactions and expenditures are still pending.

	<u>Projected</u>	<u>Spent (to date)</u>
Seed: 4 bags (2 varieties)	\$240	\$0.00
Fungicides, application supplies	\$3,000	\$919.96
Sample shipping (144 samples)	\$1,000	\$129.85
Sample Testing	\$3,000	\$5,382.20
Field supplies (flags, tools, bags, misc.)	\$300	\$0.00
Educational materials (signs, poster, handouts)	\$500	\$613.69
Travel (5 overnights for PI to field location)	\$1000	\$1,125.10
<b>TOTAL:</b>	<b>\$9,040</b>	<b>\$8,170.80</b>

**IMPACT STATEMENT**

The milling and baking market for soft red winter wheat in NC provides an opportunity for growers to earn a higher income from their crop. Fungicides are a significant input cost intended to protect yield and grain quality. This project provides data to update our science-based disease management recommendations, which currently state that fungicide applications are not cost-effective in the absence of disease. This study investigates different fungicide application timings and mode-of-action combinations to identify which fungicide approaches are most cost-effective for the grower.