

# Northeast Ag Expo Small Grains Field Day 2022 Test Results



**Cooperator: White Hat Seed Farm  
Perquimans County**



## Table of Contents

<b>Acknowledgements .....</b>	<b>3</b>
Northeast Ag Expo Team .....	3
University Partners .....	3
<b>Site Information &amp; Characteristics.....</b>	<b>4</b>
<b>Weather.....</b>	<b>5</b>
<b>Nitrogen Rate x Timing Test.....</b>	<b>7</b>
Study Design.....	7
Table 1: Nitrogen Rate x Timing Test Treatment List .....	7
Results.....	8
<b>Sulfur Rate x Timing Test .....</b>	<b>8</b>
Study Design.....	8
Table 2: Sulfur Rate x Timing Test Treatment List.....	8
Results.....	9
<b>Product Seed Treatment Test .....</b>	<b>9</b>
Study Design.....	9
Table 3: Product Seed Treatment List .....	9
Results.....	10
<b>Seeding Rate Test .....</b>	<b>10</b>
Study Design.....	10
Table 4: Seeding Rate Treatment List.....	10
Results.....	11
<b>Fungicide Test.....</b>	<b>11</b>
Study Design.....	11
Table 5: Fungicide Test Treatment List.....	11
Results.....	12
<b>NC State OVT &amp; Northeast Ag Expo Variety Trials.....</b>	<b>13</b>

## **Acknowledgements**

Any effective on-farm test requires a great deal of assistance from a number of different individuals. The Northeast Ag Expo Team would like to officially recognize these people for their contribution to the 2022 Northeast Ag Expo Small Grains Field Day. Collaboration with a willing and effective landowner/cooperator is a key component to all successful field research. The cooperator for these tests was White Hat Seed Farm of Perquimans County. We would like to thank Burt Eure and the entire staff for allowing this work to be conducted on their farm and for their assistance throughout the growing season. Several NC State Extension specialists were also vital to this process. Dr. Angela Post, Ryan Heiniger, and the On Farm Variety Testing Team provided support in planning, planting, applying treatments, harvest, and data analysis. We would also like to thank Dr. Nick Piggott, Dr. Christina Cowger, Dr. Wes Everman, and Dr. Ron Heiniger for presenting at the Northeast Ag Expo Small Grains Field Day held on February 16, 2022. Thank you to the North Carolina Small Grain Growers Association for their financial support. Thank you to the various seed and agribusiness companies represented in our data who donated seed and treatment materials used in trials. Thank you to everyone who contributed in the generation of this data. In addition, we appreciate the support of the agriculture community and all who attended the field day.

## **Northeast Ag Expo Team**

The Northeast Ag Expo Team, listed below, consists of a six-county North Carolina Cooperative Extension group located in northeastern North Carolina. This six-county team serves Camden, Chowan, Currituck, Gates, Pasquotank, and Perquimans Counties. This team conducts on-farm research, field days, and crop variety trials annually to promote the profitability and sustainability of area farming operations.

Austin Brown – Camden County Extension Director & Agriculture Agent  
Erin Eure – Commercial Fruits & Vegetables Area Specialized Agent  
Adam Formella – Currituck County Agriculture Agent  
Jared Harrell – Perquimans County Extension Director & Livestock Agent  
Matthew Leary – Chowan County Agriculture Agent  
Dylan Lilley – Hertford County Extension Director & Agriculture Agent (formerly Perquimans County Agriculture Agent)  
Paul Smith – Gates County Agriculture Agent  
Sarah White – Area Commercial Horticulture Agent  
Al Wood – Pasquotank Agriculture Agent

## **University Partners**

University partners vary each year based on regional needs and collaborate with the Northeast Ag Expo Team to execute research design, planting and harvest of plots. They also assist with data analysis and interpretation of results.

Angela Post – Small Grains Extension Specialist  
Ryan Heiniger – Official Variety Testing Director

## Site Information & Characteristics

Trials were conducted at [White Hat Seed Farm](#) of Hertford, North Carolina. Pre-plant fertilizer was applied on 11/8/21 consisting of 25-60-80-4S pounds per acre respectively, based on NCDA&CS soil test recommendations. No lime was applied. The soil type was 100% Roanoke silt loam.

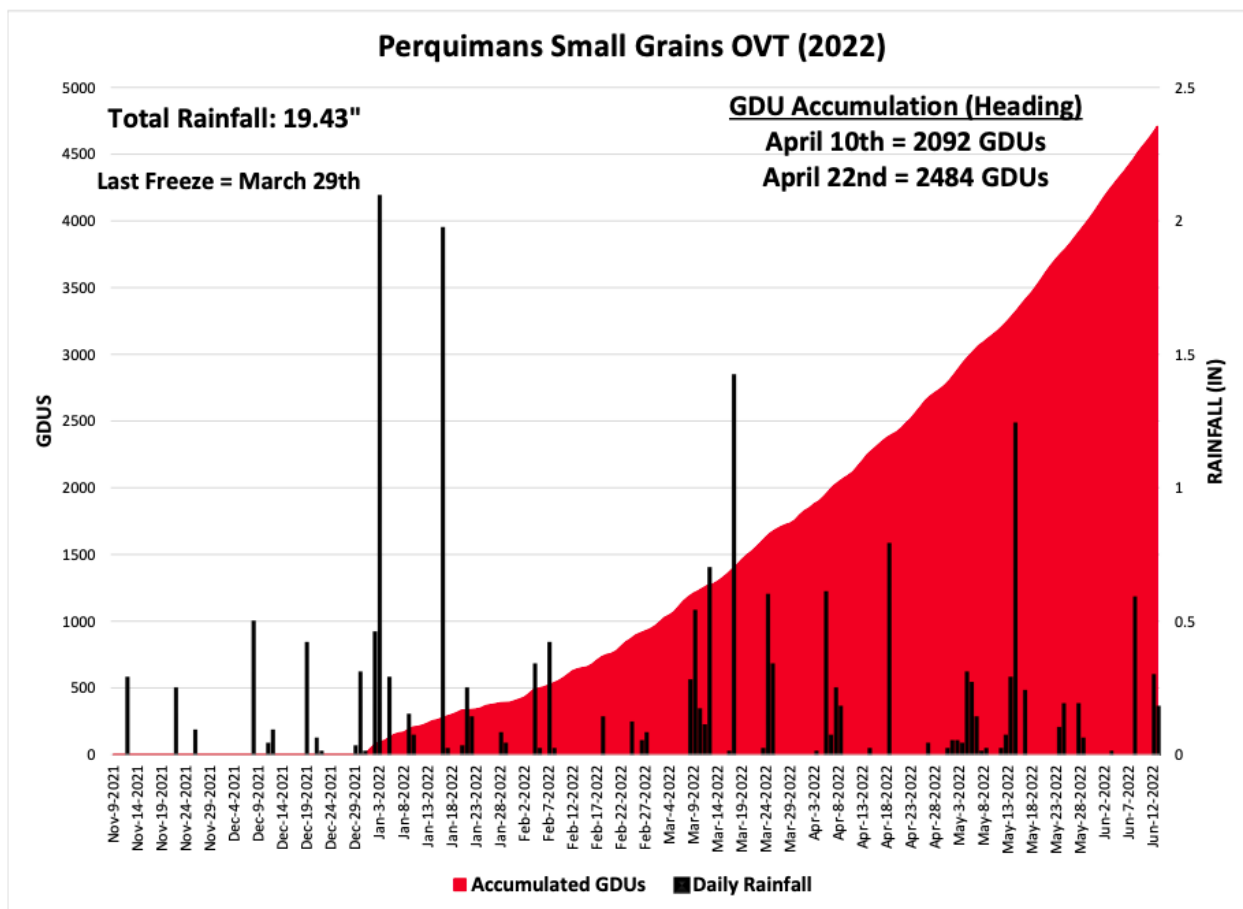
Planting occurred on 11/9/21 at a seeding rate of 1.8 million seed per acre. Varieties utilized in the tests were USG 3661 (Vibrance Extreme seed treatment), Pioneer 26R45 (untreated), and Pioneer 26R59 (untreated). The site was conventional till and soybean was the previous crop. Plots were harvested on 6/15/22.

All tests except for the Nitrogen Rate x Timing test received additional fertilization consisting of 120 pounds of nitrogen per acre applied on 2/15/22. One pre-plant herbicide application of Anthem Flex was applied on 11/9/21 to all plots. Plot combines utilized for harvest recorded plot weight, test weight, and moisture for each plot. A grain quality analysis was also conducted to capture falling number. Yields were standardized to 13.5% moisture. Statistical analysis was performed using Statistical Analysis Software (SAS). Significance is reported at the 95% confidence level, unless otherwise noted.

Cultural practices and soil information for 2022 Northeast Ag Expo Small Grains Field Day site:

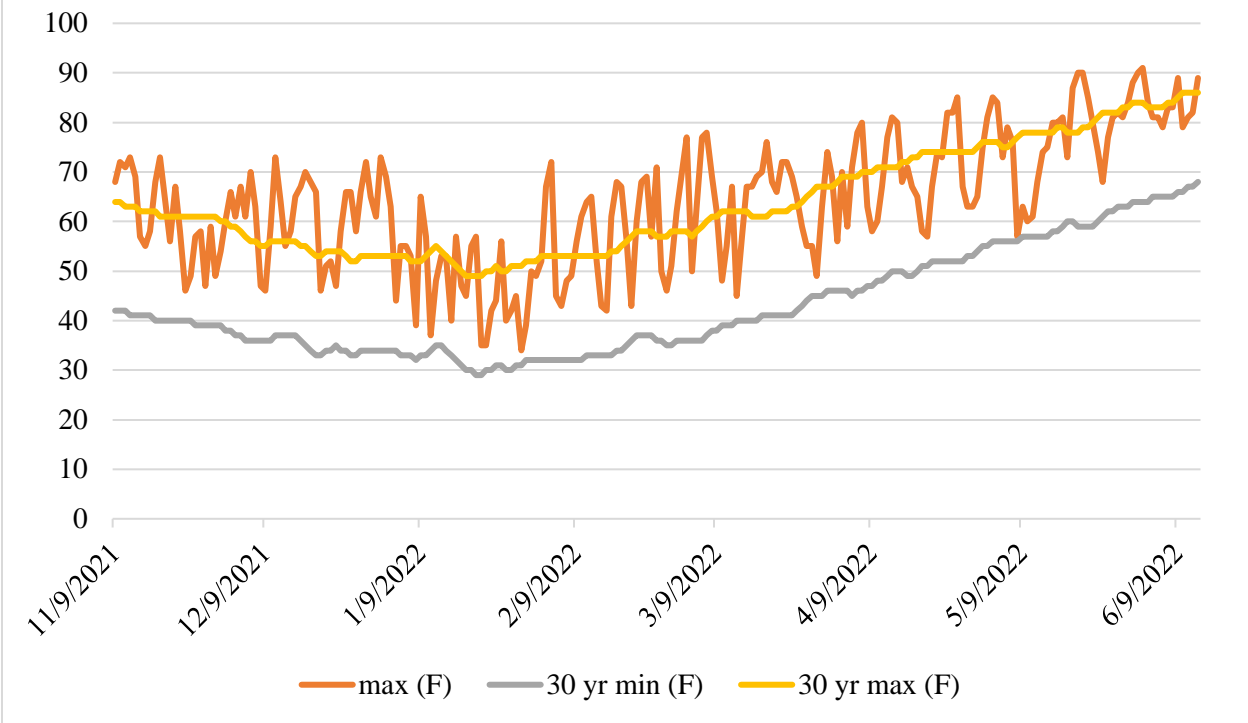
		<b>Perquimans</b>
<b>Nitrogen Applications</b>	<b>Pre-Plant (lb/A):</b>	<b>30</b>
	<b>Early Split (lb/A):</b>	<b>0</b>
	<b>Top Dress (lb/A):</b>	<b>120</b>
	<b>Total N (lb/A):</b>	<b>150</b>
<b>Soil Information</b>	<b>Soil Type:</b>	<b>Roanoke silt loam</b>
	<b>HM %:</b>	<b>0.24</b>
	<b>CEC:</b>	<b>6.34</b>
	<b>BS %:</b>	<b>81</b>
	<b>Ac:</b>	<b>1.2</b>
	<b>pH:</b>	<b>5.9</b>
	<b>P-I:</b>	<b>50</b>
	<b>K-I:</b>	<b>50</b>
	<b>Ca %:</b>	<b>54</b>
	<b>Mg %:</b>	<b>23</b>
	<b>Mn-I:</b>	<b>43</b>
	<b>Zn-i:</b>	<b>64</b>
	<b>Cu-I:</b>	<b>75</b>
<b>S-I:</b>	<b>32</b>	
	<b>Total Rainfall (in):</b>	<b>19.43</b>
	<b>Planting Date:</b>	<b>11/9/21</b>
	<b>Harvest Date:</b>	<b>6/14/22</b>

# Weather

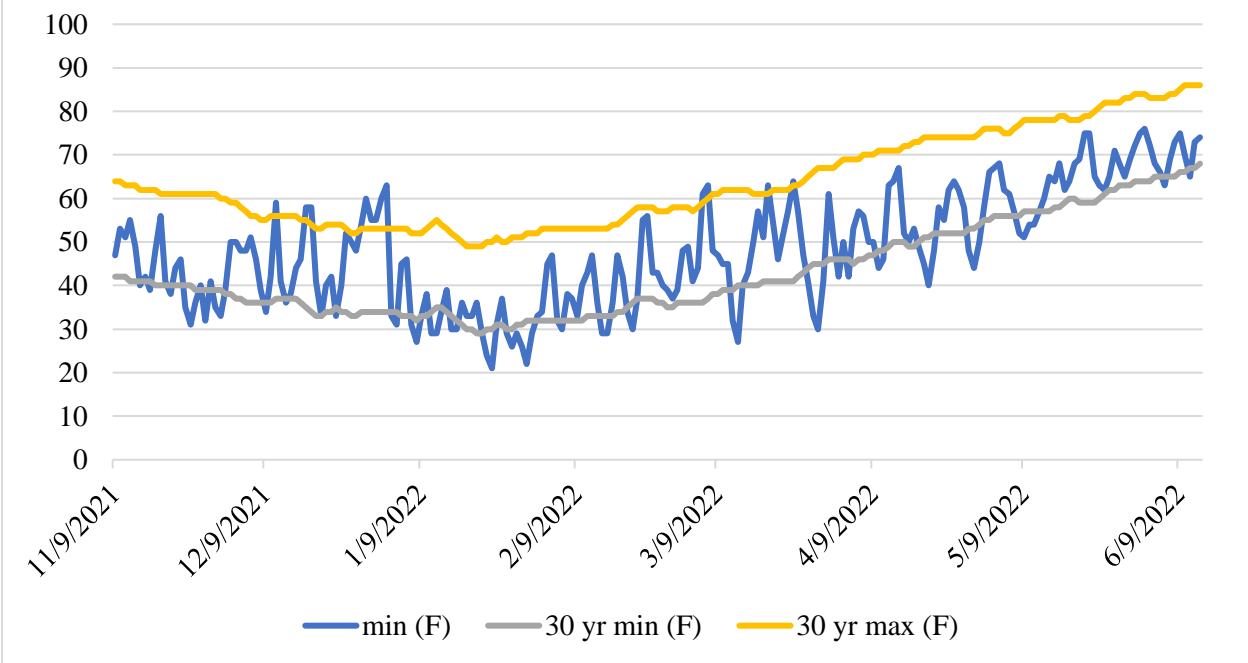


Rainfall was sufficient for the season with a dryer than usual fall. This aided in stand establishment and tiller development. Regular rainfall and steady heating unit accumulation made a good wheat crop in the region this year. However, many growers experienced rainfall at or near harvest which decreased test weights in the region.

2021-2022 Perquimans County Daily Max Temperature & 30 year Averages (F)



2021-2022 Perquimans County Daily Min Temperature & 30 year Averages (F)



Daily maximum temperatures revolved around the 30-year average trendline for the 2021-22 growing season. But notably, when looking at daily minimum temperatures in the 2021-22 growing season, we have several days where the minimum approached or exceeded the 30-year average maximum temperature for the same date. This means a much warmer than usual growing season and particularly warmer in the fall and early winter when wheat is tillering. Overall, the growing season was very good for wheat production except a short period in late January where it was unusually cold for a few nights and two late spring freeze events that injured some wheat in the region depending on its maturity and growth stage at the time of the event.

## Nitrogen Rate x Timing Test

### Study Design

Five treatments were established in a randomized complete block design. The plots were established in USG 3661 variety and were replicated four times. Plots measured 5 feet wide and 25 feet long. Each plot received 150 total units of nitrogen. Granular urea (46% N) was utilized as the nitrogen source. GS 23 indicated main shoot + 3 tillers, GS 30 indicated jointing, and GS 37 indicated flag leaf is visible.

**Table 1: Nitrogen Rate x Timing Test Treatment List**

	Treatment Name				
	1	2	3	4	5
Application Timing	Standard Topdress	Late Topdress	Split Early	Split Late	Intensive Managed
	lbs N/ac	lbs N/ac	lbs N/ac	lbs N/ac	lbs N/ac
Pre-Plant	30	30	30	30	30
GS 23	-	-	30	-	30
GS 30	120	-	90	60	60
GS 37	-	120	-	60	30

Treatment	Date	Rate
Pre-Plant	11/8/21	30 lbs N/ac
Split Early (GS 23)	1/5/22	30 lbs N/ac
Intensive Mg (GS 23)	1/5/22	30 lbs N/ac
Standard Topdress (GS 30)	3/7/22	120 lbs N/ac
Split Early (GS 30)	3/7/22	90 lbs N/ac
Split Late (GS 30)	3/7/22	60 lbs N/ac
Intensive Mg. (GS 30)	3/7/22	60 lbs N/ac
Late Topdress (GS 32)	3/21/22	120 lbs N/ac
Intensive Mg. (GS 37)	4/13/22	30 lbs N/ac
Split Late (GS 37)	4/13/22	60 lbs N/ac

## Results

NE Ag Expo Wheat 22 - Nitrogen Rate x Timing			
Treatment	Yield (bu/A)	Test Weight (lb/bu)	Falling Number (s)
Intensive Management	87.7	<b>55.4</b>	327
Split Late	86.9	<b>56.3</b>	338
Late Topdress	81.9	53.2	337
Split Early	77.0	52.6	319
Standard Topdress	76.8	50.6	331
<b>Mean</b>	82.1	53.6	330
<b>CV</b>	7.2	1.6	
<b>LSD (p&lt;0.05)</b>	n/s	1.09	n/s
<b>DF</b>	4	4	
<b>SEM</b>	5.9	0.9	
Bolded varieties are not statistically different from the highest yielding variety			

Timing and intensity of nitrogen management at this site had no statistically significant impact on yield or falling number at a 95% confidence level. The Intensive Management and Split Late treatments significantly increased test weight. Compared to the standard topdressing treatment, intensive management increased test weight by 4.8 lb/bu and the split late nitrogen application increased test weight by 5.7 lb/bu. The location did receive rainfall after maturity which decreased test weight across the board. These data indicate that wheat intensively managed with nitrogen or with the addition of a late split nitrogen may be more resistant to test weight losses following rainfall near the time of harvest.

## Sulfur Rate x Timing Test

### Study Design

Seven treatments were established in a randomized complete block design. The plots were established in USG 3661 variety and were replicated four times. Plots measured 5 feet wide and 25 feet long. Plots were treated at a 1x or 2x rate (20 & 40 lbs S/ac) at pre-plant, topdress, and flag leaf growth stages. Additionally, there was an untreated control that received 4 lbs of S/ac in the pre-plant fertilizer. Gypsum (19% S) was utilized as the sulfur source.

**Table 2: Sulfur Rate x Timing Test Treatment List**

Treatment Name	Pounds S/ac	Timing	Application Date
Control	4 (pre-plant fertilizer)	Pre-Plant	11/8/21
Pre-Plant 1x	20	Pre-Plant	11/12/21
Pre-Plant 2x	40	Pre-Plant	11/12/21
Topdress 1x	20	GS 30	3/7/22
Topdress 2x	40	GS 30	3/7/22
Flag Leaf 1x	20	GS 37	4/13/22
Flag Leaf 2x	40	GS 37	4/13/22



## Results

NE Ag Expo Wheat 22 - Sulfur Rate x Timing			
Treatment	Yield (bu/A)	Test Weight (lb/bu)	Falling Number (s)
Flag Leaf 2x	78.2	53.2	305
Pre Plant 2x	77.9	53.8	310
Pre Plant 1x	77.5	53.1	310
Top Dress 2x	76.5	52.7	309
Check	75.3	52.8	310
Flag Leaf 1x	75.2	51.8	301
Top Dress 1x	71.4	52.9	306
<b>Mean</b>	76.0	52.9	307
<b>CV</b>	3.9		
<b>LSD (p&lt;0.05)</b>	n/s	n/s	n/s
<b>DF</b>	6		
<b>SEM</b>	3.0		

No treatments at this site had a statistically significant impact on yield. Overall conditions were good up through harvest. Timing and rate of sulfur did not significantly impact yield, test weight, or falling number at a 95% confidence level compared to the check which received no sulfur. This indicates sulfur was not a limiting factor for wheat in this field in this season. Yield and falling number were good for all treatments. Test weights were low across the board due to a rainfall prior to harvest.

## Product Seed Treatment Test

### Study Design

Five treatments were established in a randomized complete block design. The plots were established in USG 3661 variety and were replicated four times. Plots measured 5 feet wide and 25 feet long. The plot seed was treated with the company treatment on the day of planting. Product rates were utilized based on the company recommendation.

**Table 3: Product Seed Treatment List**

Company	Product	Content	Rate
Control	-	-	-
Delta Ag	Seed Coat	2.0% S, 2.0% Mn, 2.0% Zn	4 oz/ac
Helena	HM-2048	9-15-0-18Zn	8 fl oz/cwt
Meherrin	Super Symcoat	0.05% Co, 0.25% Cu, 5.5% Mn, 0.05% Mo, 5.25% Zn	3 fl oz/cwt
Triangle C.C.	Tri-Able	9-6-4, 0.5% Mg, 1% S	.17 fl oz/cwt

## Results

NE Ag Expo Wheat 22 - Seed Treatment		
Treatment	Yield (bu/A)	Test Weight (lb/bu)
Triangle C.C.	79.7	53.4
Helena	78.0	53.0
Check	74.0	54.0
Meherrin	73.2	53.7
Delta Ag	72.1	51.6
<b>Mean</b>	75.4	53.1
<b>CV</b>	5.4	
<b>LSD (p&lt;0.05)</b>	n/s	n/s
<b>DF</b>	4	
<b>SEM</b>	4.1	

Seed treatments from different companies did not significantly impact yield, test weight, or falling number at a 95% confidence level compared to the check which received no seed treatment. The test site had a warm and dry fall during the time of planting and the weeks following. These conditions are not conducive to seedling disease development, therefore, all seed treatments performed similarly.

## Seeding Rate Test

### Study Design

Six treatments were established in a randomized complete block design. The plots were established in USG 3661 variety and were replicated four times. Plots measured 5 feet wide and 25 feet long. Treatments consisted of seeding rates of 1 million seed/acre, 1.25 million seed/acre, 1.5 million seed/acre, 1.75 million seed/acre, 2 million seed/acre, and 2.5 million seed/acre.

**Table 4: Seeding Rate Treatment List**

Treatment	Seed/acre	Pounds Seed/acre
1	1 million/ac	89 lbs/ac
2	1.25 million/ac	111.5 lbs/ac
3	1.5 million/ac	134 lbs/ac
4	1.75 million/ac	156 lbs/ac
5	2 million/ac	178 lbs/ac
6	2.5 million/ac	223 lbs/ac

## Results

NE Ag Expo Wheat 22 - Seeding Rate		
Treatment	Yield (bu/A)	Test Weight (lb/bu)
2 million	77.8	52.4
1.75 million	77.4	52.7
1 million	76.5	51.9
1.5 million	74.2	52.5
1.25 million	74.0	52.4
2.5 million	73.8	52.4
<b>Mean</b>	75.6	52.4
<b>CV</b>	3.9	
<b>LSD (p&lt;0.05)</b>	n/s	n/s
<b>DF</b>	5	
<b>SEM</b>	4.3	

All seeding rates performed similarly with no statistically significant impact on yield or test weight at a 95% confidence level. Early growing conditions, tillage method, and planting date can all influence the population which will perform best in a given situation. In 2022 the fall growing conditions following planting were excellent for stand establishment and seedling vigor. This location was planted on time just after the optimum planting window and seedlings did not experience common abiotic stressors we see in North Carolina in the fall and early winter. This contributed to all populations performing similarly. However, the two highest numerical treatments (1.75 and 2 million) are in the recommended seeding rate for the region for these planting dates. A more challenging growing season might separate these populations more clearly with regard to yield and test weight.

## Fungicide Test

### Study Design

Five treatments were established in two randomized complete block designs. One block was established in Pioneer 26R59 (susceptible to head scab) and the other in Pioneer 26R45 (moderately resistant to head scab), each replicated four times. Plots measured 5 feet wide and 25 feet long. Treatments consisted of fungicide applications with the following products: Folicur/Tilt, Miravis Ace, Prosaro Pro, Sphaerex, and an untreated control. Applications were made at flowering on 4/22/22.

**Table 5: Fungicide Test Treatment List**

Product	Application Rate	Active Ingredient
Untreated Control	-	-
Folicur/Tilt	4 oz/ac each	Tebuconazole (Group 3) Propiconazole (Group 3)
Miravis Ace	13.7 oz/ac	Pydiflumetofen (Group 7)

(Syngenta)		Propiconazole (Group 3)
Prosaro PRO (Bayer)	8 oz/ac	Fluopyram (Group 7) Prothioconazole (Group 3) Tebuconazole (Group 3)
Sphaerex (BASF)	7.3 oz/ac	Metconazole (Group 3) Prothioconazole (Group 3)

## Results

NE Ag Expo Wheat 22 - Fungicide (Pioneer 26R59)			
Treatment	Yield (bu/A)	Test Weight (lb/bu)	Falling Number (s)
Prosaro PRO	84.6	51.9	303
Folicur/Tilt	84.6	52.5	303
Sphaerex	83.2	52.5	314
Miravis Ace	79.0	52.9	302
Check	77.6	51.5	304
<b>Mean</b>	81.8	52.3	305
<b>CV</b>	5.1		
<b>LSD (p&lt;0.05)</b>	n/s	n/s	n/s
<b>DF</b>	4		
<b>SEM</b>	4.1		

NE Ag Expo Wheat 22 - Fungicide (Pioneer 26R45)			
Treatment	Yield (bu/A)	Test Weight (lb/bu)	Falling Number (s)
Sphaerex	95.0	55.7	337
Folicur/Tilt	93.7	55.4	354
Miravis Ace	93.0	55.8	347
Prosaro PRO	89.7	55.4	342
Check	89.5	55.5	352
<b>Mean</b>	92.2	55.5	346
<b>CV</b>	3.0		
<b>LSD (p&lt;0.05)</b>	n/s	n/s	n/s
<b>DF</b>	4		
<b>SEM</b>	2.8		

Fungicide applications applied to a moderately resistant head scab (P26R45) and a head scab susceptible (P26R59) variety in 2022 had no statistically significant impact on yield, test weight, or falling number at a 95% confidence level. At the time of application, risk for scab was low and overall disease presence was low. In every case, the addition of a fungicide numerically increased yield by as much as 7 bushels for the susceptible check and as much as 5.5 bushels per acre for the moderate resistant check; however, these data do not statistically support a trend that results would sustain year after year. More data is needed to further explore these products when higher disease pressure is present.

## **NC State OVT & Northeast Ag Expo Variety Trials**

The field day site also contained one of the 2022 NC OVT Small Grains locations. Information for both commercial and experimental variety tests can be found in the links below. Additionally, find the results from the 2021-2022 Northeast Ag Expo Small Grains Variety Trials.

[LOCATION SUMMARY – Commercial Wheat](#)

[Perquimans County – Experimental](#)

[2021-2022 Northeast Ag Expo Small Grains Variety Trials](#)

[Find more Northeast Ag Expo Information >>](#)



North Carolina State University and North Carolina A&T State University commit themselves to positive action to secure equal opportunity regardless of race, color creed, national origin, religion, sex, age, veteran status or disability. In addition, the two Universities welcome all persons without regard to sexual orientation.