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2024 VIRGINIA ON-FARM WHEAT TEST PLOTS

A Summary of Replicated Research and Demonstration Plots Conducted by Virginia Cooperative Extension in Cooperation with Local Producers and Agribusinesses



Conducted and Summarized by:

Robbie Longest, Extension Agent, Essex County
Carl Stafford, Senior Extension Agent, Culpeper County
Taylor Clarke, Extension Agent, Mecklenburg County
Bruce Jones, Senior Extension Agent, Appomattox County
Joanne Jones, Extension Agent, Charlotte County
Trent Jones, Extension Agent, Northumberland / Lancaster Counties
Todd Scott, Extension Agent, Campbell County
Turner Minx, Extension Agent, King William / King and Queen Counties
Paul Davis, Retired Extension Agent, New Kent County
Joseph Oakes, Superintendent, Eastern Virginia AREC

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Introduction

The On-Farm Variety and Research Publications are a collaboration between county agents, producers, crop specialists, and agribusinesses to provide research-based information on not only variety selection, but other management practices such as new cultivation, fertilization, planting, and harvesting practices of small grain. It is the intent of all the cooperators involved to provide an unbiased publication that provides assistance in variety selection as well as information related to other current small grain topics.

The authors of this publication wish to thank the many producers and agribusinesses for their cooperation in obtaining the data in this publication. Without their support, this information would not be available, and the resulting publication would not be possible. This publication is made available at the VCE website (<https://ext.vt.edu/>) and is also available from any local county agricultural Extension agent, who can request copies from Robbie Longest in the Essex County VCE Office. If you are a person with a disability and desire assistance or accommodation and would like to request a fully accessible copy of this publication, please contact Robbie Longest in the Essex VCE Office at 804-443-3551 or robbiel7@vt.edu.

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This is the thirty-first year of this ongoing annual project. Further work is planned for the upcoming 2024-2025 growing season. The demonstration and research plot results discussed in this publication are a cooperative effort by eight Virginia Cooperative Extension ANR agents, one retired agent, and the Eastern Virginia AREC superintendent. We are proud to present this year's on-farm small grain plot work to you. We hope the information in this publication will help farmers produce a profitable crop in 2025.

If you are a producer interested in participating in on-farm plot work or have research ideas that you would like to see evaluated through this project, please contact your local Extension office.

DISCLAIMER:

Trade and brand names used in this publication are for educational and comparative purposes only, and Virginia Cooperative Extension does not guarantee or warrant the standards of the products, nor does Virginia Cooperative Extension imply approval of the product to the exclusion of others that may be suitable.

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Figure 1: Soft red winter wheat grain following harvest.

Photos: Courtesy of Robbie Longest and Joseph Oakes.

General Summary

- A. THE SEASON:** The fall of 2023 started off dry at planting, but excessive rainfall was observed in many areas throughout the winter months and into early 2024. Many locations received significantly above average rainfall for most of the growing season which delayed spring topdress nutrient applications, however dry conditions developed near harvest, leading to a timely and expedited harvest. Widespread leaf tip necrosis (Figure 2) was observed this season across the region, and there were several conclusions being drawn including environmental factors around heading, as well as many fields testing positive for Barley Yellow Dwarf Virus (BYDV), which is transmitted by aphid vectors. Overall yields were good, but slightly lower than 2023, however grain quality was outstanding for most with excellent test weights and falling numbers being reported with minimum disease.
- B. VARIETY SELECTION:** Proper variety selection continues to be crucial for producing high-yielding, good quality wheat. With so many options being commercially available, replicated yield data such as that presented in this publication is of great value to producers in helping make this important decision. Many agronomic factors should be considered when selecting a variety such as yield, grain quality, disease resistance package, lodging susceptibility, response to fertility, heading date, stress tolerance, etc. Virginia Cooperative Extension agents, along with producer-cooperators, planted four wheat variety plots throughout eastern and central Virginia in 2023-2024. Seven varieties of soft red winter wheat (SRWW) and one variety of hard red winter wheat (HRWW) were entered and tested in the counties of Appomattox, Campbell, Culpeper, and New Kent. Variety yield and test weight summaries can be found on pages 11 and 12 respectively. An agronomic traits table found on page 20 reports heading date, plant height, and several disease resistance ratings for the tested varieties. Wheat seed size varies, resulting in differences in planting rates and pounds of seed per acre sowed. Included on page 21 is a planting chart for different sized wheat seed as a reference to insure accurate planting populations.
- C. OTHER RESEARCH:**
Impact of Planting Date on Wheat Development, Freeze Susceptibility & Yield: VCE ANR Agents partnered with Dr. Joseph Oakes at the Eastern Virginia AREC (EVAREC) to implement three site studies evaluating four different planting dates on wheat development, freeze susceptibility, and yield. Two of the three studies were on-farm with producer-cooperators, and one was located at the EVAREC. These plots were monitored for tiller development and aerial NDVI index using a drone. Complete results are located on pages 15-20. This work is planned to be continued in the 2024-2025 growing season.

It is advisable to be cautious when choosing a variety from any publication that reports yield data, particularly single-year single-location data. Simply choosing the top yielding variety found in this publication may or may not be the best choice for your style of production and farm. Please consider the production practices listed for each location versus yours when selecting a variety and anticipating its performance. It is advised to consult other replicated yield data over multi-year, multi-location trials in addition to these results when selecting varieties.



Figure 2: Many fields throughout the state and region exhibited symptoms of leaf tip necrosis and Barley Yellow Dwarf Virus (BYDV) following heading in the spring of 2024. The exact cause may have been environmentally related, however many samples collected tested positive for BYDV.



County On-Farm Wheat Variety Plots

Appomattox County Wheat Variety Plot

Cooperators: **Producer:** Chris Booth
 Extension: Bruce Jones, VCE – Appomattox
 Joanne Jones, VCE – Charlotte
 Todd Scott, VCE – Campbell

Previous Crop: Soybeans
Soil Type: Cecil fine sandy loam
Tillage: No-till
Planter/Row Width: 10 ft. John Deere 750 / 7.5 inch spacing
Planting Date: November 16, 2023
Planting Population: 2 Bu./A
Fertilizer: Jan. 3 30-40-50
 Feb. 26 41 #N (28-0-0-5S)
 Mar. 27 70-40-60 (P & K for DC Soybeans)

Crop Protection: **Burndown:** Nov. 17 Glyphosate, Harmony Extra,
 Anthem Flex
 In-Season: Feb. 26 Quelex, Calvary II, Montys
 humi-till

Harvest Date: June 20, 2024

Brand	Variety	Test Weight (Lbs./Bu.)	Moisture (%)	Yield (Bu./A @13.5%)
VIPG (HRWW)	Phoenix 29	62.9	10.9	79.8
USG	3673	62.0	10.8	98.9
Chemgro	Milton	62.8	10.3	93.2
DynaGro	9172	62.2	10.5	89.0
FS InSPIRE	745	61.8	10.3	87.6
VCIA	VT Pitman	63.1	9.9	95.0
Revere	2347	61.0	10.4	92.9
Progeny	#BINGO	60.5	10.2	91.0
AVERAGE		62.0	10.4	90.9

Discussion: This wheat plot looked very good throughout the season. Limited rainfall during June led to the good quality observed.

Campbell County Wheat Variety Plot

Cooperators: **Producer:** Mile Branch Farm – Scott Tweedy
Extension: Todd Scott, VCE – Campbell
 Bruce Jones, VCE – Appomattox
 Joanne Jones, VCE – Charlotte

Previous Crop: Soybeans
Soil Type: Cecil fine sandy loam
Tillage: No-till
Planter/Row Width: John Deere 1590 / 7.5 inch spacing
Planting Date: November 17, 2023
Planting Population: 2.5 Bu./A
Fertilizer: **Pre-plant:** 25-50-60
In-season: Feb. 25 50# N (Ammonium Nitrate)
Apr. 15 50# N (Liquid)
Crop Protection: **In-season:** Mar. Powerflex, Harmony Extra
Apr. 15 Lambda-cyhalothrin
Harvest Date: June 28, 2024

Brand	Variety	Test Weight (Lbs./Bu.)	Moisture (%)	Yield (Bu./A @13.5%)
DynaGro	9172	56.8	10.3	71.9
Revere	2347	59.5	10.1	76.8
Chemgro	Milton	57.8	10.6	71.4
Progeny	#BINGO	56.9	10.8	68.1
USG	3673	56.5	10.6	79.0
FS InSPIRE	745	59.0	10.4	76.1
VCIA	VT Pitman	59.8	10.0	69.3
VIPG (HRWW)	Phoenix 29	60.1	10.4	‡
AVERAGE		58.3	10.4	73.2

‡ The plot stand was poor for this variety, resulting in more weed pressure impacting yields, thus valuable data could not be collected.

Discussion: All other varieties had satisfactory stand and limited weed pressure. Use this data and other replicated yield data when making seed selections for the 2024-2025 growing season.

Culpeper County Wheat Variety Plot

Cooperators: **Producer:** Brad Rosenberger
 Extension: Carl Stafford, VCE – Culpeper

Previous Crop: Soybeans
Soil Type: Glenelg silt loam
Tillage: No-till
Planter/Row Width: Drilled / 7.5 inch spacing
Planting Date: November 20, 2023
Planting Population: 150 pounds/A
Fertilizer: **In-season:** Mar. 21 50-40-100-15S
 Apr. 1 45# N
Crop Protection: **In-season:** Apr. 1 Harmony (0.75 oz./A)
 Flowering Miravis Ace Fungicide
Harvest Date: July 3, 2024

Brand	Variety	Test Weight (Lbs./Bu.)	Moisture (%)	Yield (Bu./A @13.5%)
VCIA	VT Pitman	58.8	11.4	94.6
VIPG (HRWW)	Phoenix 29	58.7	12.0	82.6
DynaGro	9172	58.2	12.1	101.4
USG	3673	57.6	12.0	103.8
Chemgro	Milton	58.9	11.6	91.7
Revere	2347	58.2	11.9	90.6
FS InSPIRE	745	58.5	11.9	96.2
Progeny	#BINGO	57.4	11.8	102.3
CHECK - Pioneer	26R59	58.0	12.1	100.5
CHECK - Pioneer	26R10	56.3	11.6	84.4
Average		58.1	11.8	94.8

Discussion: Overall yields in this location were great, with an overall plot average yield of 94.8 Bu./A. The grower also included Pioneer 26R59 and Pioneer 26R10 in the plot as checks.

New Kent County Wheat Variety Plot

Cooperators: **Producer:** Davis Produce – Paul Davis
Extension: Robbie Longest, VCE – Essex
 Trent Jones, VCE – Northumberland/Lancaster

Previous Crop: Corn
Soil Type: Altavista-Douge fine sandy loam
Tillage: No-till
Planter/Row Width: John Deere No-till drill / 7.5 inch spacing
Planting Date: October 26, 2023
Planting Population: 28 seeds per row foot
Fertilizer: **Pre-plant:** Oct. 12 30-60-80 broadcast
In-season: Dec. 16 20# N (7 gal./A 28% N)
Feb. 8 40# N (15 gal./A 28%N)
Mar. 6 60# N (20 gal./A 28%N)
Crop Protection: Oct. 17 Glyphosate (1.5 pts./A)
Dec. 16 Powerflex (2 oz./A), Metribuzin
 (2 oz./A)
Mar. 21 Metribuzin (2 oz./A), Tilt,
 Palisade (5 oz./A)
Apr. 23 Miravis Ace (13.7 oz./A)
Harvest Date: June 10, 2024

Brand	Variety	Moisture (%)	Yield (Bu./A @13.5%)
CHECK - USG	3352	11.7	81.7
FS InSPIRE	745	12.0	80.3
Chemgro	Milton	11.6	71.1
DynaGro	9172	12.0	88.0
Progeny	#BINGO	12.5	82.6
VIPG (HRWW)	Phoenix 29	11.5	74.0
VCIA	VT Pitman	11.9	80.8
Revere	2347	11.8	75.3
USG	3673	10.5	79.9
AVERAGE		11.7	79.3

Discussion: Extremely wet December with this location receiving 9 inches of rainfall, and another 9 inches in March. Heavy Barley Yellow Dwarf Virus (BYDV) was observed throughout the plot. No lodging was observed, and poor tillering was noted. USG 3352 was used as the grower check. Test weight data was not available for this location.

2024 Virginia Cooperative Extension On-Farm Wheat Variety Plots
Variety Yield Summary
(bushels/acre @ 13.5% moisture)

Company	Variety	Location				Variety AVERAGE *
		Appomattox	Campbell	Culpeper	New Kent	
USG	3673	98.9	79.0	103.8	79.9	90.4
DynaGro	9172	89.0	71.9	101.4	88.0	87.6
Progeny	#BINGO	91.0	68.1	102.3	82.6	86.0
FS InSPIRE	745	87.6	76.1	96.2	80.3	85.1
VCIA	VT Pitman	95.0	69.3	94.6	80.8	84.9
Revere	2347	92.9	76.8	90.6	75.3	83.9
Chemgro	Milton	93.2	71.4	91.7	71.1	81.9
VIPG (HRWW)	Phoenix 29	79.8	‡	82.6	74.0	78.8
Location AVERAGE *		90.9	73.2	95.4	79.0	

§ Color scale for yields indicates higher yields in green, and lower yields in red within test location (column)

* Location and Variety yield averages derived across reported test locations and varieties

‡ Poor stands were noted for this variety within location, impacting yield

**2024 Virginia Cooperative Extension On-Farm Wheat Variety Plots
Variety Test Weight Summary**
(pounds/bushel)

Company	Variety	Location				Variety AVERAGE *
		Appomattox	Campbell	Culpeper	New Kent	
USG	3673	62.0	56.5	57.6	N/A	58.7
DynaGro	9172	62.2	56.8	58.2	N/A	59.1
Progeny	#BINGO	60.5	56.9	57.4	N/A	58.3
FS InSPIRE	745	61.8	59.0	58.5	N/A	59.8
VCIA	VT Pitman	63.1	59.8	58.8	N/A	60.6
Revere	2347	61.0	59.5	58.2	N/A	59.6
Chemgro	Milton	62.8	57.8	58.9	N/A	59.8
VIPG (HRWW)	Phoenix 29	62.9	60.1	58.7	N/A	60.6
Location AVERAGE *		62.0	58.3	58.3	-	

* Location and Variety test weight averages derived across reported test locations and varieties
N/A Test weight data was not available for the New Kent location



Other Research

Impact of Planting Date and Weather Patterns on Wheat Development, Freeze Susceptibility, & Yield

Richmond County Location

Cooperators: Eastern Virginia AREC

Previous Crop: Soybeans

Soil Type: Kempsville sandy loam

Tillage: No-till

Planter/Row Width: Great Plains 1205NT drill / 7.5 inch spacing

Planting Dates: October 19, 2023
October 30, 2023
November 15, 2023
November 28, 2023

Variety: DynaGro 9172

Fertilizer: **Pre-plant:** Oct. 9 36-100-60-7.5S
In-season: Dec. 15 25# N (12-0-0-1.5S)
Jan. 17 25# N (12-0-0-1.5S)
Feb. 16 25# N (12-0-0-1.5S)
Mar. 21 60# N (24-0-0-3S)

Crop Protection: Dec. 8 Quelex Herbicide
Feb. 26 Starane Herbicide

Harvest Date: June 13, 2024

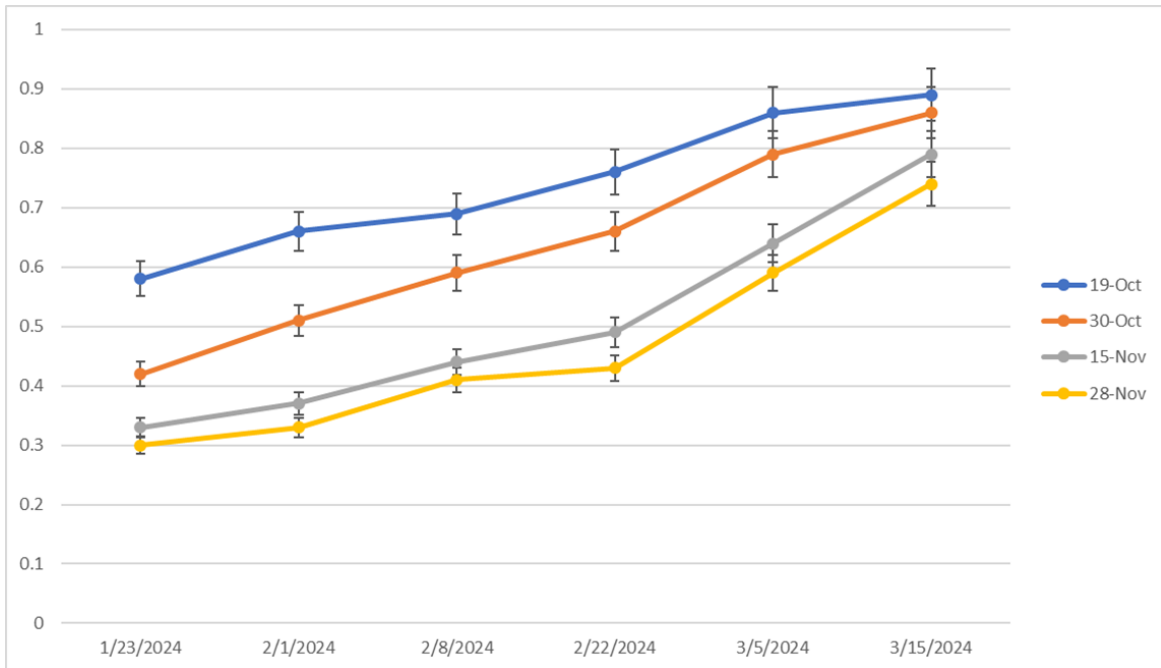


Figure 3: Aerial NDVI throughout the growing season at the Richmond County location, which serves as a proxy for tiller development and overall growth.

Plant Date	Date to 700 GDD	Yield (Bu./A)	Test Weight (Lbs./Bu.)
10/19/2023	Nov. 18	74 B	55.2 BC
10/30/2023	Dec. 16	85 A	56.1 A
11/15/2023	Jan. 13	72 B	55.5 AB
11/28/2023	Feb. 2	67 B	54.5 C

Table 1: A look at date to 700 GDD, yield, and test weight for the four plant dates at the Richmond County location.

Discussion: The purpose of this trial is to determine if Virginia wheat growers can afford to shift their planting dates later in an attempt to stave off spring freeze, but still achieve adequate tiller growth in the fall by accumulating 700 GDD before December 31. Aerial NDVI data collected throughout the growing season (Figure 3) shows that while there was a significant difference in growth and tiller development between the two October plant dates, both had higher tiller densities than the two November plating dates. Both October plant dates achieved adequate tiller density by GS 25 since they both achieved 700 GDD before December 31 (Table 1). The Oct. 30 plant date had the highest yield and test weight, with no significant differences in yield between the Oct. 19, Nov. 15, and Nov. 28 plant date. This location showed in 2023-24 that shifting the planting date a week to 10 days later than recommended could achieve adequate GDD accumulation, tiller density and superior yields. However, this is only one year of data, and it is not advisable to make major management changes based on one year's worth of research. A similar study is being planned for the 2024-25 growing season which will give us a clearer picture year to year of the appropriate planting date.

New Kent County Location

Cooperators:	Producer: Davis Produce – Paul Davis Extension: Joseph Oakes, Superintendent, EVAREC Robbie Longest, VCE – Essex
Previous Crop:	Corn
Soil Type:	Altavista, Pamunkey fine sandy loam
Tillage:	No-till
Planter/Row Width:	John Deere No-till drill / 7.5 inch spacing
Planting Dates:	October 17, 2023 October 27, 2023 November 15, 2023 November 30, 2023
Variety:	USG 3352
Fertilizer:	Pre-plant: <u>Oct. 12</u> 30-60-80 In-season: <u>Dec. 16</u> 20# N <u>Feb. 9</u> 40# N <u>Mar. 14</u> 60# N
Crop Protection:	<u>Dec. 16</u> Metribuzin <u>Mar. 21</u> Metribuzin, Tilt, Palisade <u>April 23</u> Miravis Ace
Harvest Date:	June 17, 2024

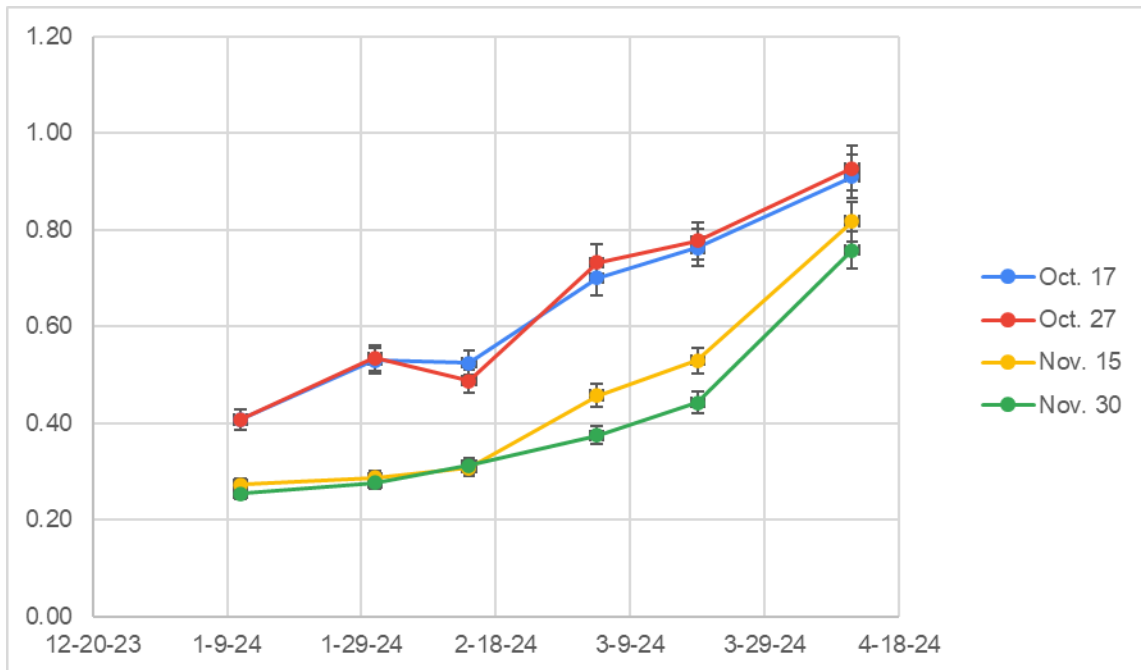


Figure 4: Aerial NDVI throughout the growing season at the New Kent location, which serves as a proxy for tiller development and overall growth.

Plant Date	Date to 700 GDD	Yield (Bu./A)
10/17/2023	Nov. 12	79 B
10/27/2023	Nov. 30	90 A
11/15/2023	Jan. 3	81 AB
11/30/2023	Jan. 26	60 C

Table 2: A look at date to 700 GDD and yield for the four plant dates at the New Kent location.

Discussion: The purpose of this trial is to determine if Virginia wheat growers can afford to shift their planting dates later in an attempt to stave off spring freeze, but still achieve adequate tiller growth in the fall by accumulating 700 GDD before December 31. Aerial NDVI data collected throughout the growing season (Figure 4) shows that while there was no difference in growth and tiller development between the two October plant dates, both had higher tiller densities than the two November planting dates. Both October plant dates achieved adequate tiller density by GS 25 since they both achieved 700 GDD before December 31 (Table 2). The Oct. 27 plant date had the highest yield, with no statistically significant yield difference from the Nov. 15 plant date. This location showed in 2023-24 that shifting the planting date a week to 10 days later than recommended could achieve adequate GDD accumulation, tiller density and superior yields. However, this is only one year of data, and it is not advisable to make major management changes based on one year's worth of research. A similar study is being planned for the 2024-25 growing season which will give us a clearer picture year to year of the appropriate planting date.

King William County Location

Cooperators:	Producer: Thomas H. Fox, Jr. Extension: Joseph Oakes, Superintendent, EVAREC Turner Minx, VCE – King William Robbie Longest, VCE – Essex
Previous Crop:	Corn
Soil Type:	Suffolk and Rumford
Tillage:	No-till
Planter/Row Width:	John Deere 1590 drill / 7.5 inch spacing
Planting Dates:	October 13, 2023 October 29, 2023 November 15, 2023 November 30, 2023
Variety:	DynaGro 9172
Fertilizer:	Pre-plant: <u>Fall 23'</u> 40-40-120 In-season: <u>Feb.</u> 40# N <u>Mar.</u> 60# N
Crop Protection:	<u>May</u> Miravis Ace Fungicide
Harvest Date:	June 20, 2024

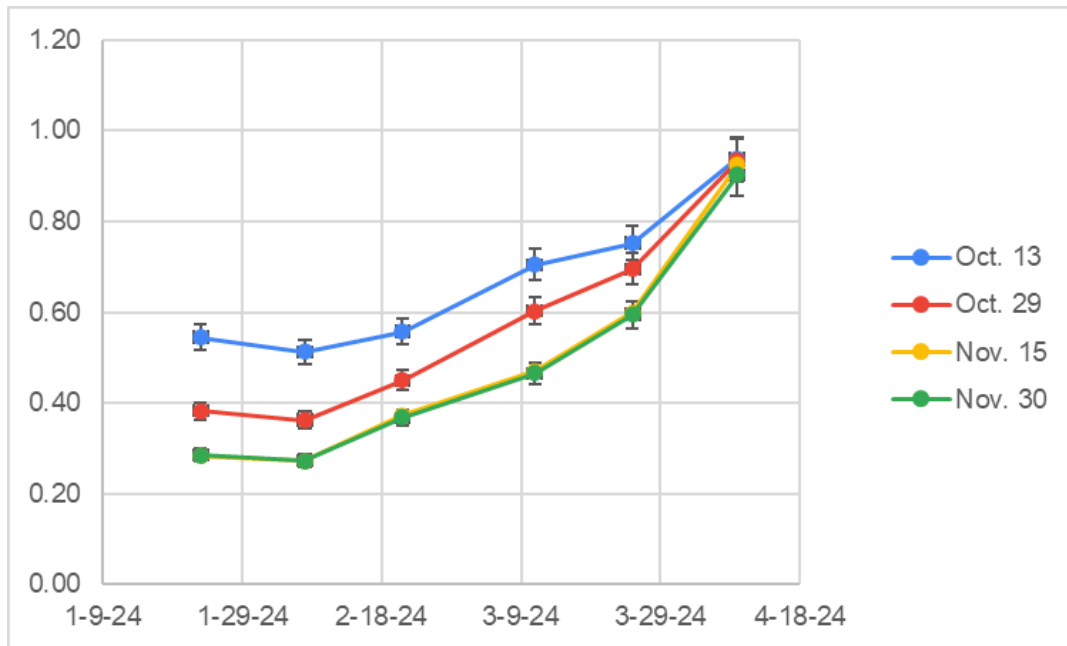


Figure 5: Aerial NDVI throughout the growing season at the King William location, which serves as a proxy for tiller development and overall growth.

Plant Date	Date to 700 GDD	Yield (Bu./A)	Test Weight (Lbs./Bu.)
10/13/2023	Nov. 8	82	59.7
10/29/2023	Dec. 4	74	59.6
11/15/2023	Jan. 6	59	61.2
11/30/2023	Feb. 27	40	61.4

Table 3: A look at date to 700 GDD, yield, and test weight for the four plant dates at the King William location.

Discussion: The purpose of this trial is to determine if Virginia wheat growers can afford to shift their planting dates later in an attempt to stave off spring freeze, but still achieve adequate tiller growth in the fall by accumulating 700 GDD before December 31. Aerial NDVI data collected throughout the growing season (Figure 5) shows that while there was a significant difference in growth and tiller development between the two October plant dates, both had higher tiller densities than the two November planting dates. The Oct. 13 plant date had the highest yield and test weight, followed in sequential order with the remaining three plant dates (Table 3). This location showed in 2023-24 that the Oct. 15 planting date window achieved adequate GDD accumulation, tiller density and superior yields. However, this is only one year of data, and it is not advisable to make major management changes based on one year's worth of research. A similar study is being planned for the 2024-25 growing season which will give us a clearer picture year to year of the appropriate planting date. No stats were run on this location's yield and test weight data since only one strip was harvested from each planting date treatment.

2024 Variety Performance Summary and Disease Ratings
 (Source: VT Small Grains Breeding and Research Program, 2022- 2024)

Brand	Variety	Heading Date (Julian)	Height (in.)	Powdery Mildew* (22' and 23')	Leaf Rust* (23' and 24')	FHB Plant Response* (23')
USG	3673 ^b	116	36.8	4.6	0.2	3.5
DynaGro	9172 ^c	120	35.1	3.7	6.5	3.0
Progeny	#BINGO ^a	122	33.0	3.0	-	-
FS InSPIRE	745 ^c	120	35.4	3.7	6.9	4.0
VCIA	VT Pitman ^c	116	34.4	2.2	0.2	3.5
Revere	2347 ^b	118	38.0	3.0	5.87	5.0
Chemgro	Milton	-	-	-	-	-
VIPG (HRWW)	Phoenix 29 ^b	118	36.6	2.14	2.0	4.0

^a Single year data (2022)

^b Two-year average (2023 and 2024)

^c Three-year average (2022, 2023, 2024)

* The 0-9 ratings indicate a varieties response to disease where 0 = highly resistant and 9 = highly susceptible
 (Data for the reported disease ratings is derived from the years reported in the column heading if data was available for variety)

Wheat Seed Size Planting Conversion Table

	SEEDS PER ROW FOOT (7.5" row spacing)					
	19	22	25	28	31	34
	SEEDS PER SQUARE FOOT					
	30	35	40	45	50	55
SEEDS/POUND	POUNDS OF SEED/ACRE (divided by 60 equals bushels/acre)					
10,000 (large seed)	131	152	174	196	218	240
11,000	119	139	158	178	198	217
12,000	109	127	145	163	182	200
13,000	101	117	134	151	168	184
14,000	93	109	124	140	156	171
15,000	87	102	116	131	145	159
16,000	82	95	109	123	136	150
17,000	77	90	102	115	128	141
18,000	73	85	97	109	121	133
19,000	69	80	92	103	115	126
20,000 (small seed)	65	76	87	98	109	120

