



**Virginia Cooperative Extension**

Virginia Tech • Virginia State University

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# Small Grains in 2019



## Table of Contents

<b>Recommended Small Grain Varieties .....</b>	<b>1</b>
<b>Barley and Wheat Entries .....</b>	<b>4</b>
<b>Introduction and The Season .....</b>	<b>6</b>
<b>Section 1: Barley Varieties</b>	
Discussion of hulless and hulled barley varieties and summary of management practices for the 2019 harvest season .....	8
<b>Table 1.</b> Summary of performance of entries in the Virginia Tech Hulless Barley Test over locations, 2019 harvest. ....	11
<b>Table 2.</b> Two-year average summary of performance of entries in the Virginia Tech Hulless Barley Tests, 2018 and 2019 harvests. ....	12
<b>Table 3.</b> Three-year average summary of performance of entries in the Virginia Tech Hulless Barley Tests, 2017, 2018, and 2019 harvests. ....	13
<b>Table 4.</b> Summary of performance of entries in the Virginia Tech Hulless Barley Test, Southern Piedmont AREC, Blackstone VA, 2019 harvest. ....	14
<b>Table 5.</b> Summary of performance of entries in the Virginia Tech Hulless Barley Test, Tidewater AREC, Holland VA, 2019 harvest. ....	15
<b>Table 6.</b> Summary of performance of entries in the Virginia Tech Hulless Barley Test, Eastern Shore AREC, Painter, VA, 2019 harvest. ....	16
<b>Table 7.</b> Summary of performance of entries in the Virginia Tech Hulless Barley Test, Northern Piedmont Center, Orange, VA, 2019 harvest. ....	17
<b>Table 8.</b> Summary of performance of entries in the Virginia Tech Hulless Barley Test, Kentland Farm, Blacksburg, VA, 2019 harvest. ....	18
<b>Table 9.</b> Summary of performance of entries in the Virginia Tech Hulless Barley Test, Eastern Virginia AREC, Warsaw, VA, 2019 harvest. ....	19
<b>Table 10.</b> Summary of performance of entries treated with plant growth regulator and fungicide in the Virginia Tech Hulless Barley Test, Eastern Virginia AREC, Warsaw, VA, 2019 harvest. ....	20
<b>Table 11.</b> Summary of performance of entries in the Virginia Tech Barley Test over locations, 2019 harvest. ....	21
<b>Table 12.</b> Two-year average summary of performance of entries in the Virginia Tech Barley Tests, 2018 and 2019 harvests. ....	23
<b>Table 13.</b> Three-year average summary of performance of entries in the Virginia Tech Barley Tests, 2017, 2018, and 2019 harvests. ....	24
<b>Table 14.</b> Summary of performance of entries in the Virginia Tech Barley Test, Southern Piedmont AREC, Blackstone VA, 2019 harvest. ....	25
<b>Table 15.</b> Summary of performance of entries in the Virginia Tech Barley Test, Tidewater AREC, Holland VA, 2019 harvest. ....	27
<b>Table 16.</b> Summary of performance of entries in the Virginia Tech Barley Test, Eastern Virginia AREC, Warsaw, VA, 2019 harvest. ....	29
<b>Table 17.</b> Summary of performance of entries in the Virginia Tech Barley Test, Eastern Shore AREC, Painter, VA, 2019 harvest. ....	31
<b>Table 18.</b> Summary of performance of entries in the Virginia Tech Barley Test, Northern Piedmont Center, Orange, VA, 2019 harvest. ....	33
<b>Table 19.</b> Summary of performance of entries in the Virginia Tech Barley Test, Kentland Farm, Blacksburg, VA, 2019 harvest. ....	35
<b>Section 2: Barley Scab Research</b>	
Discussion of reaction of entries in the 2018-19 Virginia Tech Hulless Barley and Barley Tests to Fusarium head blight. ....	37

<b>Table 20.</b> Summary of reaction of entries in Virginia Tech State Hulless Barley Test to Fusarium head blight (scab), 2019 harvest. ....	38
<b>Table 21.</b> Two-year average summary of entries in the Virginia Tech State Hulless Test to Fusarium head blight (scab), 2018 and 2019 harvests. ....	39
<b>Table 22.</b> Summary of reaction of entries in Virginia Tech State Barley Test to Fusarium head blight (scab), 2019 harvest. ....	40
<b>Table 23.</b> Two-year average summary of entries in the Virginia Tech State Barley Tests to Fusarium head blight (scab), 2018 and 2019 harvests. ....	42

### Section 3: Wheat Varieties

Discussion of wheat varieties and summary of wheat management practices for the 2019 harvest season...	43
Entries in the 2018-19 Virginia Wheat Test, arranged by company.....	45
<b>Table 24.</b> Summary of performance of entries in the Virginia Tech Wheat Test, 2019 harvest. ....	49
<b>Table 25.</b> Two-year average summary of performance of entries in the Virginia Tech Wheat Tests, 2018 and 2019 harvests. ....	55
<b>Table 26.</b> Three-year average summary of performance of entries in the Virginia Tech Wheat Tests, 2017, 2018, and 2019 harvests. ....	58
<b>Table 27.</b> Summary of performance of entries in the Virginia Tech Wheat Test, Eastern Virginia AREC, Warsaw, VA, 2019 harvest. ....	61
<b>Table 28.</b> Summary of performance of entries in the Virginia Tech Wheat Test, Eastern Shore AREC, Painter, VA, 2019 harvest. ....	65
<b>Table 29.</b> Summary of performance of entries in the Virginia Tech Wheat Test, Southern Piedmont AREC, Blackstone, VA, 2019 harvest. ....	69
<b>Table 30.</b> Summary of performance of entries in the Virginia Tech Wheat Test, Northern Piedmont, Center, Orange, VA, 2019 harvest. ....	73
<b>Table 31.</b> Summary of performance of entries in the Virginia Tech Wheat Test, Kentland Farm, Blacksburg, VA, 2019 harvest. ....	77
<b>Table 32.</b> Summary of performance of entries in the Virginia Tech Wheat Test, Tidewater AREC, Holland, VA, 2019 harvest. ....	81
<b>Table 33.</b> Summary of performance of entries in the Virginia Tech Wheat Test, Chad Mathias' Farm, Rockingham County, VA, 2019 harvest. ....	85

### Section 4: Milling and Baking Quality

Discussion of milling and baking quality of entries in the 2017-18 Virginia Wheat Test .....	89
<b>Table 34.</b> Milling and baking quality of entries in the Virginia Tech Wheat Test based on evaluation of the 2018 harvest. ....	91

### Section 5: Wheat Scab Research

Discussion of reaction of entries in the 2018-19 Virginia Tech Wheat Test to Fusarium head blight .....	93
<b>Table 35.</b> Summary of reaction of entries in the Virginia Tech State Wheat Test to Fusarium head blight (scab), 2019 harvest. ....	94
<b>Table 36.</b> Two-year average summary of reaction of entries in the Virginia Tech State Wheat Test to Fusarium head blight (scab), 2018 and 2019 harvests. ....	98
<b>Table 37.</b> Three-year average summary of reaction of entries in the Virginia Tech State Wheat Test to Fusarium head blight (scab), 2017, 2018, and 2019 harvests. ....	101

## Recommended Small Grain Varieties

The following are the small grain variety recommendations for Virginia in 2019. The recommendations are based on the agronomic performance in wheat and barley variety tests conducted by the Research and Extension Divisions of Virginia Tech in the various agricultural regions of the state.

### Recommended Wheat Varieties Arranged in Order of Maturity

#### Agronomic Characteristics

Cultivar	Grain Yield	Test Weight	Milling Quality	SRW Baking Quality
<i>Early to Mid-Season Heading Varieties (118-119 d, Julian)</i>				
MAS 61	3	2	Fair	Fair
SY Viper	3	4	Poor	Fair
#Berkeley	3	2	Fair	Good
MBX 17-M-245	4	1	Good	Moderate
#Warrior	4	1	Good	Good
USG 3458	4	1	Good	Moderate
Liberty 5658	3	4	Good	Moderate
CROPLAN CP9606	3	1	Good	Good
Pioneer Brand 26R59	4	3	Moderate	Moderate
Dyna-Gro 9811	3	3	Fair	Fair
AgriMAXX 415	4	4	Good	Moderate

<i>Mid- to Full-Season Heading Varieties (120-121 d, Julian)</i>				
Hilliard	3	3	Fair	Moderate
#Blaze	3	3	Moderate	Moderate
Pioneer Brand 26R45	3	3	Moderate	Good
USG 3895	4	2	Good	Good
Shirley	3	1	Moderate	Moderate
AgriMAXX 473	3	2	Moderate	Moderate
Pioneer Brand 26R41	3	3	Good	Moderate
Pioneer Brand 26R10	3	3	Moderate	Moderate
USG 3316	4	2	Good	Good
USG 3404	3	3	Good	Good

4 - Significantly higher than average

3 - Average or higher than average

2 - Average or lower than average

1 - Significantly lower than average

## Disease Resistance

Cultivar	FHB <sup>†</sup> Resistance	Powdery Mildew Resistance	Leaf Rust Resistance	Stripe Rust Resistance	Barley Yellow Dwarf Virus Tolerance
<i>Early to Mid-Season Heading Varieties (118-119 d, Julian)</i>					
MAS 61	Mod-Good	Mod-Weak	Mod-Good	Good	Good
SY Viper	Mod-Good	Good	Weak	Very Good	Moderate
#Berkeley	Mod-Weak	Good	Mod-Good	Very Good	Good
MBX 17-M-245	Moderate	Good	Weak	Very Good	Mod-Good
#Warrior	Mod-Weak	Moderate	Weak	Very Good	Mod-Good
USG 3458	Mod-Weak	Moderate	Weak	Very Good	Moderate
Liberty 5658	Mod-Good	Moderate	Good	Very Good	Mod-Good
CROPLAN CP9606	Moderate	Moderate	Moderate	Very Good	Mod-Good
Pioneer Brand 26R59	Mod-Weak	Good	Weak	Very Good	Mod-Weak
Dyna-Gro 9811	Mod-Good	Very Good	Good	Very Good	Moderate
AgriMAXX 415	Good	Mod-Weak	Moderate	Very Good	Good

<i>Mid- to Full-Season Heading Varieties (120-121 d, Julian)</i>					
Hilliard	Good	Very Good	Good	Very Good	Very Good
#Blaze	Good	Good	Weak	Very Good	Mod-Weak
Pioneer Brand 26R45	Mod-Good	Moderate	Good	Very Good	Moderate
USG 3895	Mod-Weak	Weak	Good	Very Good	Very Good
Shirley	Mod-Weak	Very Good	Good	Very Weak	Good
AgriMAXX 473	Mod-Good	Very Good	Good	Good	Moderate
Pioneer Brand 26R41	Moderate	Good	Good	Very Good	Mod-Good
Pioneer Brand 26R10	Moderate	Weak	Weak	Very Good	Moderate
USG 3316	Good	Very Weak	Very Weak	Mod-Weak	Moderate
USG 3404	Mod-Good	Moderate	Moderate	Very Good	Very Good

† FHB - Fusarium head blight

## Recommended Barley Varieties

	Hulled Barley				Hulless Barley
	Nomini*	Thoroughbred	Atlantic	Secretariat	Amaze 10
<b>Adapted Regions</b>					
Coastal Plain		X	X	X	X
Piedmont, South of James River		X	X	X	X
Piedmont, North of James River		X	X	X	X
West of Blue Ridge	X	X	X	X	X

<b>Agronomic Characteristics</b>					
Yield	2	4	4	4	4
Test Weight	1	3	3	3	2
Lodging Tolerance	Very	Good	Good	Good	Fair
Relative Height	3	3	2	2	3
Relative Heading	Avg	Late	Early	Avg	Avg

4 - Significantly greater than average

3 - Average or greater than average

2 - Average or less than average

1 - Significantly less than average

\*Nomini barley has low test weight. It is not recommended in eastern Virginia because low test weight grain is unsuitable for export or domestic non-ruminant feed markets.

# Barley and Wheat Entries

## Commercial Barley Entries

**Limagrain Cereal Seed (LCS)**, 2040 SE Frontage Rd, Fort Collins, CO 80525 – Calypso, Casanova, Nenea, and Violetta.

**Virginia Tech and Virginia Crop Improvement Association (VT and VCIA)**, 9142 Atlee Station Road, Mechanicsville, VA 23116 – Amaze 10, Atlantic, Barsoy, Callao, Dan, Doyce, Eve, Nomini, Price, Secretariat, Thoroughbred, and Wysor.

## Commercial and Experimental Wheat Entries

**AgriMAXX Wheat Company (AgriMAXX)**, 7167 Highbanks Road, Mascoutah, IL 62258 – 415, 463, 473, 480, 485, 486, 495, Exp 1902 and Exp 1906.

**Armor Seed, LLC (Armor)**, 2532 Alexander Drive Suite B, Jonesboro, AR 72401 – Mayhem, Venom, Velocity, ARW1913, and ARW1819.

**CORTEVA Agriscience Agriculture Division of DowDuPont (Pioneer)**, 425 Abbeydale Way, Columbia, SC 29229 - 26R10, 26R36, 26R41, 26R45, and 26R59.

**Eddie Mercer Agri-Services, Inc. (Mercer Brand)**, 6900 Linganore Road, Frederick, MD 21701 – MBX 932, MBX 969, MBX 17-M-245, and MBX 17-P-275.

**Erwin-Keith, Inc. (Progeny Ag Products)**, 1529 Highway 193, Wynne, AR 72396 – #BERKELEY, #BLAZE, #BULLET, #TURBO, #WARRIOR, PGX 17-16, PGX 18-2, PGX 18-7, and PGX 18-8.

**Featherstone Farm Seed, Inc. (Featherstone)**, 13941 Genito Road, Amelia, VA 23002 – Featherstone 31.

**University of Georgia**, 1109 Experiment Street, Griffin, GA 30223 – GA071518-16E39, GA09129-16E55, and GA09436-16LE12.

**University of Kentucky**, 327 Plant Science Building, Lexington, KY 40546-0312 – KY07C-1145-94-12-5 and KY09C-1245-99-12-3.

**KWS Cereals (KWS)**, 4101 Colleen Drive, Champaign, IL 61822 – KWS19X03, KWS19X08, and KWS19X09.

**Limagrain Cereal Seeds (LCS)**, 7099 Parkbrook Lane, Cordova, TN 38018 – L11718, L11719, and L11814.

**Local Seed Company (Local Seed)**, 802 Rozelle Street, Memphis, TN 38104 – LW2848, LW2867, LW2937, and LW2958.

**Meherrin Ag & Chemical (Southern Harvest)**, PO Box 200, Severn, NC 27877 – SH 4400, SH 7200, and SH 7510.

**Mid-Atlantic Seeds (Mid-Atlantic Seeds)**, 204 St. Charles Way, #163E, York, PA 17402 – MAS #6, MAS #7, MAS #35, MAS #61, MAS #67, MAS #86, MAS #105, MAS #106, MAS #108, MAS #116, and MAS #316.

**NC State University (NCSU)**, 840 Method Road Unit 3, Raleigh, NC 27695-7629 – NC13-21213, NC14-20369, NC14-23372, and NC15-21834.

**Nutrien Ag Solutions (Dyna-Gro Seed)**, 15277 Richmond-Tappahannock Highway, St Stephens Church, VA 23148 - 9600, 9701, 9750, 9772, 9811, 9932, 9941, 9980, Shirley, WX19711, WX19712, and WX19714.

**Syngenta Seeds, Inc. (AgriPro)**, 806 N. 2<sup>nd</sup> St, Berthoud, CO 80513 – SY 007, SY 100, SY 546, SY 547, SY Viper, and SR 8144.

**Texas A&M AgriLife Research**, 2600 S Neal, Commerce, TX 75429 – TX15D9253, TX15D9579, TX15D9597, and TX15D9608.

**UniSouth Genetics, Inc. (USG)**, 3205 C Highway 46S, Dickson, TN 37055 – 3118, 3197, 3228, 3316, 3329, 3404, 3458, 3536, 3790, and 3895.

**Virginia Tech and Virginia Crop Improvement Association (VT and VCIA)**, 9142 Atlee Station Road, Mechanicsville, VA 23111 – Massey, Hilliard and all lines prefixed by VA, VTK, DH and VDH.

**Winfield United (CROPLAN)**, 1080 County Road F West, MS 5850, Shoreview, MN 55126-2910 – CP9606, CP9415, CP8550, and CP8800.

Appreciation is expressed to the Virginia Small Grains Check-Off Board, AgriMAXX, Armor Seed, LLC, CORTEVA Agriscience Agriculture Division of DowDuPont, Eddie Mercer Agri-Services, Inc., Erwin-Keith, Inc., Featherstone Farm Seed, Inc., KWS Cereals, Limagrain Cereal Seeds, Local Seed Company, Meherrin Ag & Chemical, Mid-Atlantic Seeds, Nutrien Ag Solutions, Syngenta Seeds, Inc., UniSouth Genetics, Inc., Winfield United, and the Virginia Crop Improvement Association for their financial support of the Small Grains Variety Testing Program at Virginia Tech.

Conducted and summarized by the following Virginia Tech employees: Dr. Wade Thomason, Extension Agronomist, Grains; Dr. Carl Griffey, Small Grains Breeder; Mr. Harry Behl, Agricultural Supervisor; Ms. Elizabeth Rucker, Research Associate. Location Supervisors: Mr. Tom Custis (Painter); Dr. David Langston and Mr. Karl Jones (Holland); Dr. Joseph Oakes and Mr. Mark Vaughn, (Warsaw); Mr. Ned Jones (Blackstone); Dr. Carl Griffey, Mr. Wynse Brooks, Mr. Jon Light (Blacksburg); Mr. Bobby Clark (Shenandoah Valley); Mr. Gregory Lillard (Orange).

## **Introduction**

The following tables present results from barley and wheat varietal tests conducted in Virginia in 2017-2019. Small grain cultivar performance tests are conducted each year in Virginia by the Virginia Tech School of Plant and Environmental Sciences and the Virginia Agricultural Experiment Station. The tests provide information to assist Virginia Cooperative Extension Service agents in formulating cultivar recommendations for small grain producers and to companies developing cultivars and/or marketing seed within the state. Yield data are given for individual locations and across locations and years; yield and other performance characteristics are averaged over the number of locations indicated in parenthesis near the column heading. Performance of a given variety often varies widely over locations and years which makes multiple location-year averages a more reliable indication of expected performance than data from a single year or location. Details about management practices for barley and wheat are listed for each experiment location.

## **The Season – 2019**

A wet fall in 2018 resulted in some small grain acres not planted but those acres that were seeded were mostly planted on time, with 44 and 66% of wheat acres seeded by October 21 and November 11, respectively. These proportions mirrored the 5-year average for planting progress. December and January were drier with variable but seasonal temperatures. Due to later planting of some wheat acres and wet soils, only 61% of the small grain crop was rated as good or excellent in January. Significant statewide precipitation in February resulted in a decline in small grain ratings with only 43% of the crop rated good or excellent. Over 80% of acres were reported to have excess topsoil moisture. By March 31, only 15% of acres were reported to have excess topsoil moisture and 55% of the wheat crop was rated as good or excellent. Favorable weather continued through most of April and resulted in 9% of the wheat crop headed by April 21, compared with a 5-year average of 12%. By May 6, half the wheat crop was headed which was very near the 5-year average but well below the 78% headed mark reported by this date in 2018. Rain in early June hampered some harvesting efforts, but farmers were still able to harvest 11% of the crop by June 10. Farmers pushed to harvest fields as quickly as possible but continued periods of heavy rain in mid and late June resulted in delays and declining grain quality. Because of unplanted acres and wet, unfavorable conditions through much of the winter, the Virginia wheat crop was expected to produce only 7.6 million bushels, an 18% reduction from 2018 production. Yields were estimated at 66 bushels per acre, up 6 bushels per acre from 2018 and up 4 bushels from May. Virginia farmers planted a total of 180,000 acres in fall of 2018 with 115,000 acres intended to be harvested for grain. 65,000 acres were planted as cover crop or to be cut as silage or hay.

Figure 1. 2018-19 and 30-yr mean cumulative growing season precipitation for Virginia.

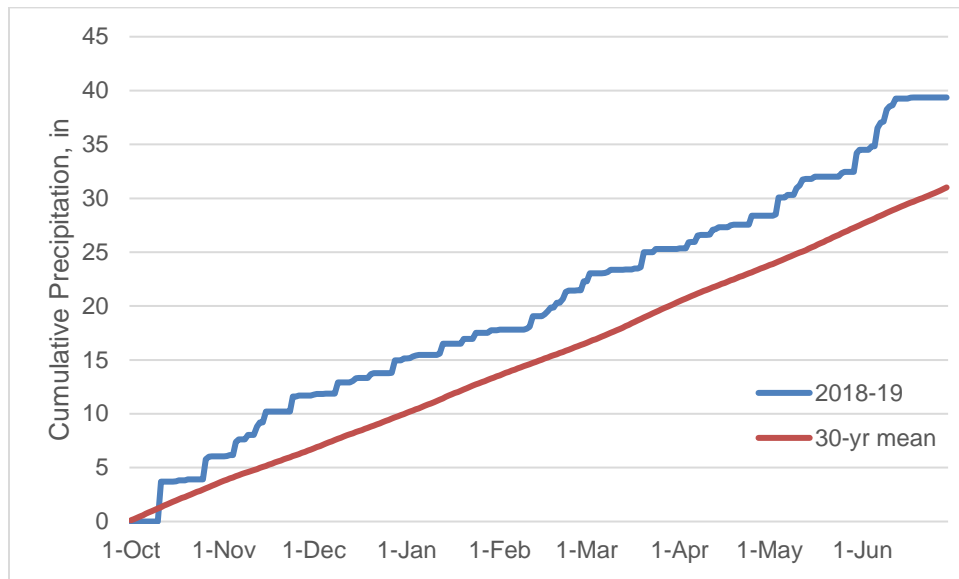
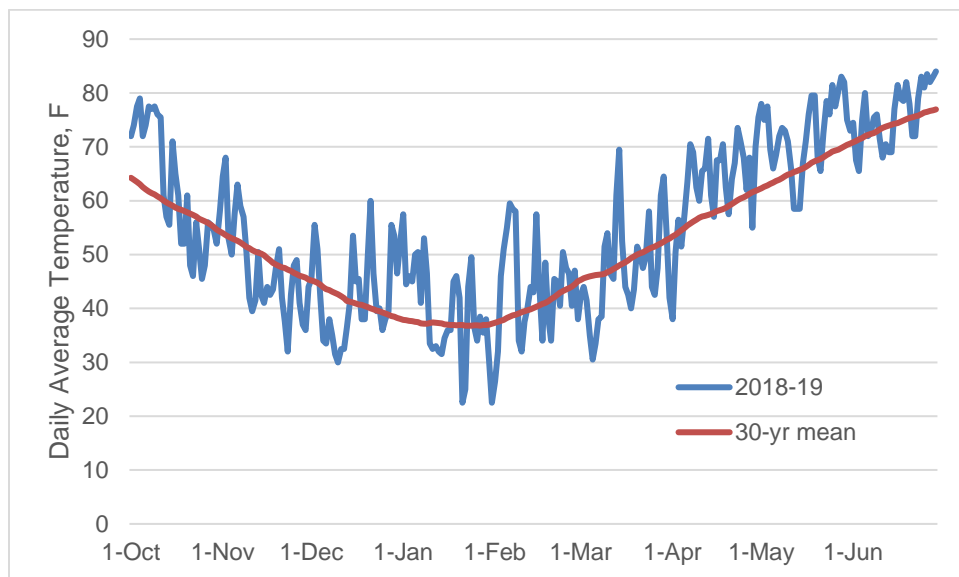


Figure 2. Growing season daily average temperature, 2018-19 and 30-yr mean.



## Section 1: Barley Varieties

The Virginia Tech barley breeding program is significantly diverse with breeding efforts focused on development and improvement of superior, widely adapted, high-yielding winter barley cultivars and a major focus on incorporation of value-added traits geared toward development of new markets. As a result, twelve winter barleys have been released from the program since 1990. Those releases are comprised of eight hulled (Nomini, Pamunkey, Starling, Callao, Price, Thoroughbred, Atlantic, and Secretariat) and four hulless (Doyce, Eve, Dan, and Amaze 10) varieties. Meanwhile, due to the continued decline in price and production of feed barley and to the increasing interest from local and regional maltsters and brewers, the Virginia Tech breeding program has shifted emphasis of the barley program to the rapid development of adapted winter malting barley varieties. Nevertheless, significant progress continues to be made in the development of high value winter barley lines. Development of improved varieties is a cooperative effort between breeding programs and the end users (feed, food, malting and brewing industries.) End users dictate goals of the breeding program. Our program contributions are through the direct testing of germplasm, research to help improve our understanding of the genetics of quality, and screening of fusarium head blight (FHB)/DON resistance lines.

We have continued to make progress improving resistance to FHB. We are using marker assisted selection (MAS) to incorporate unique FHB resistant Quantitative Trait Loci (QTL) into our

high yielding barley varieties and breeding lines. A resistance QTL associated with scab severity, DON toxin and fusarium damaged kernel (FDK) was recently identified in one of our hulless barley varieties, Eve. We are also using the double haploid (DH) breeding method in collaboration with Oregon State University. This will reduce our breeding cycle by at least 3-4 years and could have a dramatic impact on breeding progress.

### Hulless Barley

Hulless barley tests were planted in seven-inch rows at Blackstone, Orange, Holland, and Painter. They were planted in six-inch rows at Warsaw and Blacksburg. The no-till site at Holland was planted at 66 seeds per square foot. All other locations were planted at 60 seeds per square foot.

In the 2019 harvest year, grain yield for Doyce hulless barley in Virginia was 74 bushels per acre with test weight of 50.9 pounds per bushel. Average grain yield of Eve was 76 bushels per acre with test weight of 57.9 pounds per bushel. Average grain yield of Dan was 75 bushels per acre with a test weight of 60.3 pounds per bushel. Amaze 10 had the highest average grain yield (81 bushels per acre) among released cultivars (Eve, Dan and Doyce). It produced a test weight of 57.8 pounds/bushel that was similar to Eve (57.9 pounds/bushel) and 6.9 pounds per bushel higher than Doyce (50.9 pounds/bushel). The experimental line VA16H-160 had the highest overall average grain yield (93 bushels per acre) that was 12 bushels per acre higher than that of Amaze 10 (81 bushels per acre), 17 bushels per acre higher than Eve (76 bushels per acre), 18 bushels per acre

higher than Dan (75 bushels/acre), 19 bushels per acre higher than Doyce (74 bushels per acre), and 8 bushels per acre more than the test average (85 bushels per acre). Two other hulless experimental lines (VA14H-58 and VA15H-11) ranked 2<sup>nd</sup> and 3<sup>rd</sup> respectively in grain yield.

grain yield (100 and 99 bushels per acre) that were 8 and 7 bushels per acre higher than that of Secretariat and 12 and 11 bushels per acre higher than Thoroughbred.

## **Hulled Barley**

Hulled barley tests were planted in seven-inch rows at Blackstone, Orange, Holland, and Painter. They were planted in six-inch rows at Warsaw and Blacksburg. The no-till site at Holland was planted at 48 seeds per square foot. All other locations were planted at 44 seeds per square foot.

In the 2019 harvest year, the overall grain yield of Thoroughbred was 88 bushels per acre with an average test weight of 45.2 pounds per bushel compared to the mean yield of 89 bushels per acre and a test weight of 46.4 pounds per bushel for the mean of all cultivars tested. Average grain yield of Secretariat (92 bushels per acre) was 4 bushels per acre higher than Thoroughbred (88 bushels per acre), 7 bushels per acre higher than Price and Atlantic (85 bushels per acre), 12 bushels per acre higher than Callao (80 bushels per acre) and 19 bushels per acre higher than Nomini 73 bushels per acre). However, the experimental line VA17B-166 (LA) had the highest average overall grain yield (100 bushel per acre) that was 8 bushel per acre higher than Secretariat, 12 bushel per acre more than Thoroughbred and 11 bushel per acre higher than the overall test mean. In addition, two other experimental lines (VA16B-217 LA and VA16B-264 LA) ranked 2<sup>nd</sup> and 3<sup>rd</sup> respectively in average

## **Summary of barley management practices for the 2019 harvest season (All rates are given on a per acre basis.)**

**Blacksburg** - Planted October 8, 2018. Pre-plant fertilizer was 30-50-50-10(S)-3(B)-2(Zn). Site was sprayed with .8 oz. Harmony Extra SG® on March 6, 2019. Site was fertilized with 30 units UAN 30-0-0 March 6, 2019 and 35 units on March 24, 2019. Harvest occurred June 3, 2019.

**Blackstone** - Planted October 24, 2018. Pre-plant fertilizer was 300 lb. 10-10-10 on October 19, 2018. Site received 60 lb. N using UAN + 0.5 oz. Harmony Extra XP® February 6, 2019. Site received 60 lb. N using UAN + 4 oz. Mustang® Maxx on March 27, 2019. Harvest occurred June 3, 2019.

**Painter** - Planted November 1, 2018. Pre-plant fertilizer was 60 lb. N using 30% on October 25, 2018. Application of .75 oz. Harmony was on March 29, 2019. Site was fertilized with 60 lb. N using 30% UAN March 29, 2019. Harvest occurred June 4, 2019.

**Warsaw** - Planted October 18, 2018. Lime was applied at 1 ton September 21, 2018. Pre-plant fertilizer was 30-100-100 applied October 10, 2018. (Hulless barley site received 30-80-100.) Site was fertilized using 12-0-0-1.5 at 25 lb. on December 6, 2018 and again on February 1, 2019 (second application on hulless barley was on January 31.) Harmony Extra SG® was applied at .9 oz. with surfactant at 1.5 qt. /100 gal. water on March 13, 2019. Site was fertilized using 12-0-0-1.5 at 30 lb. on March 18, 2019 (hulless site received 60 lb.) Site was treated with 10 oz. Starane® Ultra + 2 qt. surfactant per 100 gallons of water on March 29, 2019 then with 4.5 oz. Endigo® ZC + 1 qt. surfactant per 100 gallons of water on April 11, 2019. Note: intensively-managed replications of the hulless barley test also were treated with 4 oz. Fitness® on March 25, 2019, with 12 oz. Palisade® EC + 1 qt. surfactant per 100 gallons of water on March 30, 2019, with 4 oz. Fitness® + 1 qt. surfactant per 100 gallons of water on April 18, 2019, and with 8 oz. Prosaro® + 1 qt. surfactant per 100 gallons of water on May 3, 2019. Harvest occurred May 30, 2019.

**Holland** - Planted conventional-till November 29, 2018. Pre-plant fertilizer was 451 lb. 7-13-35 on November 25, 2018. Site was fertilized with 60 units N using 24-0-0-3 + 1 qt Mn + 0.75 oz Harmony Extra SG® on February 12, 2019 and again with 60 units N using 24-0-0-3 on March 14, 2019. Site was treated with 16.4 oz. Axial XL® on March 23, 2019. Harvest occurred May 30, 2019.

**Orange** - Planted October 22, 2018. Pre-plant fertilizer was 30-80-60 October 3, 2018. Sixty lb. N plus 0.6 oz. Harmony Extra SG® was applied February 28, 2019. Harvest occurred June 3-4, 2019.

**Table 1. Summary of performance of entries in the Virginia Tech Hulless Barley Test over locations, 2019 harvest.**

Hulless Lines	Yield (Bu/a @ 48 lb/bu)		Test Weight (Lb/bu)		Date Headed (Julian)		Mature Height (In)		Plant Lodging (0-9)		Net Blotch (0-9)	
	(5)		(5)		(2)		(3)		(5)		(3)	
VA16H-160	92.5	+	58.1	+	111		31	-	1	-	3	
VA14H-58	92.2	+	58.9	+	110	-	33		2		2	-
VA15H-11	91.9	+	58.2	+	110	-	34		2		1	-
VA16H-159	90.3	+	58.0		111		31	-	1	-	4	+
VA15H-73 (2R)	90.3	+	58.1		113		37	+	1	-	2	
VA16H-26 (2R)	90.0	+	57.8		115		34		0	-	1	-
VA06H-79	89.6		56.5	-	110	-	33		2		1	-
VA17H-14	89.1		57.6		111		33		3	+	3	
VA16H-24 (2R)	88.5		58.1	+	115		35	+	1	-	1	-
VA16H-28 (2R)	87.9		57.7		115		35	+	1	-	1	-
VA16H-27 (2R)	87.6		57.8		115		34		0	-	1	-
VA17H-19	87.2		58.5	+	113		33		2		1	-
VA17H-21	84.8		57.8		116		33		2		2	
VA17H-23	83.9		58.3	+	112		34		2		5	+
VA14H-33	83.8		59.1	+	110	-	33		2		3	
VA17H-20	82.4		57.8		111		31	-	3	+	2	
VA08H-79 WS	82.3		57.0	-	113		33		2		2	-
VA07H-35 WS	82.1		58.0		112		33		3	+	4	+
VA06H-25	81.9		57.9		112		33		4	+	3	+
VA16H-25 (2R)	81.7		58.3	+	111		34		3	+	1	-
<b>Amaze 10</b>	81.4		57.8		112		34		3	+	4	+
<b>Eve</b>	75.7	-	57.9		106	-	29	-	4	+	6	+
<b>Dan</b>	75.2	-	60.3	+	111	-	32		2		2	-
<b>Doyce</b>	74.3	-	50.9	-	108	-	30	-	5	+	7	+
Average	85.3		57.8		112		33		2		3	
LSD (0.05)	4.4		0.3		1		1		1		1	
C.V.	7.9		0.8		1		5		49		33	

Released cultivars are shown in bold print. The number in parentheses below column headings indicates the number of locations on which data are based.

Varieties are ordered by descending yield averages. A plus or minus sign indicates a performance significantly above or below the test average.

The 0-9 ratings indicate a genotype's response to disease or lodging where 0 = highly resistant and 9 = highly susceptible.

**Table 2. Two-year average summary of performance of entries in the Virginia Tech Hulless Barley Tests, 2018 and 2019 harvests.**

Hulless Lines	Yield (Bu/a @ 48 lb/bu)		Test Weight (Lb/bu)		Date Headed (Julian)		Mature Height (In)		Plant Lodging (0-9)		Leaf Rust (0-9)		Net Blotch (0-9)		Powdery Mildew (0-9)	
	(10)		(11)		(4)		(6)		(11)		(1)		(4)		(1)	
VA16H-27 (2R)	86.5	+	55.2		120	+	36		2	-	4		1	-	0	
VA15H-73 (2R)	86.4	+	56.0	+	117	+	37	+	2	-	4		3		0	
VA16H-26 (2R)	85.8	+	55.1		119	+	36		2	-	4		1	-	0	
VA16H-160	85.4	+	55.5		115	-	34	-	3	-	3		3		1	
VA16H-28 (2R)	84.9	+	55.2		119	+	37	+	2	-	5		2	-	0	
VA16H-24 (2R)	84.9	+	55.6	+	119	+	37	+	3		5		1	-	0	
VA06H-79	84.6	+	54.4	-	115	-	35		3		6	+	2	-	0	
VA15H-11	84.1		55.8	+	115	-	36		3		2	-	1	-	0	
VA16H-159	83.5		55.1		116		33	-	3		4		4	+	1	
VA14H-33	81.6		56.7	+	114	-	35		2	-	3		3		0	
VA14H-58	81.3		56.5	+	115	-	35		4	+	2	-	3		0	
VA16H-25 (2R)	80.2		56.1	+	116	-	36		4	+	3		2	-	0	
VA06H-25	78.6		54.8		117	+	36		4	+	4		4	+	1	
VA07H-35 WS	77.2	-	54.8		117	+	34		4	+	3		4	+	2	+
VA08H-79 WS	76.9	-	53.5	-	118	+	35		3		8	+	2	-	0	
<b>Amaze 10</b>	76.7	-	54.8		117	+	35		4	+	3		4	+	2	
<b>Dan</b>	74.7	-	56.7	+	115	-	35		3		5		2		0	
<b>Eve</b>	74.2	-	55.7	+	110	-	32	-	4	+	4		6	+	1	
<b>Doyce</b>	70.8	-	49.1	-	114	-	33	-	5	+	3		7	+	1	
Average	81.0		55.1		116		35		3		4		3		0	
LSD (0.05)	3.3		0.4		0		1		1		1		1		1	
C.V.	9.0		1.8		1		6		49		21		30		156	

Released cultivars are shown in bold print.

The number in parentheses below column headings indicates the number of location-years on which data are based.

Varieties are ordered by descending yield averages.

A plus or minus sign indicates a performance significantly above or below the test average.

The 0-9 ratings indicate a genotype's response to disease or lodging where 0 = highly resistant and 9 = highly susceptible.

**Table 3. Three-year average summary of performance of entries in the Virginia Tech Hulless Barley Tests, 2017, 2018, and 2019 harvests.**

Hulless Lines	Yield (Bu/a @ 48 lb/bu)	Test Weight (Lb/bu)	Date Headed (Julian)	Mature Height (In)	Plant Lodging (0-9)	Leaf Rust (0-9)	Net Blotch (0-9)	Powdery Mildew (0-9)	Early Height (In)
	(13)	(14)	(6)	(8)	(14)	(5)	(6)	(4)	(1)
VA15H-11	82.1 +	55.8 +	111	35	3	3 -	2 -	1	13
VA15H-73 (2R)	81.9 +	56.1 +	113 +	36 +	2 -	5	4	0	11 -
VA14H-58	81.1 +	56.6 +	111 -	34	4	4 -	3 -	1	13
VA14H-33	80.1 +	56.5 +	110 -	34	3 -	4 -	3 -	1	14
VA06H-79	79.4 +	54.4	112	34	3	7 +	2 -	1	13
VA06H-25	74.2	54.9	114 +	34	4 +	4 -	4	2	11 -
VA07H-35 WS	74.1	54.9	113 +	33	4	4 -	4	3	12
<b>Amaze 10</b>	72.4 -	54.9	113 +	34	4	5	4	2	12
VA08H-79 WS	71.5 -	53.6 -	114 +	33	4	8 +	3 -	6 +	9 -
<b>Eve</b>	69.8 -	55.7 +	107 -	31 -	4	4	7 +	1	16 +
<b>Doyce</b>	65.5 -	49.4 -	110 -	32 -	5 +	5	7 +	1	16 +
Average	75.6	54.8	112	34	4	5	4	2	13
LSD (0.05)	2.9	0.4	0	1	1	1	1	2	1
C.V.	10.0	2.0	1	6	44	17	22	88	8

Released cultivars are shown in bold print.

The number in parentheses below column headings indicates the number of location-years on which data are based.

Varieties are ordered by descending yield averages.

A plus or minus sign indicates a performance significantly above or below the test average.

The 0-9 ratings indicate a genotype's response to disease or lodging where 0 = highly resistant and 9 = highly susceptible.

**Table 4. Summary of performance of entries in the Virginia Tech Hulless Barley Test, Southern Piedmont AREC, Blackstone, VA, 2019 harvest.**

Hulless Lines	3-year Av. Yield (Bu/a)	2-year Av. Yield (Bu/a)	Yield (Bu/a @ 48 lb/bu)	Test Weight (Lb/bu)	Plant Lodging (0-9)	Net Blotch (0-9)
VA16H-26 (2R)	---	76.5	76.1 +	56.7	1	0 -
VA14H-58	74.7 +	75.4	73.6 +	58.3 +	2	1 -
VA16H-160	---	77.8 +	72.4 +	58.1 +	2	2
VA15H-73 (2R)	75.4 +	76.7	72.3 +	56.8	0 -	1
VA17H-14	---	---	71.4	56.7	3	2
VA06H-79	73.3	74.8	69.4	55.9 -	2	1 -
VA16H-28 (2R)	---	78.0 +	68.6	56.7	1	0 -
VA17H-19	---	---	68.6	58.9 +	3	1
VA16H-159	---	73.8	68.0	57.9	1	4 +
VA16H-27 (2R)	---	72.3	66.9	56.4	1	1 -
VA07H-35 WS	69.9	72.3	65.7	57.8	4 +	3
VA08H-79 WS	67.9	70.7	64.4	56.4	2	2
VA06H-25	64.9 -	71.3	63.7	57.5	5 +	2
VA17H-23	---	---	62.9	57.6	3	3 +
<b>Dan</b>	---	70.2	62.5	60.7 +	2	2
VA16H-24 (2R)	---	72.8	62.2	56.7	1 -	0 -
<b>Eve</b>	67.1	73.7	62.1	57.9	2	3 +
VA14H-33	75.1 +	74.1	61.6	58.9 +	2	2
VA15H-11	69.0	69.4	61.5	57.9	3	0 -
VA17H-20	---	---	60.0	57.3	3	2
VA17H-21	---	---	59.4	57.5	2	2
<b>Amaze 10</b>	63.6 -	66.6 -	58.2 -	57.2	5 +	2
<b>Doyce</b>	62.3 -	66.4 -	58.2 -	48.5 -	4	5 +
VA16H-25 (2R)	---	69.1	55.6 -	57.6	3	0 -
Average	69.4	72.7	65.2	57.1	2	2
LSD (0.05)	4.3	4.9	6.7	0.8	2	1
C.V.	7.5	6.6	6.8	1.0	47	42

Released cultivars are shown in bold print.

Varieties are ordered by descending one-year yield averages.

A plus or minus sign indicates a performance significantly above or below the test average.

The 0-9 ratings indicate a genotype's response to disease or lodging where 0 = highly resistant and 9 = highly susceptible.

**Table 5. Summary of performance of entries in the Virginia Tech Hulless Barley Test, Tidewater AREC, Holland, VA, 2019 harvest.**

Hulless Lines	Yield (Bu/a @ 48 lb/bu)	Test Weight (Lb/bu)	
VA17H-14	58.0	+	59.3
VA16H-24 (2R)	51.6		57.2
VA16H-27 (2R)	50.7		58.0
VA17H-20	50.4		60.1
VA17H-21	49.4		59.7
VA15H-73 (2R)	47.8		58.0
<b>Eve</b>	46.9		58.8
VA14H-58	46.6		60.4
VA06H-79	46.6		58.0
VA08H-79 WS	45.8		59.0
VA16H-160	44.3		60.4
<b>Doyce</b>	43.3		53.0 -
VA17H-23	42.6		59.4
VA16H-25 (2R)	42.1		58.1
VA16H-26 (2R)	42.1		57.6
VA16H-28 (2R)	41.6		58.0
<b>Amaze 10</b>	41.4		59.8
VA17H-19	41.1		59.5
<b>Dan</b>	40.9		60.5
VA15H-11	38.3		59.4
VA14H-33	35.8		60.2
VA16H-159	35.7		60.3
VA07H-35 WS	35.1		57.9
VA06H-25	28.3	-	58.9
Average	43.6		58.8
LSD (0.05)	12.8		1.7
C.V.	17.8		1.8

Released cultivars are shown in bold print.

Varieties are ordered by descending yield averages.

A plus or minus sign indicates a performance significantly above or below the test average.

The 0-9 ratings indicate a genotype's response to disease or lodging where 0 = highly resistant and 9 = highly susceptible.

**NOTE: This location is not being included in over-location or over-years analysis. It was not representative of performance.**

**Table 6. Summary of performance of entries in the Virginia Tech Hulless Barley Test, Eastern Shore AREC, Painter, VA, 2019 harvest.**

Hulless Lines	2-year Av. Yield (Bu/a)	Yield (Bu/a @ 48 lb/bu)	Test Weight (Lb/bu)	Plant Lodging (0-9)	Net Blotch (0-9)
VA14H-58	75.5	87.7 +	58.1 +	3	3
VA17H-20	---	86.4 +	56.9	3	1
VA17H-14	---	82.6	56.9	3	1
VA15H-11	74.3	81.4	57.0	3	0 -
VA17H-23	---	80.7	58.0 +	1	3
VA16H-26 (2R)	85.2 +	80.2	56.6	1 -	0 -
VA15H-73 (2R)	85.7 +	79.9	56.9	0 -	0 -
VA17H-19	---	79.4	57.0	2	0 -
VA14H-33	77.8	78.1	58.2 +	2	3
VA16H-24 (2R)	81.8	78.0	57.1	1	0 -
VA16H-159	73.7	77.9	57.3	2	1
VA16H-160	76.8	77.3	57.4	2	1
VA17H-21	---	77.0	57.0	4	2
VA16H-28 (2R)	82.3	76.6	56.7	1	0 -
VA16H-27 (2R)	84.2 +	75.9	56.8	1	0 -
VA16H-25 (2R)	79.7	75.2	57.6	4	1
<b>Doyce</b>	70.8	74.6	49.2 -	4 +	8 +
VA06H-79	77.8	74.5	55.7 -	2	1
VA08H-79 WS	72.1	74.3	56.4	2	0 -
<b>Dan</b>	71.8	73.6	59.4 +	2	1
<b>Eve</b>	69.8	62.0 -	57.2	2	7 +
VA07H-35 WS	68.0	58.3 -	56.6	4 +	6 +
<b>Amaze 10</b>	60.0 -	57.5 -	56.7	5 +	5 +
VA06H-25	64.3 -	56.8 -	56.6	5 +	5 +
Average	75.3	75.3	56.8	2	2
LSD (0.05)	8.4	10.1	0.9	2	2
C.V.	10.9	9.2	1.0	46	59

Released cultivars are shown in bold print.

Varieties are ordered by descending one-year yield averages.

A plus or minus sign indicates a performance significantly above or below the test average.

The 0-9 ratings indicate a genotype's response to disease or lodging where 0 = highly resistant and 9 = highly susceptible.

**Table 7. Summary of performance of entries in the Virginia Tech Hulless Barley Test, Northern Piedmont Center, Orange, VA, 2019 harvest.**

Hulless Lines	3-year Av. Yield (Bu/a)		2-year Av. Yield (Bu/a)		Yield (Bu/a @ 48 lb/bu)		Test Weight (Lb/bu)		Mature Height (In)		Plant Lodging (0-9)		Net Blotch (0-9)	
VA15H-11	96.8	+	106.5	+	116.4	+	59.8	+	37		1	-	3	-
VA14H-58	91.4	+	96.2		107.8		60.4	+	36		1	-	2	-
VA06H-79	90.4	+	98.0		106.5		57.5	-	35		2		2	-
VA16H-28 (2R)	---		93.3		105.8		59.3		40	+	0	-	3	-
VA15H-73 (2R)	87.5		96.9		105.1		59.2		41	+	1		6	+
VA16H-27 (2R)	---		99.5	+	104.1		58.7		38		0	-	3	-
VA16H-24 (2R)	---		97.4		102.2		59.6	+	39		1		4	
VA17H-14	---		---		102.0		58.4		37		4		5	
VA14H-33	85.8		92.5		101.7		60.6	+	35		1	-	4	
<b>Amaze 10</b>	75.4		86.9		100.6		58.6		35		5	+	5	
VA16H-26 (2R)	---		95.5		100.2		59.6	+	38		0	-	3	-
VA16H-160	---		89.2		97.7		58.7		35		1		5	
VA06H-25	80.2		89.4		95.9		59.1		36		5	+	3	-
VA17H-19	---		---		94.2		59.6	+	36		3		3	-
VA08H-79 WS	77.9		77.1	-	92.8		58.2		36		4		3	-
VA16H-25 (2R)	---		85.0		92.3		59.0		36		5	+	3	-
VA17H-21	---		---		91.5		58.7		36		2		2	-
VA07H-35 WS	72.5	-	78.7	-	87.8		59.4		35		2		3	-
VA16H-159	---		85.7		86.5		58.5		34		2		8	+
<b>Eve</b>	73.4	-	79.9		84.2		57.5	-	26	-	9	+	9	+
VA17H-20	---		---		80.9	-	59.2		34		5	+	5	
<b>Dan</b>	---		81.9		80.4	-	60.7	+	36		4		3	-
VA17H-23	---		---		76.1	-	58.6		36		3		9	+
<b>Doyce</b>	60.6	-	66.7	-	67.2	-	51.5	-	28	-	8	+	9	+
Average	81.1		89.3		95.0		58.8		35		3		4	
LSD (0.05)	7.0		9.8		13.5		0.7		4		2		1	
C.V.	10.2		10.6		9.7		0.8		7		43		15	

Released cultivars are shown in bold print.

Varieties are ordered by descending yield averages.

A plus or minus sign indicates a performance significantly above or below the test average.

The 0-9 ratings indicate a genotype's response to disease or lodging where 0 = highly resistant and 9 = highly susceptible.

**Table 8. Summary of performance of entries in the Virginia Tech Hulless Barley Test, Kentland Farm, Blacksburg, VA, 2019 harvest.**

Hulless Lines	Yield (Bu/a @ 48 lb/bu)		Test Weight (Lb/bu)		Date Headed (Julian)	Mature Height (In)		Plant Lodging (0-9)	
VA16H-159	112.5	+	60.4	+	114	28		0	
VA16H-160	107.7	+	60.1		113	-	27	0	
VA06H-25	105.8	+	60.1		114	29		1	
VA17H-23	105.5	+	60.4	+	115	30	+	1	
<b>Amaze 10</b>	105.4	+	60.3	+	114	30		1	
VA07H-35 WS	104.1		59.9		114	29		1	
VA15H-11	102.6		59.7		112	-	29	1	
VA14H-58	101.6		60.6	+	112	-	29	1	
VA06H-79	100.5		58.6	-	112	-	28	1	
VA16H-25 (2R)	100.5		60.1		113	30	+	0	-
VA17H-21	98.0		59.3		119	+	29	1	
VA15H-73 (2R)	97.7		59.9		114	31	+	1	
VA08H-79 WS	96.9		58.8	-	115	28		1	
VA16H-24 (2R)	95.8		59.9		117	+	30	+	0
VA16H-27 (2R)	92.2		60.0		117	+	29	0	-
VA17H-20	91.8		59.6		114	26	-	1	
VA16H-28 (2R)	91.0		59.6		117	+	29	0	-
<b>Eve</b>	89.2		59.7		108	-	28	2	+
<b>Doyce</b>	88.6		55.3	-	111	-	28	2	+
VA16H-26 (2R)	88.3		59.0	-	117	+	29	0	
VA17H-14	88.2		60.0		114	28		1	
VA14H-33	87.2	-	60.7	+	113	28		1	
VA17H-19	84.4	-	59.7		115	+	27	1	
<b>Dan</b>	82.0	-	61.7	+	113	27	-	1	
Average	96.6		59.7		114	28		1	
LSD (0.05)	8.5		0.5		1	2		1	
C.V.	6.1		0.6		1	4		70	

Released cultivars are shown in bold print.

Varieties are ordered by descending yield averages.

A plus or minus sign indicates a performance significantly above or below the test average.

The 0-9 ratings indicate a genotype's response to disease or lodging where 0 = highly resistant and 9 = highly susceptible.

**Table 9. Summary of performance of entries in the Virginia Tech Hulless Barley Test, Eastern Virginia AREC, Warsaw, VA, 2019 harvest.**

Hulless Lines	3-year Av. Yield (Bu/a)	2-year Av. Yield (Bu/a)	Yield (Bu/a @ 48 lb/bu)	Test Weight (Lb/bu)	Date Headed (Julian)	Mature Height (In)	Plant Lodging (0-9)
VA16H-159	---	92.9 +	112.0 +	55.5	108 -	33 -	1
VA17H-19	---	---	110.7 +	56.9 +	109	37	1
VA16H-160	---	90.6 +	105.5	55.7	109	33 -	1
VA06H-79	70.7	88.4	103.3	54.9 -	108 -	38	3
VA16H-27 (2R)	---	92.5 +	102.7	56.8 +	113 +	37	0 -
VA16H-28 (2R)	---	90.3 +	101.6	56.4	112 +	39 +	0 -
VA16H-26 (2R)	---	90.5 +	101.1	56.2	113 +	37	0 -
VA07H-35 WS	73.8	83.3	100.8	56.4	110	37	2
VA16H-24 (2R)	---	87.7	100.6	56.6	113 +	37	1
VA17H-21	---	---	99.9	56.4	113 +	35	0 -
VA17H-14	---	---	99.3	55.4 -	108	37	5 +
VA14H-33	77.0 +	86.1	98.9	57.0 +	105 -	36	2
VA15H-73 (2R)	78.6 +	88.3	98.3	57.4 +	111 +	39 +	0 -
VA17H-20	---	---	97.6	55.3 -	108 -	36	3
VA17H-23	---	---	97.5	56.7 +	108	36	2
VA15H-11	78.0 +	82.5	95.7	56.0	108 -	36	2
VA06H-25	72.0	82.5	93.7	56.3	111 +	35	3
<b>Amaze 10</b>	72.8	82.8	93.2	56.0	110	37	2
VA08H-79 WS	62.6 -	82.8	90.1	55.3 -	111 +	37	1
VA16H-25 (2R)	---	80.5	86.2 -	56.6	109	36	2
<b>Doyce</b>	57.9 -	72.3 -	86.2 -	49.2 -	105 -	36	6 +
VA14H-58	70.1	72.9 -	83.6 -	56.6	107 -	35	3 +
<b>Dan</b>	---	72.9 -	78.5 -	58.7 +	108 -	36	1
<b>Eve</b>	60.7 -	67.0 -	73.7 -	56.7 +	103 -	33 -	4 +
Average	73.8	83.5	96.3	56.0	109	36	2
LSD (0.05)	4.6	5.3	9.9	0.6	1	2	1
C.V.	7.7	6.0	6.3	0.7	1	4	47

Released cultivars are shown in bold print.

Varieties are ordered by descending one-year yield averages.

A plus or minus sign indicates a performance significantly above or below the test average.

The 0-9 ratings indicate a genotype's response to disease or lodging where 0 = highly resistant and 9 = highly susceptible.

**Table 10. Summary of performance of entries treated with plant growth regulator and fungicide in the Virginia Tech Hulless Barley Test, Eastern Virginia AREC, Warsaw, VA, 2019 harvest.**

Hulless Lines	Yield (Bu/a @ 48 lb/bu)	Test Weight (Lb/bu)	Date Headed (Julian)	Mature Height (In)	Plant Lodging (0-9)
VA16H-159	115.0 +	55.9	108 -	31	0
VA17H-19	109.8	56.7	109	31	0
VA07H-35 WS	105.2	56.5	111	34	1 +
VA16H-27 (2R)	104.3	57.4 +	113 +	33	0 -
VA17H-23	103.0	57.0 +	107 -	35 +	1 +
VA16H-28 (2R)	103.0	57.2 +	113 +	34	0 -
VA16H-160	102.9	56.3	108 -	31	0
VA17H-21	102.3	56.7	113 +	31	0 -
<b>Amaze 10</b>	101.5	56.4	110	33	1
VA17H-20	100.2	55.7	108 -	32	1
VA06H-25	100.0	56.4	111 +	33	2 +
VA15H-11	99.4	55.9	108 -	31	1
VA15H-73 (2R)	98.8	57.6 +	113 +	33	0 -
VA06H-79	98.3	54.5 -	108 -	33	1
VA17H-14	90.7	55.1 -	109	31	0
VA16H-24 (2R)	89.9	57.1 +	114 +	31	0 -
VA14H-33	88.7	57.1 +	106 -	31	1
VA16H-26 (2R)	88.7	56.9	114 +	31	0 -
<b>Doyce</b>	88.6	47.7 -	105 -	32	2 +
VA16H-25 (2R)	88.2	57.0 +	109	33	1
VA14H-58	86.7	56.6	107 -	31	1
VA08H-79 WS	85.9	55.2 -	111 +	34	0 -
<b>Dan</b>	70.1 -	58.5 +	109	30	1
<b>Eve</b>	65.7 -	56.4	103 -	32	2 +
Average	95.3	56.2	109	32	1
LSD (0.05)	17.9	0.7	1	3	1
C.V.	11.5	0.8	1	5	54

Released cultivars are shown in bold print.

Varieties are ordered by descending yield averages.

A plus or minus sign indicates a performance significantly above or below the test average.

The 0-9 ratings indicate a genotype's response to disease or lodging where 0 = highly resistant and 9 = highly susceptible.

**Table 11. Summary of performance of entries in the Virginia Tech Barley Test, 2019 harvest.**

Barley Lines	Yield (Bu/a @ 48 lb/bu)		Test Weight (Lb/bu)		Date Headed (Julian)		Mature Height (In)		Plant Lodging (0-9)		Net Blotch (0-9)		Awns <sup>1</sup>
	(5)		(5)		(2)		(3)		(5)		(3)		
VA17B-166 LA	99.8	+	48.1	+	109		32		2		1	-	LA
VA16B-217 LA	99.6	+	46.3		111	+	33	+	1	-	4		LA
VA16B-264 LA	98.7	+	47.9	+	107	-	31		2		2	-	LA
VA17B-74 LA	98.1	+	47.7	+	109		29		2		2	-	LA
VA17B-163 LA	97.5	+	48.3	+	109	-	33	+	2		1	-	LA
VA16B-236 LA	97.1	+	46.0		111	+	33	+	2	-	3		LA
VA16B-254 LA	96.7	+	45.9		111	+	33	+	1	-	3		LA
VA17B-76 LA	96.5	+	48.5	+	106	-	33		3		4		LA
VA17B-175 LA	96.4	+	48.2	+	107	-	31		3		2	-	LA
VA16B-263 LA	96.4	+	45.6	-	111	+	33	+	1	-	3		LA
VA17B-65 LA	95.3	+	48.5	+	106	-	33	+	2		2	-	LA
VA16B-213 LA	95.1	+	46.3		111	+	33	+	1	-	3		LA
VA16B-203 LA	94.5	+	46.0		111	+	32		1	-	3		LA
VA17B-177 LA	94.0		47.3	+	108	-	30		1	-	2	-	LA
VA17B-26	93.6		48.2	+	107	-	31		1	-	4		SA
VA17B-151 LA	92.8		48.0	+	109	-	31		3		1	-	LA
VA14B-63	92.5		46.9		111	+	30		2		1	-	SA
VA16B-238 LA	92.5		45.4	-	111	+	33	+	2		4		LA
VA16B-244 LA	92.0		45.2	-	111	+	31		2		3		LA
VA17B-148 LA	92.0		48.0	+	110		32		2		2	-	LA
VA17B-156 LA	91.9		48.8	+	107	-	32		2		2	-	LA
<b>Secretariat</b>	91.9		46.9		109		29		4	+	4	+	SA
VA17B-124	91.3		47.1	+	108	-	29		2		3		SA
VA11B-141 LA	90.7		46.9		111	+	33	+	3		3		LA
<b>Barsoy</b>	88.0		46.4		107	-	29	-	4	+	4	+	LA
<b>Thoroughbred</b>	87.5		45.2	-	111	+	31		2		6	+	LA
<b>Price</b>	85.0		46.1		110		29		3		6	+	SA
<b>LCS Casanova</b>	84.9		45.6	-	115	+	28	-	2	-	4		LA
<b>Atlantic</b>	84.7		45.3	-	108	-	27	-	4	+	5	+	SA
VA08B-95	84.2		44.8	-	108	-	30		4	+	2	-	SA
VA13B-25 LA	82.6	-	46.7		107	-	29		4	+	3		LA
<b>Callao</b>	80.4	-	44.9	-	107	-	23	-	6	+	5	+	SA
<b>LCS Violetta</b>	79.3	-	46.3		111	+	28	-	2		4		LA
<b>LCS Nerea</b>	77.6	-	44.4	-	108	-	26	-	4	+	7	+	LA
<b>Nomini</b>	72.8	-	44.8	-	106	-	34	+	2		2	-	AL
<b>LCS Calypso</b>	72.5	-	42.6	-	115	+	31		4	+	6	+	LA
<b>Wysor</b>	72.0	-	43.9	-	109		33	+	4	+	6	+	AL
VA92-42-46	65.3	-	44.3	-	109		31		4	+	7	+	AL
Average	89.3		46.4		109		31		2		3		
LSD (0.05)	5.2		0.6		1		2		1		1		

**Table 11. Summary of performance of entries in the Virginia Tech Barley Test, 2019 harvest.**

Barley Lines	Yield (Bu/a @ 48 lb/bu)	Test Weight (Lb/bu)	Date Headed (Julian)	Mature Height (In)	Plant Lodging (0-9)	Net Blotch (0-9)	Awns <sup>1</sup>
	(5)	(5)	(2)	(3)	(5)	(3)	
C.V.	8.7	2.1	1	7	49	30	

Released cultivars are shown in bold print. The number in parentheses below column headings indicates the number of locations on which data are based.

Varieties are ordered by descending yield averages. A plus or minus sign indicates a performance significantly above or below the test average.

The 0-9 ratings indicate a genotype's response to disease or lodging where 0 = highly resistant and 9 = highly susceptible.

1 LA=long awned, SA=short awned, AL=awnletted or awnless.

**Table 12. Two-year average summary of performance of entries in the Virginia Tech Barley Tests, 2018 and 2019 harvests.**

Barley Lines	Yield (Bu/a @ 48 lb/bu)		Test Weight (Lb/bu)		Date Headed (Julian)		Mature Height (In)		Plant Lodging (0-9)		Leaf Rust (0-9)		Net Blotch (0-9)	
	(11)		(10)		(4)		(6)		(11)		(1)		(5)	
VA16B-217 LA	100.0	+	46.5	+	115	+	35	+	2	-	3		3	-
VA16B-236 LA	97.5	+	46.1		115	+	35	+	3	-	2	-	2	-
VA16B-263 LA	97.2	+	45.8		115	+	34		2	-	3		3	-
VA16B-254 LA	97.2	+	45.9		115	+	34		2	-	3		3	-
VA16B-264 LA	95.5	+	47.5	+	112	-	33		3	-	2		2	-
VA16B-213 LA	95.2	+	46.4	+	115	+	34		3	-	2	-	3	-
VA16B-203 LA	94.3	+	45.9		115	+	33		3	-	2	-	2	-
VA16B-244 LA	93.8	+	45.8		115	+	33		3		2	-	3	-
VA14B-63	93.6	+	46.3	+	115	+	32		4		2	-	1	-
VA16B-238 LA	92.0	+	45.8		115	+	34		3		3		3	-
<b>Secretariat</b>	90.9		46.6	+	113	-	30	-	5	+	1	-	3	
VA13B-25 LA	90.1		46.5	+	111	-	32		4		3		3	-
VA11B-141 LA	89.7		46.8	+	115	+	34		4		3		2	-
<b>Thoroughbred</b>	86.6		44.2	-	115	+	32		3	-	3		6	+
<b>Atlantic</b>	86.3		45.3		111	-	30	-	5	+	4	+	5	+
<b>Price</b>	84.8		45.6		113	-	31	-	4		4		6	+
<b>LCS Violetta</b>	84.1		46.3	+	116	+	29	-	2	-	2		3	
<b>LCS Calypso</b>	82.6	-	42.5	-	119	+	31		3		2	-	4	+
<b>Barsoy</b>	82.3	-	46.0		111	-	31		5	+	6	+	4	+
VA08B-95	81.2	-	44.6	-	111	-	32		6	+	2	-	2	-
<b>Callao</b>	76.0	-	44.8	-	111	-	28	-	7	+	4		4	
<b>Nomini</b>	72.7	-	44.1	-	110	-	37	+	3		4	+	2	-
<b>Wysor</b>	65.5	-	43.2	-	113	-	36	+	5	+	6	+	6	+
VA92-42-46	64.7	-	43.2	-	113	-	35	+	5	+	1	-	7	+
Average	87.2		45.5		114		33		4		3		3	
LSD (0.05)	4.2		0.6		0		2		1		1		1	
C.V.	10.8		3.0		1		9		42		23		25	

Released cultivars are shown in bold print.

Varieties are ordered by descending yield averages.

A plus or minus sign indicates a performance significantly above or below the test average.

The 0-9 ratings indicate a genotype's response to disease or lodging where 0 = highly resistant and 9 = highly susceptible.

The number in parentheses below column headings indicates the number of location-years on which data are based.

**Table 13. Three-year average summary of performance of entries in the Virginia Tech Barley Tests, 2017, 2018, and 2019 harvests.**

Barley Lines	Yield (Bu/a @ 48 lb/bu)		Test Weight (Lb/bu)		Date Headed (Julian)		Mature Height (In)		Plant Lodging (0-9)		Leaf Rust (0-9)		Net Blotch (0-9)		Powdery Mildew (0-9)		Early Height (In)	
	(15)		(14)		(6)		(8)		(16)		(4)		(6)		(2)		(1)	
VA14B-63	96.1	+	45.4	+	112	+	32		4		2	-	2	-	1		11	-
<b>Secretariat</b>	93.1	+	45.7	+	109		31	-	5		1	-	3	-	0		13	
VA13B-25 LA	91.7	+	45.5	+	108	-	32		4		3	-	3	-	0		14	
VA11B-141 LA	90.5	+	45.9	+	112	+	35	+	3	-	4	-	3	-	0		13	
<b>Thoroughbred</b>	89.2	+	43.2	-	112	+	32		3	-	7	+	6	+	5	+	13	
<b>Atlantic</b>	87.8	+	44.2		108	-	30	-	5		5	+	5	+	1		13	
<b>Price</b>	84.7		44.5		109		31		4		5	+	6	+	0		13	
<b>LCS Violetta</b>	84.0		45.7	+	113	+	29	-	2	-	3	-	3	-	1		9	-
VA08B-95	83.7		43.8		108	-	32		5	+	2	-	2	-	8	+	13	
<b>Barsoy</b>	80.2		44.3		108	-	32		5		7	+	4		0		15	
<b>Callao</b>	77.7	-	43.5	-	107	-	28	-	6	+	5	+	4		0		13	
<b>Nomini</b>	73.5	-	42.9	-	107	-	37	+	3	-	5	+	2	-	0		16	+
<b>Wysor</b>	67.6	-	42.1	-	109		37	+	5	+	7	+	5	+	0		14	
VA92-42-46	66.2	-	42.3	-	110		36	+	4		1	-	7	+	0		15	
Average	83.3		44.2		109		32		4		4		4		1		13	
LSD (0.05)	3.9		0.5		0		1		1		1		0		1		2	
C.V.	12.5		3.2		1		8		37		19		22		91		11	

Released cultivars are shown in bold print.

Varieties are ordered by descending yield averages.

A plus or minus sign indicates a performance significantly above or below the test average.

The 0-9 ratings indicate a genotype's response to disease or lodging where 0 = highly resistant and 9 = highly susceptible.

The number in parentheses below column headings indicates the number of location-years on which data are based.

**Table 14. Summary of performance of entries in the Virginia Tech Barley Test, Southern Piedmont AREC, Blackstone, VA, 2019 harvest.**

Barley Lines	3-year Av. Yield (Bu/a)	2-year Av. Yield (Bu/a)	Yield (Bu/a @ 48 lb/bu)	Test Weight (Lb/bu)	Plant Lodging (0-9)	Net Blotch (0-9)
VA17B-166 LA	---	---	86.6 +	46.4 +	3	0
VA16B-203 LA	---	90.5 +	85.4	42.0 -	2	0
<b>Barsoy</b>	85.0	86.2	83.6	45.1	2	4 +
VA16B-264 LA	---	87.7	81.9	45.5	1	1
VA11B-141 LA	86.3	83.8	79.9	45.6	3	2
VA16B-236 LA	---	86.6	79.6	43.8	2	1
VA17B-163 LA	---	---	79.4	46.7 +	3	0
<b>Thoroughbred</b>	89.1 +	82.8	79.3	44.5	1	2
VA16B-263 LA	---	87.3	79.1	44.3	2	1
VA17B-177 LA	---	---	77.8	45.5	1 -	1
VA16B-244 LA	---	82.8	77.6	42.6 -	2	1
<b>Callao</b>	75.6	76.8	76.9	44.0	5 +	3
VA17B-175 LA	---	---	76.8	47.6 +	3	0 -
VA17B-76 LA	---	---	76.5	47.1 +	3	1
VA16B-217 LA	---	87.2	76.3	44.6	2	3
VA17B-124	---	---	75.7	46.2	3	1
VA16B-238 LA	---	85.6	75.6	43.4	2	1
<b>Atlantic</b>	85.4	82.9	75.3	43.8	4	2
VA17B-148 LA	---	---	75.3	46.5 +	1	1
<b>Secretariat</b>	86.3	81.1	75.1	45.4	5 +	2
VA17B-74 LA	---	---	74.9	46.9 +	2	1
VA08B-95	77.2	78.7	74.6	44.4	3	1
VA17B-151 LA	---	---	73.2	47.1 +	3	0 -
<b>Price</b>	81.0	80.4	72.7	45.0	3	4 +
VA16B-254 LA	---	83.1	72.2	43.6	2	2
<b>Wysor</b>	77.0	75.1	71.8	42.5 -	5 +	5 +
<b>LCS Casanova</b>	---	---	71.1	43.9	2	1
VA13B-25 LA	81.8	78.4	70.3	45.1	5 +	3
VA17B-26	---	---	70.2	45.9	1	1
<b>Nomini</b>	77.4	74.5 -	68.5	45.1	3	1
VA17B-156 LA	---	---	68.4	47.8 +	2	1
VA16B-213 LA	---	79.0	68.3	43.8	2	1
<b>LCS Calypso</b>	---	75.3	67.7	40.8 -	5 +	5 +
VA17B-65 LA	---	---	66.8	46.7 +	2	0
VA14B-63	84.8	78.2	66.3	45.6	1	0
<b>LCS Nerea</b>	---	---	61.8 -	43.4	3	5 +
VA92-42-46	76.5	77.9	61.6 -	43.7	4	4 +
<b>LCS Violetta</b>	75.7	74.9 -	61.2 -	43.5	2	2
Average	81.4	81.5	74.1	44.9	2	2
LSD (0.05)	6.4	6.6	11.9	1.5	2	2
C.V.	9.4	7.7	10.3	2.2	55	68

**Table 14. Summary of performance of entries in the Virginia Tech Barley Test, Southern Piedmont AREC, Blackstone, VA, 2019 harvest.**

	3-year Av. Yield (Bu/a)	2-year Av. Yield (Bu/a)	Yield (Bu/a @ 48 lb/bu)	Test Weight (Lb/bu)	Plant Lodging (0-9)	Net Blotch (0-9)
Barley Lines						

Released cultivars are shown in bold print.

Varieties are ordered by descending one-year yield averages.

A plus or minus sign indicates a performance significantly above or below the test average.

The 0-9 ratings indicate a genotype's response to disease or lodging where 0 = highly resistant and 9 = highly susceptible.

**Table 15. Summary of performance of entries in the Virginia Tech Barley Test, Tidewater AREC, Holland, VA, 2019 harvest.**

Barley Lines	Yield (Bu/a @ 48 lb/bu)		Test Weight (Lb/bu)
<b>LCS Calypso</b>	78.8	+	51.2
VA17B-76 LA	73.1	+	52.2
VA17B-175 LA	72.4	+	52.5
<b>LCS Casanova</b>	70.8	+	49.2
VA17B-26	70.5	+	51.5
VA17B-166 LA	69.9	+	54.0
VA13B-25 LA	65.3	+	51.8
VA16B-217 LA	64.1		51.9
<b>Price</b>	63.1		51.3
VA16B-264 LA	61.0		52.4
VA16B-244 LA	59.9		52.1
<b>LCS Violetta</b>	59.6		50.1
VA17B-163 LA	59.1		53.3
VA17B-151 LA	58.9		52.2
<b>Barsoy</b>	58.5		52.5
VA16B-254 LA	56.9		52.2
<b>LCS Nerea</b>	56.8		49.8
VA14B-63	56.5		52.9
<b>Thoroughbred</b>	55.6		47.4 -
VA16B-238 LA	55.5		51.7
VA17B-177 LA	53.1		51.9
VA16B-213 LA	52.1		49.2
VA17B-148 LA	51.9		52.8
VA17B-65 LA	51.7		51.9
VA11B-141 LA	50.2		52.8
VA16B-203 LA	49.3		51.4
VA17B-156 LA	48.6		52.6
VA17B-74 LA	47.9		51.7
<b>Secretariat</b>	46.8		51.7
VA16B-263 LA	45.4	-	51.2
VA16B-236 LA	42.0	-	51.4
<b>Callao</b>	41.6	-	52.3
VA17B-124	39.8	-	49.7
VA08B-95	37.8	-	49.3
<b>Atlantic</b>	34.5	-	51.0
<b>Wysor*</b>	---		---
<b>Nomini*</b>	---		---
VA92-42-46*	---		---
Average	57.7		51.7
LSD (0.05)	9.2		3.4
C.V.	9.7		3.9

**Table 15. Summary of performance of entries in the Virginia Tech Barley Test, Tidewater AREC, Holland, VA, 2019 harvest.**

	Yield (Bu/a @ 48 lb/bu)	Test Weight (Lb/bu)
Barley Lines		

Released cultivars are shown in bold print.

Varieties are ordered by descending yield averages.

A plus or minus sign indicates a performance significantly above or below the test average.

The 0-9 ratings indicate a genotype's response to disease or lodging where 0 = highly resistant and 9 = highly susceptible.

\* Variety was eaten by deer.

**NOTE: This location is not being included in over-location or over-years analysis. It was not representative of performance.**

**Table 16. Summary of performance of entries in the Virginia Tech Barley Test, Eastern Virginia AREC, Warsaw, VA, 2019 harvest.**

Barley Lines	3-year Av. Yield (Bu/a)		2-year Av. Yield (Bu/a)		Yield (Bu/a @ 48 lb/bu)		Test Weight (Lb/bu)		Date Headed (Julian)		Mature Height (In)		Plant Lodging (0-9)	
VA17B-163 LA	---		---		97.2	+	48.3	+	106	-	31		1	
<b>Atlantic</b>	83.3		96.2	+	96.5	+	44.5		106	-	29		2	
VA17B-26	---		---		94.2	+	47.5	+	105	-	31		1	
VA17B-166 LA	---		---		93.6	+	48.0	+	107		32		2	
<b>LCS Nerea</b>	---		---		92.5		45.0		105	-	28	-	2	
<b>Secretariat</b>	93.4	+	92.1	+	91.6		45.5		107		29		2	
<b>Callao</b>	77.1		85.7		91.6		44.9		106	-	27	-	4	+
VA14B-63	89.4	+	89.9		91.3		46.7	+	109	+	29		1	
<b>LCS Casanova</b>	---		---		91.0		46.2		112	+	29		0	-
VA17B-177 LA	---		---		90.7		48.0	+	105	-	29		1	
VA17B-65 LA	---		---		90.0		47.1	+	105	-	33		2	
VA17B-76 LA	---		---		89.7		47.0	+	104	-	33	+	2	
VA16B-264 LA	---		91.0		89.4		46.9	+	105	-	30		1	
VA17B-175 LA	---		---		88.2		47.2	+	105	-	30		3	+
VA11B-141 LA	86.3	+	89.0		87.0		45.8		108	+	32		2	
<b>Barsoy</b>	74.5	-	85.0		85.7		44.8		105	-	32		3	+
VA17B-156 LA	---		---		85.5		48.1	+	105	-	31		2	
VA08B-95	81.4		83.0		85.2		44.3		106		29		3	
VA92-42-46	71.6	-	80.5	-	85.1		44.4		106		36	+	2	
VA13B-25 LA	88.7	+	91.6		84.2		45.8		105	-	31		2	
VA16B-263 LA	---		88.2		84.0		41.1	-	109	+	32		1	-
<b>Price</b>	80.0		88.6		84.0		45.6		107		29		2	
VA17B-74 LA	---		---		83.6		46.6		107		28	-	1	-
VA16B-254 LA	---		90.1		83.3		43.4	-	109	+	32		0	-
<b>Thoroughbred</b>	76.9		88.0		82.0		44.4		108	+	30		1	
VA17B-151 LA	---		---		81.7		47.1	+	106		30		1	
VA16B-236 LA	---		88.9		81.1		43.1	-	109	+	31		0	-
<b>Wysor</b>	73.0	-	79.5	-	81.0		44.6		106		34	+	2	
VA16B-213 LA	---		88.6		80.5		43.4	-	109	+	31		1	-
VA16B-217 LA	---		85.7		80.4		43.5	-	108	+	32		0	-
<b>LCS Calypso</b>	---		84.8		80.4		42.4	-	112	+	33		2	
<b>LCS Violetta</b>	83.4		82.7		80.0		46.2		109	+	28		1	
<b>Nomini</b>	73.7	-	82.9		79.7		45.2		103	-	33	+	3	+
VA16B-238 LA	---		84.1		77.3		42.5	-	109	+	33		1	-
VA16B-203 LA	---		83.6		76.1	-	43.6	-	109	+	29		1	-
VA17B-124	---		---		75.5	-	46.2		106		27	-	1	
VA16B-244 LA	---		83.1		73.7	-	41.8	-	108	+	29		1	
VA17B-148 LA	---		---		67.8	-	47.0	+	108		30		1	
Average	80.9		86.8		85.1		45.3		107		30		1	
LSD (0.05)	4.7		5.0		8.4		1.4		1		2		1	
C.V.	7.1		5.8		6.7		2.1		1		6		45	

**Table 16. Summary of performance of entries in the Virginia Tech Barley Test, Eastern Virginia AREC, Warsaw, VA, 2019 harvest.**

	3-year	2-year	Yield	Test	Date	Mature	Plant
Barley Lines	Av. Yield (Bu/a)	Av. Yield (Bu/a)	(Bu/a @ 48 lb/bu)	Weight (Lb/bu)	Headed (Julian)	Height (In)	Lodging (0-9)

Released cultivars are shown in bold print.

Varieties are ordered by descending one-year yield averages.

A plus or minus sign indicates a performance significantly above or below the test average.

The 0-9 ratings indicate a genotype's response to disease or lodging where 0 = highly resistant and 9 = highly susceptible.

**Table 17. Summary of performance of entries in the Virginia Tech Barley Test, Eastern Shore AREC, Painter, VA, 2019 harvest.**

Barley Lines	2-year Av. Yield (Bu/a)		Yield (Bu/a @ 48 lb/bu)		Test Weight (Lb/bu)	Plant Lodging (0-9)		Net Blotch (0-9)	
VA16B-213 LA	109.7	+	108.0	+	46.2	1	-	1	-
VA16B-217 LA	117.2	+	107.2	+	45.9	2		1	-
VA16B-236 LA	109.4	+	106.7	+	46.4	2		1	-
VA16B-254 LA	110.2	+	100.3	+	45.2	1	-	0	-
VA17B-76 LA	---		99.8	+	48.3	+	3	3	
VA17B-177 LA	---		99.4	+	46.7		2	2	
VA16B-203 LA	106.8	+	97.7	+	46.1	1	-	1	-
VA17B-175 LA	---		97.2	+	48.1	+	4	2	
VA14B-63	98.5		96.8		47.7	+	2	1	-
VA16B-244 LA	106.7	+	96.4		45.6		2	1	
VA16B-263 LA	108.5	+	95.3		46.3	1	-	2	
VA17B-74 LA	---		94.6		47.7	+	2	3	
VA16B-264 LA	98.5		94.1		47.4		3	2	
VA16B-238 LA	100.5		93.2		44.8		3	2	
VA17B-166 LA	---		92.3		48.1	+	2	1	-
<b>Barsoy</b>	89.2		92.1		46.4		3	2	
VA17B-148 LA	---		91.1		47.6		3	1	-
VA17B-65 LA	---		90.8		48.0	+	3	4	
VA17B-124	---		90.1		47.2		2	2	
VA17B-151 LA	---		87.7		47.4		2	1	-
<b>Secretariat</b>	86.2		87.6		47.5		4	3	
VA17B-163 LA	---		85.9		47.9	+	2	1	-
<b>LCS Casanova</b>	---		83.7		44.4	-	3	4	
VA17B-26	---		83.6		47.6		1	-	3
<b>LCS Violetta</b>	102.6	+	80.7		45.3		4	4	
<b>Price</b>	86.2		80.3		46.2		4	6	+
<b>LCS Nerea</b>	---		77.3		43.2	-	6	+	7
VA17B-156 LA	---		73.2		48.5	+	3	4	
<b>Atlantic</b>	81.6		72.7		45.8		4	5	+
VA11B-141 LA	93.2		72.2		46.9		3	2	
<b>Callao</b>	72.8	-	70.8		46.0		4	3	
VA13B-25 LA	89.8		68.2	-	45.6		3	3	
<b>Wysor</b>	62.6	-	58.2	-	44.0	-	4	7	+
<b>Nomini</b>	73.7	-	57.2	-	45.1		1	-	2
<b>LCS Calypso</b>	95.0		53.6	-	40.6	-	6	+	5
<b>Thoroughbred</b>	72.2	-	50.8	-	41.5	-	4	9	+
VA08B-95	63.1	-	47.3	-	44.9		4	4	
VA92-42-46	58.9	-	24.4	-	44.4	-	3	7	+
Average	91.4		83.1		46.1		3	3	
LSD (0.05)	10.1		13.8		1.6		2	2	
C.V.	10.2		10.5		2.5		42	42	

**Table 17. Summary of performance of entries in the Virginia Tech Barley Test, Eastern Shore AREC, Painter, VA, 2019 harvest.**

	2-year	Yield	Test	Plant	Net
Barley Lines	Av. Yield (Bu/a)	(Bu/a @ 48 lb/bu)	Weight (Lb/bu)	Lodging (0-9)	Blotch (0-9)

Released cultivars are shown in bold print.

Varieties are ordered by descending one-year yield averages.

A plus or minus sign indicates a performance significantly above or below the test average.

The 0-9 ratings indicate a genotype's response to disease or lodging where 0 = highly resistant and 9 = highly susceptible.

**Table 18. Summary of performance of entries in the Virginia Tech Barley Test, Northern Piedmont Center, Orange, VA, 2019 harvest.**

Barley Lines	3-year Av. Yield (Bu/a)		2-year Av. Yield (Bu/a)		Yield (Bu/a @ 48 lb/bu)	Test Weight (Lb/bu)		Mature Height (In)	Plant Lodging (0-9)	Net Blotch (0-9)	
VA17B-156 LA	---		---		112.0 +	49.5 +		35	2	2	-
VA17B-65 LA	---		---		108.0 +	51.2 +		35	2	3	-
VA17B-74 LA	---		---		107.3 +	48.4		32	4	3	-
VA17B-166 LA	---		---		106.5 +	49.0		35	3	3	-
VA16B-254 LA	---		98.5 +		104.7 +	49.6 +		35	2	7	+
VA17B-163 LA	---		---		104.6 +	49.1		37 +	3	2	-
VA17B-26	---		---		104.5 +	50.3 +		33	3	7	+
VA16B-217 LA	---		106.1 +		103.8 +	49.0		36	3	7	+
VA16B-264 LA	---		104.0 +		103.5 +	50.6 +		34	3	3	-
VA17B-151 LA	---		---		103.2 +	48.9		33	7 +	2	-
VA17B-175 LA	---		---		101.9 +	48.9		35	2	4	-
VA17B-148 LA	---		---		100.2 +	49.5 +		36	4	4	-
VA16B-263 LA	---		96.5 +		99.5 +	49.4 +		37 +	3	7	+
<b>Thoroughbred</b>	100.2 +		93.9 +		97.3	47.6		32	2	9	+
VA17B-177 LA	---		---		95.7	47.2		33	2 -	5	-
VA16B-203 LA	---		94.4 +		94.6	50.0 +		35	2	7	+
VA16B-236 LA	---		98.2 +		94.5	48.8		36	3	6	
VA16B-244 LA	---		95.1 +		94.2	48.5		34	4	8	+
VA16B-213 LA	---		99.0 +		94.2	50.0 +		34	1 -	7	+
VA16B-238 LA	---		87.8		92.5	48.9		34	4	8	+
VA17B-124	---		---		91.1	47.5		32	3	5	-
VA17B-76 LA	---		---		86.0	50.5 +		35	4	7	+
VA14B-63	94.2 +		91.9 +		82.0	46.9		31	6	3	-
VA13B-25 LA	95.9 +		96.5 +		81.8	49.3 +		30	8 +	4	-
<b>Secretariat</b>	87.1 +		87.6		76.6	47.6		32	5	8	+
<b>LCS Casanova</b>	---		---		75.6	44.9 -		29	1 -	7	+
<b>Price</b>	82.6		82.4		73.9	45.7 -		29	5	9	+
VA11B-141 LA	82.4		81.8		71.4 -	47.0		33	7 +	5	
<b>Barsoy</b>	67.1		63.7 -		66.9 -	48.1		25 -	9 +	7	+
<b>LCS Violetta</b>	75.1		72.8		66.3 -	47.0		30	2	5	
<b>Wysor</b>	48.1 -		40.3 -		66.1 -	43.9 -		36	6	7	+
<b>LCS Calypso</b>	---		71.2		64.0 -	42.9 -		32	2	7	+
VA08B-95	80.4		67.6 -		57.9 -	44.1 -		30	8 +	2	-
<b>LCS Nerea</b>	---		---		56.3 -	43.5 -		28 -	5	8	+
<b>Atlantic</b>	80.2		70.6		56.1 -	45.4 -		24 -	8 +	9	+
VA92-42-46	44.8 -		35.9 -		52.3 -	43.6 -		26 -	9 +	9	+
<b>Nomini</b>	48.5 -		37.6 -		48.7 -	44.5 -		37 +	4	4	-
<b>Callao</b>	62.4 -		41.1 -		42.8 -	43.0 -		16 -	9 +	8	+
Average	74.9		79.8		85.2	47.6		32	4	6	
LSD (0.05)	7.9		11.9		13.3	1.7		4	2	1	
C.V.	12.1		13.9		9.9	2.5		9	40	11	

**Table 18. Summary of performance of entries in the Virginia Tech Barley Test, Northern Piedmont Center, Orange, VA, 2019 harvest.**

Barley Lines	3-year Av. Yield (Bu/a)	2-year Av. Yield (Bu/a)	Yield (Bu/a @ 48 lb/bu)	Test Weight (Lb/bu)	Mature Height (In)	Plant Lodging (0-9)	Net Blotch (0-9)
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Released cultivars are shown in bold print.

Varieties are ordered by descending one-year yield averages.

A plus or minus sign indicates a performance significantly above or below the test average.

The 0-9 ratings indicate a genotype's response to disease or lodging where 0 = highly resistant and 9 = highly susceptible.

**Table 19. Summary of performance of entries in the Virginia Tech Barley Test, Kentland Farm, Blacksburg, VA, 2019 harvest.**

Barley Lines	3-year Av. Yield (Bu/a)	2-year Av. Yield (Bu/a)	Yield (Bu/a @ 48 lb/bu)	Test Weight (Lb/bu)	Date Headed (Julian)	Mature Height (In)	Plant Lodging (0-9)
<b>Thoroughbred</b>	100.8	94.3	127.1 +	47.9	113 +	30	1
VA16B-217 LA	---	115.3 +	126.4 +	47.9	114 +	32 +	1
VA11B-141 LA	110.4 +	107.7	126.2 +	49.0 +	113 +	33 +	2
VA14B-63	120.4 +	117.4 +	126.1 +	47.6	114 +	30	1
<b>Secretariat</b>	114.7 +	113.2 +	124.6	48.4	111	28	3
VA16B-236 LA	---	115.3 +	123.4	47.8	113 +	32	1
VA17B-74 LA	---	---	123.3	48.9 +	111	28	2
VA16B-254 LA	---	112.9 +	123.0	47.5	114 +	31	0 -
VA08B-95	106.8 +	106.2	121.9	46.1 -	110 -	32	3
VA17B-76 LA	---	---	121.2	49.1 +	108 -	29	2
VA16B-213 LA	---	111.3 +	121.1	47.5	114 +	34 +	1
VA16B-264 LA	---	108.3	120.7	48.6	110 -	30	3
VA17B-166 LA	---	---	119.8	49.0 +	111	31	1
VA17B-124	---	---	119.8	48.4	111 -	30	2
VA16B-263 LA	---	111.7 +	119.6	46.8 -	114 +	30	1
VA17B-156 LA	---	---	119.5	49.7 +	109 -	31	1
VA17B-148 LA	---	---	119.5	49.3 +	112	31	2
<b>Atlantic</b>	109.8 +	105.8	118.6	47.0 -	110 -	28	3
VA16B-244 LA	---	107.1	118.2	47.4	114 +	30	1
VA17B-175 LA	---	---	118.2	49.0 +	109 -	30	1
VA17B-151 LA	---	---	118.0	49.6 +	111	30	1
VA16B-203 LA	---	104.7	116.5	47.2	114 +	31	1
VA16B-238 LA	---	109.9 +	115.8	46.9 -	114 +	32	1
VA17B-163 LA	---	---	114.5	49.2 +	111	30	1
VA17B-26	---	---	113.5	49.8 +	109 -	30	1
VA17B-65 LA	---	---	112.5	49.2 +	108 -	31	1
<b>Barsoy</b>	92.3 -	92.9 -	111.7	47.5	110 -	30	3
<b>Price</b>	97.4	91.2 -	111.4	47.9	112	30	2
<b>Callao</b>	98.3	97.1	110.7	46.5 -	109 -	25 -	7 +
VA13B-25 LA	105.7	100.1	108.3	47.7	109 -	27	4 +
<b>LCS Violetta</b>	93.5	94.7	104.2	49.1 +	114 +	27 -	1
VA17B-177 LA	---	---	103.9	48.5	111	28	1
<b>LCS Casanova</b>	---	---	99.2 -	48.5	118 +	25 -	2
<b>LCS Nerea</b>	---	---	98.3 -	47.1	111	23 -	3
<b>Nomini</b>	90.0 -	86.4 -	94.0 -	44.1 -	109 -	32	2
<b>LCS Calypso</b>	---	86.2 -	92.4 -	46.2 -	118 +	27	5 +
<b>Wysor</b>	73.6 -	69.5 -	83.2 -	44.3 -	111	31	3
VA92-42-46	74.5 -	70.2 -	77.4 -	45.1 -	112	33 +	3
Average	99.1	101.2	113.8	47.8	112	30	2
LSD (0.05)	6.8	7.9	11.4	0.8	1	3	2
C.V.	8.4	7.8	7.1	1.2	1	6	59

**Table 19. Summary of performance of entries in the Virginia Tech Barley Test, Kentland Farm, Blacksburg, VA, 2019 harvest.**

	3-year	2-year	Yield	Test	Date	Mature	Plant
Barley Lines	Av. Yield (Bu/a)	Av. Yield (Bu/a)	(Bu/a @ 48 lb/bu)	Weight (Lb/bu)	Headed (Julian)	Height (In)	Lodging (0-9)

Released cultivars are shown in bold print.

Varieties are ordered by descending one-year yield averages.

A plus or minus sign indicates a performance significantly above or below the test average.

The 0-9 ratings indicate a genotype's response to disease or lodging where 0 = highly resistant and 9 = highly susceptible.

## Section 2: Barley Scab Research

One of the primary research objectives of the Virginia Tech barley breeding program is to identify and develop cultivars possessing resistance to *Fusarium* head blight (FHB) or scab. Each year all barley and hulless barley entries in Virginia's Official State Variety Trials are evaluated for FHB at the Virginia Crop Improvement Association (VCIA) test site in Mt. Holly, VA. Cultivars possessing complete resistance or immunity to FHB have not been identified and resistance levels in currently available cultivars vary from moderately resistant to highly susceptible.

A major goal of the breeding program is to identify and incorporate unique and complementary types of FHB resistance into cultivars to enhance the overall level of resistance. Incorporating multiple resistance genes having additive effects on FHB resistance into cultivars will enhance the overall level of resistance. Because the individual resistance genes are located on different barley chromosomes and each gene confers only partial resistance to FHB, identifying lines having multiple resistance genes is difficult using traditional breeding techniques. To overcome this limitation, our program will incorporate the available markers to help select FHB resistant cultivars.

In 2019, entries were inoculated by spreading scabby corn kernels (50g/4-rows) in plots at the booting stage. A moderate level of FHB infection was obtained in 2019. Among 24 hulless lines and varieties tested in 2019, the FHB index ranged from 0.1 to 3.7 with FHB incidence ranging from 7.5% to 90% and FHB severity from 7.3% to 48.8% (Table 20). Twelve lines and three varieties had FHB index values lower than the mean ( $<1.2$ ) in 2019 (Table 20). Several lines, VA15H-73 (2R), VA16H-25 (2R) and VA16H-24 (2R) have shown significantly lower FHB Index, incidence and severity values compared to the test means in 2018 and 2019.

Among 38 barley lines and varieties tested in 2019, the FHB index varied from 0.0 to 1.3 with FHB incidence ranging from 5% to 62.5% and FHB Severity from 3.3% to 26.3% (Table 22). Eighteen lines and three varieties had FHB index values lower than the mean ( $<0.5$ ) in 2019 (Table 22). Two elite malt barley varieties, Violetta and Calypso, developed in Europe, are currently being recommended for production in the mid-Atlantic and the eastern United States. They both had FHB incidence, severity and index values significantly lower than the test mean. Finally, the hulled line VA11B-141 LA continues to show good FHB resistance to field related FHB traits as well as DON accumulation and is slated for release from our program in the near future.

**Table 20. Summary of reaction of entries in the Virginia Tech State Hulless Barley Test to Fusarium head blight (scab), 2019 harvest.**

Line	FHB Incidence <sup>1</sup> (%)	FHB Severity <sup>2</sup> (%)	FHB Index <sup>3</sup> (0-9)	Flowering Date (Julian)				
VA16H-25 (2R)	7.5	-	7.3	0.1	109.5			
VA15H-73 (2R)	10.0		10.8	0.1	112.3			
Eve	10.0		15.8	0.1	106.8	-		
VA16H-28 (2R)	15.0		15.5	0.2	114.3			
VA16H-27 (2R)	20.0		12.8	0.2	111.3			
VA16H-26 (2R)	25.0		13.8	0.3	113.5			
VA15H-11	27.5		17.0	0.4	110.8			
VA16H-24 (2R)	25.0		17.0	0.5	113.3			
VA14H-58	35.0		21.1	0.7	109.5			
Amaze 10	32.5		21.5	0.7	113.8			
VA16H-160	42.5		21.8	0.9	105.8	-		
VA17H-14	35.0		19.8	0.9	110.3			
VA16H-159	55.0		20.0	0.9	109.8			
Dan	35.0		27.0	1.0	111.3			
VA06H-25	40.0		31.8	1.2	112.5			
VA06H-79	62.5		23.5	1.3	109.0			
VA14H-33	50.0		33.8	1.5	110.8			
VA07H-35 WS	42.5		40.8	1.6	113.3			
VA17H-20	65.0		32.5	1.9	111.3			
VA17H-23	70.0		32.3	2.1	112.0			
VA08H-79 WS	65.0		40.5	2.4	113.8			
VA17H-21	70.0		43.3	2.8	+	114.8		
VA17H-19	75.0		48.8	+	3.3	+	111.0	
Doyce	90.0	+	45.0	+	3.7	+	106.5	-
Average	41.9		25.5	1.2			111.1	
LSD (0.05)	34.3		18.3	1.5			3.7	
C.V.	58.3		51.0	91.5			2.3	

Released cultivars are shown in bold print.

Varieties are ordered by ascending index averages.

A plus or minus sign indicates a performance significantly above or below the average.

Entries were planted in 2-row plots, 4ft in length at Mt. Holly, VA and were inoculated at booting stage with scabby corn kernels (50g/4-rows).

<sup>1</sup> Scab Incidence (0-10): Based on infected spikes within 4 ft row.

<sup>2</sup> Scab Severity (0-10): Based on infected spikelets in 10 spikes showing disease symptoms.

<sup>3</sup> FHB Index is an overall indicator of scab resistance/susceptibility level and takes into account both incidence and severity where 0 = highly resistant and 9 = highly susceptible.

**Table 21. Two-year summary of reaction of entries in the Virginia Tech State Hulless Barley Test to Fusarium head blight (scab), 2018 and 2019 harvests.**

Line	FHB Incidence <sup>1</sup> (%)		FHB Severity <sup>2</sup> (%)		FHB Index <sup>3</sup> (0-9)		Flowering Date (Julian)	FDK <sup>4</sup> (%)		ISK Index <sup>5</sup> (0-9)		DON <sup>6</sup> (ppm)
Year	2018-19		2018-19		2018-19		2018-19	2018		2018		2018
VA15H-73 (2R)	41.3	-	16.6	-	0.8	-	117.5	+	15.0	2.6	-	7.5
VA16H-25 (2R)	50.0	-	18.4	-	1.3	-	113.8	-	5.0	3.3	-	10.6
VA16H-24 (2R)	52.5	-	23.0	-	1.3	-	119.4	+	20.0	3.0	-	6.2
VA16H-27 (2R)	55.0		22.0	-	1.4	-	115.9		30.0	3.3	-	16.7
VA16H-28 (2R)	53.8	-	24.4	-	1.5	-	118.4	+	35.0	3.4	-	6.4
VA16H-26 (2R)	58.8		24.0	-	1.6	-	117.5	+	35.0	3.5	-	23.0
VA15H-11	60.0		28.5		1.9		114.4		35.0	3.6	-	11.3
VA16H-159	77.5	+	33.3		2.6		115.9		60.0	4.0		6.2
<b>Eve</b>	55.0		37.3		2.7		110.8	-	30.0	4.3		11.3
VA14H-58	67.5		39.5		3.0		114.5		60.0	4.3		12.2
VA14H-33	75.0		42.9		3.1		115.0		30.0	4.2		5.8
<b>Dan</b>	67.5		43.9		3.3		115.1		45.0	4.4	+	11.3
VA16H-160	71.3		44.3		3.5		112.6	-	50.0	4.6	+	7.6
VA06H-25	70.0		47.8		3.5		117.1		35.0	4.5	+	6.6
<b>Amaze 10</b>	66.3		46.4		3.6		117.1		35.0	4.7	+	17.9
VA06H-79	81.3	+	45.9		3.8	+	113.3	-	40.0	4.6	+	7.0
VA07H-35 WS	71.3		54.3	+	3.9	+	117.9	+	60.0	4.6	+	21.1
VA08H-79 WS	82.5	+	55.1	+	4.4	+	118.4	+	60.0	4.7	+	8.1
<b>Doyce</b>	95.0	+	56.3	+	4.9	+	110.5	-	65.0	4.6	+	8.6
Average	65.9		37.0		2.7		115.5		39.2	4.0		10.8
LSD (0.05)	11.6		9.7		0.9		1.6		0.0	0.4		0.0
C.V.	17.8		26.6		34.8		1.4		0.0	6.5		0.0

Released cultivars are shown in bold print.

Varieties are ordered by ascending two-year index averages.

A plus or minus sign indicates a performance significantly above or below the average.

Entries were planted in 2-row plots, 4ft in length at Mt. Holly, VA and were inoculated at booting stage with scabby corn kernels (50g/4-rows).

<sup>1</sup> Scab Incidence (0-10): Based on infected spikes within 4 ft row.

<sup>2</sup> Scab Severity (0-10): Based on infected spikelets in 10 spikes showing disease symptoms.

<sup>3</sup> FHB Index is an overall indicator of scab resistance/susceptibility level and takes into account both incidence and severity where 0 = highly resistant and 9 = highly susceptible.

<sup>4</sup> FDK (%): Fusarium damaged kernels, visual assessment of the percent of infected kernels.

<sup>5</sup> ISK Index takes into account both incidence and severity and is a composite of head and kernel traits; 0 = highly resistant and 9 = highly susceptible.

<sup>6</sup> DON (ppm): Concentration of vomitoxin (deoxynivalenol).

**Table 22. Summary of reaction of entries in the Virginia Tech State Barley Test to Fusarium head blight (scab), 2019 harvest.**

Line	FHB Incidence <sup>1</sup> (%)		FHB Severity <sup>2</sup> (%)		FHB Index <sup>3</sup> (0-9)		Flowering Date (Julian)
VA17B-148 LA	5.0	-	3.3	-	0.0		107.8
LCS Nerea	10.0		6.0	-	0.1		106.5
VA11B-141 LA	10.0		9.5		0.1		108.3
VA17B-26	10.0		12.5		0.1		105.3
VA16B-236 LA	15.0		12.3		0.2		109.0
VA16B-203 LA	15.0		12.3		0.2		109.5
VA16B-238 LA	15.0		13.8		0.2		108.5
LCS Violetta	17.5		13.0		0.2		112.3 +
VA17B-166 LA	17.5		9.8		0.2		107.8
VA13B-25 LA	17.5		12.5		0.2		105.3
VA17B-177 LA	25.0		11.0		0.3		106.3
LCS Calypso	22.5		12.5		0.3		113.0 +
VA16B-244 LA	25.0		11.8		0.3		108.0
VA16B-254 LA	20.0		16.0		0.3		108.8
VA17B-163 LA	20.0		14.0		0.3		107.0
VA16B-264 LA	30.0		11.3		0.3		105.8
VA16B-213 LA	22.5		15.0		0.3		109.0
VA17B-156 LA	25.0		14.0		0.3		105.8
VA16B-217 LA	27.5		15.3		0.4		109.5
VA17B-65 LA	30.0		15.5		0.4		106.0
VA17B-151 LA	40.0		13.0		0.5		108.0
VA16B-263 LA	35.0		15.3		0.5		109.0
VA17B-76 LA	50.0		12.5		0.6		104.5 -
VA17B-124	35.0		18.0		0.6		105.3
VA92-42-46	32.5		19.5		0.6		107.3
Nomini	37.5		15.8		0.6		104.5 -
VA17B-175 LA	47.5		15.8		0.6		106.0
Secretariat	40.0		17.3		0.6		108.3
LCS Casanova	47.5		16.0		0.7		113.8 +
VA17B-74 LA	42.5		18.5		0.7		108.3
Callao	50.0		17.8		0.8		106.3
Barsoy	35.0		26.3	+	0.9		107.0
VA08B-95	45.0		22.5		0.9		106.0
Price	45.0		24.3	+	1.0	+	108.0
VA14B-63	62.5	+	19.3		1.1	+	108.8
Thoroughbred	55.0	+	23.5	+	1.1	+	109.5
Atlantic	55.0	+	22.8		1.2	+	107.0
Wysor	60.0	+	23.5	+	1.3	+	108.5
Average	31.4		15.3		0.5		107.8
LSD (0.05)	23.0		7.6		0.5		3.1
C.V.	52.4		35.5		69.3		2.0

**Table 22. Summary of reaction of entries in the Virginia Tech State Barley Test to Fusarium head blight (scab), 2019 harvest.**

Line	FHB Incidence <sup>1</sup> (%)	FHB Severity <sup>2</sup> (%)	FHB Index <sup>3</sup> (0-9)	Flowering Date (Julian)
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Released cultivars are shown in bold print.

Varieties are ordered by ascending index averages.

A plus or minus sign indicates a performance significantly above or below the average.

Entries were planted in 2-row plots, 4ft in length at Mt. Holly, VA and were inoculated at booting stage with scabby corn kernels (50g/4-rows).

<sup>1</sup> Scab Incidence (0-10): Based on infected spikes within 4 ft row.

<sup>2</sup> Scab Severity (0-10): Based on infected spikelets in 10 spikes showing disease symptoms.

<sup>3</sup> FHB Index is an overall indicator of scab resistance/susceptibility level and takes into account both incidence and severity where 0 = highly resistant and 9 = highly susceptible.

**Table 23. Two-year summary of reaction of entries in the Virginia Tech State Barley Test to Fusarium head blight (scab), 2018 and 2019 harvests.**

Line	FHB Incidence <sup>1</sup> (%)		FHB Severity <sup>2</sup> (%)		FHB Index <sup>3</sup> (0-9)		Flowering Date (Julian)		FDK <sup>4</sup> (%)	ISK Index <sup>5</sup> (0-9)		DON <sup>6</sup> (ppm)
Year	2018-19		2018-19		2018-19		2018-19		2018	2018		2018
LCS Calypso	42.5	-	15.8	-	0.7	-	116.6	+	5.0	2.2	-	15.7
LCS Violetta	55.0		22.6	-	1.5	-	117.1	+	8.0	3.4		9.2
VA11B-141 LA	52.5	-	22.4	-	1.6		112.6		25.0	3.6		6.7
VA16B-236 LA	52.5	-	27.5		1.9		114.9		15.0	3.6		14.8
VA13B-25 LA	56.3		26.9		1.9		109.5	-	5.0	3.7		28.3
VA16B-254 LA	56.3		29.0		1.9		114.4		10.0	3.7		13.8
VA16B-213 LA	57.5		29.0		2.0		114.4		10.0	3.7		6.9
VA16B-244 LA	61.3		27.3		2.0		113.3		8.0	3.8		6.6
VA16B-203 LA	55.0		29.9		2.1		113.8		15.0	3.9		26.9
VA16B-264 LA	62.5		29.1		2.2		110.4	-	5.0	3.9		15.6
SECRETARIAT	70.0		30.1		2.3		112.4		30.0	3.9		11.4
VA16B-238 LA	53.8		33.0		2.3		113.9		20.0	4.0		9.6
VA16B-217 LA	63.8		32.3		2.4		113.5		8.0	4.1		6.5
VA92-42-46	65.0		34.4		2.5		113.1		15.0	4.0		3.5
VA08B-95	72.5		34.6		2.6		109.9	-	40.0	4.0		8.0
Thoroughbred	72.5		36.9		2.6		114.5		50.0	3.8		9.8
Barsoy	67.5		37.3		2.6		110.4	-	8.0	4.0		17.1
VA16B-263 LA	67.5		40.1		3.2		113.5		30.0	4.5	+	4.4
Atlantic	77.5	+	40.5		3.2		110.6	-	20.0	4.3		12.9
Wysor	80.0	+	41.1		3.3		113.1		40.0	4.3		9.3
Callao	75.0	+	41.8		3.4		111.4		35.0	4.5	+	31.5
Price	70.0		47.1	+	3.6		112.8		35.0	4.5	+	12.7
VA14B-63	81.3	+	45.1	+	3.8		114.4		60.0	4.7	+	9.3
Average	63.8		32.8		2.4		113.1		21.6	3.9		12.6
LSD (0.05)	10.7		9.6		0.9		1.8		0.0	0.5		0.0
C.V.	17.0		29.8		37.0		1.6		0.0	9.9		0.0

Released cultivars are shown in bold print.

Varieties are ordered by ascending two-year FHB index averages.

A plus or minus sign indicates a performance significantly above or below the average.

Entries were planted in 2-row plots, 4ft in length at Mt. Holly, VA and were inoculated at booting stage with scabby corn kernels (50g/4-rows).

<sup>1</sup> Scab Incidence (0-10): Based on infected spikes within 4 ft row.

<sup>2</sup> Scab Severity (0-10): Based on infected spikelets in 10 spikes showing disease symptoms.

<sup>3</sup> FHB Index is an overall indicator of scab resistance/susceptibility level and takes into account both incidence and severity where 0 = highly resistant and 9 = highly susceptible.

<sup>4</sup> FDK (%): Fusarium damaged kernels, visual assessment of the percent of infected kernels.

<sup>5</sup> ISK Index takes into account both incidence and severity and is a composite of head and kernel traits; 0 = highly resistant and 9 = highly susceptible.

<sup>6</sup> DON (ppm): Concentration of vomitoxin (deoxynivalenol).

## Section 3: Wheat Varieties

Wheat trials were planted in seven-inch rows at Blackstone, Orange, Holland, Painter, and Shenandoah Valley. They were planted in six-inch rows at Blacksburg and Warsaw. The no-till locations (Holland and Shenandoah Valley) were planted at 48 seeds per square foot. All other locations were planted at 44 seeds per square foot.

Selecting the best wheat varieties is challenging but becomes easier with adequate information on performance over multiple environments. Past seasons across Virginia have provided the opportunity to evaluate day length sensitivity, spring freeze damage, glume blotch, scab (*Fusarium* head blight), and general plant health. Many newer wheat varieties and lines performed well in all environments tested. The future for wheat varieties adapted to Virginia conditions is very positive. Dr. Carl Griffey, Virginia Tech's small grains breeder, has many lines starting with "VA" shown in the by- and over-location tables that are in the top-yielding group and that display good disease resistance.

The released varieties that yielded significantly higher than the statewide mean in 2019, in descending yield order were, SY Viper, Pioneer 26R59, USG 3316, SY 100, USG 3790, #Warrior, Pioneer 26R36, MBX 17-M-245, Dyna-Gro 9941, Pioneer 26R10, USG 3458, #Blaze, USG 3329, and AgriMAXX 486. SY Viper also had test weight that was significantly higher than the mean of all lines tested. Average yield of all lines tested in 2018-19 was 83.4 bushels per acre, up 12.5 bushels from 2017-18.

Released lines with yields higher than the 3-year statewide mean, in descending yield order, were MBX 17-M-245, Pioneer 26R59, USG 3458, #Warrior, AgriMAXX 415, USG 3895, AgriMAXX 473, and Pioneer 26R45. AgriMAXX 415 also had test weight that was significantly higher than the mean of all lines tested over the 3 years.

Producers who grow large acreages of wheat should plant two or more varieties having significantly different maturity dates in order to ensure harvest of high quality grain having high test weight and no sprouting. In Virginia it is typical for sporadic or consistent rain showers to interrupt harvest. These wetting and drying cycles and subsequent delays and significantly reduce grain test weight and quality. Growers can circumvent this problem by planting varieties that differ significantly in maturity. Early maturing varieties often can be harvested first and prior to significant rain showers, and later maturing varieties harvested 42 subsequently will suffer less damage and losses in test weight and quality due to exposure to such a rain event.

## **Summary of wheat management practices for the 2019 harvest season (All rates are given on a per acre basis.)**

**Blacksburg** - Planted October 7, 2018. Pre-plant fertilizer was 30-50-50-10(S)-3(B)-2(Zn). Site was sprayed with .8 oz. Harmony Extra SG® on March 6, 2019. Site was fertilized with 30 units UAN 30-0-0 on March 6, 2019 and 45 units on March 24, 2019. Harvest occurred June 24, 2019.

**Blackstone** - Planted October 24, 2018. Pre-plant fertilizer was 300 lb. 10-10-10 on October 19, 2018. Site received 60 lb. N using UAN + 0.5 oz. Harmony Extra XP® February 6, 2019. Site received 60 lb. N using UAN + 4 oz Mustang® Maxx on March 27, 2019. Harvest occurred June 12, 2019.

**Warsaw** - Planted October 22, 2018. Lime was applied at 1.5 tons September 21, 2018. Pre-plant fertilizer was 30-80-100 applied October 10, 2018. Site was fertilized using 12-0-0-1.5 at 25 lb. on December 6, 2018 and again on February 1, 2019. Harmony Extra SG® was applied at .9 oz. with surfactant at 1.5 qt. /100 gallons of water on March 13, 2019. Site was fertilized using 24-0-0-3 at 60 lb. on March 19, 2019. Site was treated with 10 oz. Starane® Ultra + 2 qt. surfactant per 100 gallons of water on March 29, 2019 then with 2.4 oz. Tombstone® on April 11, 2019. Harvest occurred June 16, 2019.

**Painter** - Planted November 1, 2018. Pre-plant fertilizer was 60 lb. N on October 25, 2018. Application of .75 oz. Harmony Extra SG® was on March 29, 2019. Site was fertilized with 60 lb. N using 30% UAN March 29, 2019. Site was fertilized with 40 lb. N using 30% UAN cut 50/50 with water on April 18, 2019. Harvest occurred June 25, 2019.

**Holland** - Planted conventional-till November 29, 2018. Pre-plant fertilizer was 451 lb. 7-13-35 on November 25, 2018. Site was fertilized with 60 units N using 24-0-0-3 + 1 qt Mn + 0.75 oz Harmony Extra SG® on February 12, 2019 and again with 60 units N using 24-0-0-3 on March 14, 2019. Site was treated with 16.4 oz. Axial XL® on March 23, 2019. Harvest occurred June 5, 2019.

**Orange** - Planted October 22, 2018. Pre-plant fertilizer was 30-80-60 October 3, 2018. Sixty lb. N plus 0.6 oz. Harmony Extra SG® was applied February 28, 2019. Site was harvested June 17, 2019.

**Shenandoah Valley** - Planted on October 23, 2018. Pre-plant fertilizer was 30 lb. N plus glyphosate. Sixty units N plus 0.7 oz. Harmony Extra SG® were applied on February 15, 2019. Forty units N was applied on April 3, 2019. Harvest occurred on June 27, 2019.

**Entries in 2018-19 Virginia Wheat Test, arranged by company.**

<b>Company</b>	<b>Line</b>	<b>Seed Treatment reported by company</b>
AgriMAXX Wheat Company 7167 Highbanks Road Mascoutah, IL 62258	<b>AgriMAXX 415</b>	Vibrance™ Extreme, Cruiser® 5FS, Maxim 4FS
	<b>AgriMAXX 463</b>	Vibrance™ Extreme, Cruiser® 5FS, Maxim 4FS
	<b>AgriMAXX 473</b>	Vibrance™ Extreme, Cruiser® 5FS, Maxim 4FS
	<b>AgriMAXX 480</b>	Vibrance™ Extreme, Cruiser® 5FS, Maxim 4FS
	<b>AgriMAXX 485</b>	Vibrance™ Extreme, Cruiser® 5FS, Maxim 4FS
	<b>AgriMAXX 486</b>	Vibrance™ Extreme, Cruiser® 5FS, Maxim 4FS
	<b>AgriMAXX 495</b>	Vibrance™ Extreme, Cruiser® 5FS, Maxim 4FS
	AgriMAXX Exp 1902	Vibrance™ Extreme, Cruiser® 5FS, Maxim 4FS
	AgriMAXX Exp 1906	Vibrance™ Extreme, Cruiser® 5FS, Maxim 4FS
Armor Seed, LLC 183 Pennsylvania Avenue Waldenburg, AR 72475	Armor ARW1813	Vibrance™ Extreme
	Armor ARW1819	Vibrance™ Extreme
	<b>Armor Mayhem</b>	Vibrance™ Extreme
	<b>Armor Velocity</b>	Vibrance™ Extreme
	<b>Armor Venom</b>	Vibrance™ Extreme
Crop Production Services 15277 Richmond-Tappahannock Highway St Stephens Church, VA 23148	<b>Dyna-Gro 9600</b>	Foothold® Virock™ w/ Awaken® ST
	<b>Dyna-Gro 9701</b>	Foothold® Virock™ w/ Awaken® ST
	<b>Dyna-Gro 9750</b>	Foothold® Virock™ w/ Awaken® ST
	<b>Dyna-Gro 9772</b>	Foothold® Virock™ w/ Awaken® ST
	<b>Dyna-Gro 9811</b>	Foothold® Virock™ w/ Awaken® ST
	<b>Dyna-Gro 9932</b>	Foothold® Virock™ w/ Awaken® ST
	<b>Dyna-Gro 9941</b>	Foothold® Virock™ w/ Awaken® ST
	<b>Dyna-Gro 9980</b>	Foothold® Virock™ w/ Awaken® ST
	Dyna-Gro WX19711	Foothold® Virock™ w/ Awaken® ST
	Dyna-Gro WX19712	Foothold® Virock™ w/ Awaken® ST
	Dyna-Gro WX19714	Foothold® Virock™ w/ Awaken® ST
Eddie Mercer Agri-Services, Inc. 6900 Liganore Road Frederick, MD 21702	<b>Shirley</b>	Foothold® Virock™ w/ Awaken® ST
	<b>MBX 17-M-245</b>	Cruiser Maxx® Vibrance® Cereals
	<b>MBX 17-P-275</b>	Cruiser Maxx® Vibrance® Cereals
	<b>MBX 932</b>	Cruiser Maxx® Vibrance® Cereals
Featherstone Farm Seed 13941 Genito Road Amelia, VA 23002	<b>MBX 969</b>	Cruiser Maxx® Vibrance® Cereals
	<b>Featherstone 31</b>	Vibrance™ Extreme
KWS Cereals 4101 Colleen Drive Champaign, IL 61822	KWS19X03	Vibrance™ Extreme, Cruiser® 5FS
	KWS19X08	Vibrance™ Extreme, Cruiser® 5FS
	KWS19X09	Vibrance™ Extreme, Cruiser® 5FS
Limagrain Cereal Seeds 7099 Parkbrook Lane Codova, TN 38018	L11718	Albaugh Cereals F&I Custom Blend (Macho® 480, difenoconazole 3L, metalaxyl 265, thiabendazole 4.0, Rizolex®)
	L11719	Albaugh Cereals F&I Custom Blend (Macho® 480, difenoconazole 3L, metalaxyl 265, thiabendazole 4.0, Rizolex®)
	L11814	Albaugh Cereals F&I Custom Blend (Macho® 480, difenoconazole 3L, metalaxyl 265, thiabendazole 4.0, Rizolex®)
Local Seed Company, LLC 802 Rozelle Street Memphis, TN 38104	<b>LW2848</b>	Radius Premium (Imidicloprid, Metalaxyl, Tebuconazole)
	<b>LW2867</b>	Cruiser Maxx® Vibrance® Cereals
	<b>LW2937</b>	Cruiser Maxx® Vibrance® Cereals

**Entries in 2018-19 Virginia Wheat Test, arranged by company.**

<b>Company</b>	<b>Line</b>	<b>Seed Treatment reported by company</b>
	<b>LW2958</b>	Cruiser Maxx® Vibrance® Cereals
Mid-Atlantic Seeds	<b>MAS #105</b>	MAS Proshield
204 St. Charles Way #163E	<b>MAS #106</b>	MAS Proshield
York, PA 17402	<b>MAS #108</b>	MAS Proshield
	<b>MAS #116</b>	MAS Proshield
	<b>MAS #316</b>	MAS Proshield
	<b>MAS #35</b>	MAS Proshield
	<b>MAS #6</b>	MAS Proshield
	<b>MAS #61</b>	MAS Proshield
	<b>MAS #67</b>	MAS Proshield
	<b>MAS #7</b>	MAS Proshield
	<b>MAS #86</b>	MAS Proshield
North Carolina State University	NC13-21213	untreated
840 Method Road Unit 3	NC14-20369	untreated
Raleigh, NC 27695-7629	NC14-23372	untreated
	NC15-21834	untreated
Dupont Pioneer	<b>Pioneer 26R10</b>	Dividend Extreme®
425 Abbeydale Way	<b>Pioneer 26R36</b>	Dividend Extreme®
Columbia, SC 29229	<b>Pioneer 26R41</b>	Dividend Extreme®
	<b>Pioneer 26R45</b>	Dividend Extreme®
	<b>Pioneer 26R59</b>	Dividend Extreme®
Erwin-Keith, Inc. (Progeny)	<b>#Berkeley</b>	EverGol™, Gaucho®
1529 Hwy 193	<b>#Blaze</b>	EverGol™, Gaucho®
Wynne, AR 72396	<b>#Bullet</b>	EverGol™, Gaucho®
	<b>#Turbo</b>	EverGol™, Gaucho®
	<b>#Warrior</b>	EverGol™, Gaucho®
	PGX 17-16	EverGol™, Gaucho®
	PGX 18-2	EverGol™, Gaucho®
	PGX 18-7	EverGol™, Gaucho®
	PGX 18-8	EverGol™, Gaucho®
Meherrin Ag & Chemical (Southern Harvest)	<b>SH 4400</b>	Vibrance™ Extreme, Super Symcoat®
413 Main Street	<b>SH 7200</b>	Vibrance™ Extreme, Super Symcoat®
Severn, NC 27877	<b>SH 7510</b>	Vibrance™ Extreme, Super Symcoat®
Syngenta Seeds, Inc.	SR 8144	Vibrance™ Extreme, Cruiser® 5FS
806 N. 2nd Street	<b>SY 007</b>	Vibrance™ Extreme, Cruiser® 5FS
Berthoud, CO 80513	<b>SY 100</b>	Vibrance™ Extreme, Cruiser® 5FS
	<b>SY 547</b>	Vibrance™ Extreme, Cruiser® 5FS
	<b>SY 576</b>	Vibrance™ Extreme, Cruiser® 5FS
	<b>SY Viper</b>	Vibrance™ Extreme, Cruiser® 5FS
Texas A&M AgriLife Research	TX15D9253	Cruiser Maxx® Vibrance® Cereals
2600 S Neal	TX15D9579	Cruiser Maxx® Vibrance® Cereals
Commerce, TX 75429	TX15D9597	Cruiser Maxx® Vibrance® Cereals

**Entries in 2018-19 Virginia Wheat Test, arranged by company.**

<b>Company</b>	<b>Line</b>	<b>Seed Treatment reported by company</b>
	TX15D9608	Cruiser Maxx® Vibrance® Cereals
University of Georgia	GA071518-16E39	Dividend Extreme®
1109 Experiment Street	GA09129-16E55	Dividend Extreme®
Griffin, GA 30223	GA09436-16LE12	Dividend Extreme®
University of Kentucky	KY07C-1145-94-12-5	Vibrance™ Extreme, Cruiser® 5FS
327 Plant Science Building	KY09C-1245-99-12-3	Vibrance™ Extreme, Cruiser® 5FS
Lexington, KY 40546-0312		
UniSouth Genetics, Inc.	<b>USG 3118</b>	USG, Inc. Treatment (thiabendazole, metalaxyl, imidacloprid)
3205-C Highway 46S	<b>USG 3197</b>	USG, Inc. Treatment (thiabendazole, metalaxyl, imidacloprid)
Dickson, TN 37055	<b>USG 3228</b>	USG, Inc. Treatment (thiabendazole, metalaxyl, imidacloprid)
	<b>USG 3316</b>	USG, Inc. Treatment (thiabendazole, metalaxyl, imidacloprid)
	<b>USG 3329</b>	USG, Inc. Treatment (thiabendazole, metalaxyl, imidacloprid)
	<b>USG 3404</b>	USG, Inc. Treatment (thiabendazole, metalaxyl, imidacloprid)
	<b>USG 3458</b>	USG, Inc. Treatment (thiabendazole, metalaxyl, imidacloprid)
	<b>USG 3536</b>	USG, Inc. Treatment (thiabendazole, metalaxyl, imidacloprid)
	<b>USG 3790</b>	USG, Inc. Treatment (thiabendazole, metalaxyl, imidacloprid)
	<b>USG 3895</b>	USG, Inc. Treatment (thiabendazole, metalaxyl, imidacloprid)
Virginia Tech and the Virginia	12VTK17-132	Raxil®MD Pro + Gaucho 600
Crop Improvement Association	12VTK17-159	Raxil®MD Pro + Gaucho 600
9142 Atlee Station Road	12VTK17-55	Raxil®MD Pro + Gaucho 600
Mechanicsville, VA 23111	13VTK429-3	Raxil®MD Pro + Gaucho 600
	13VTK434-89	Raxil®MD Pro + Gaucho 600
	13VTK59-55	Raxil®MD Pro + Gaucho 600
	14VDH-SRW06-207	Raxil®MD Pro + Gaucho 600
	15VDH-FHB-MAS22-14	Raxil®MD Pro + Gaucho 600
	15VDH-FHB-MAS22-15	Raxil®MD Pro + Gaucho 600
	15VDH-FHB-MAS25-08	Raxil®MD Pro + Gaucho 600
	15VDH-FHB-MAS33-30	Raxil®MD Pro + Gaucho 600
	15VDH-FHB-MAS41-13	Raxil®MD Pro + Gaucho 600
	15VDH-SRW02-075	Raxil®MD Pro + Gaucho 600
	DH11SRW066-153†	Raxil®MD Pro + Gaucho 600
	DH12SRW057-006	Raxil®MD Pro + Gaucho 600
	DH12SRW057-081	Raxil®MD Pro + Gaucho 600
	DH13SRW021-70	Raxil®MD Pro + Gaucho 600
	DH13SRW022-23	Raxil®MD Pro + Gaucho 600
	DH13SRW023-201	Raxil®MD Pro + Gaucho 600
	DH13SRW025-14	Raxil®MD Pro + Gaucho 600
	<b>Hilliard</b>	Raxil®MD Pro + Gaucho 600
	<b>Liberty 5658</b>	Raxil®MD Pro + Gaucho 600
	<b>Massey</b>	Raxil®MD Pro + Gaucho 600
	VA09MAS1-12-5-1-1	Raxil®MD Pro + Gaucho 600
	VA09MAS2-131-6-2	Raxil®MD Pro + Gaucho 600

**Entries in 2018-19 Virginia Wheat Test, arranged by company.**

<b>Company</b>	<b>Line</b>	<b>Seed Treatment reported by company</b>
	VA11MAS2-68-4-1-3	Raxil@MD Pro + Gaucho 600
	VA11MAS2-92-3-2-2	Raxil@MD Pro + Gaucho 600
	VA12MAS11-779-5-2	Raxil@MD Pro + Gaucho 600
	VA12MAS7-519-1-3WS	Raxil@MD Pro + Gaucho 600
	VA13W-38	Raxil@MD Pro + Gaucho 600
	VA15W-86	Raxil@MD Pro + Gaucho 600
	VA16W-105†	Raxil@MD Pro + Gaucho 600
	VA16W-108†	Raxil@MD Pro + Gaucho 600
	VA16W-124†	Raxil@MD Pro + Gaucho 600
	VA16W-148	Raxil@MD Pro + Gaucho 600
	VA16W-149	Raxil@MD Pro + Gaucho 600
	VA16W-196	Raxil@MD Pro + Gaucho 600
	VA16W-202	Raxil@MD Pro + Gaucho 600
	VA16W-224	Raxil@MD Pro + Gaucho 600
	VA16W-29	Raxil@MD Pro + Gaucho 600
	VA17W-126	Raxil@MD Pro + Gaucho 600
	VA17W-167	Raxil@MD Pro + Gaucho 600
	VA17W-176	Raxil@MD Pro + Gaucho 600
	VA17W-74	Raxil@MD Pro + Gaucho 600
	VA17W-75	Raxil@MD Pro + Gaucho 600
	VA17W-79†	Raxil@MD Pro + Gaucho 600
Winfield United	<b>CROPLAN CP8550</b>	Warden Cereals II, Resonate® 480 ST
1080 County Road F West, MS 5850	<b>CROPLAN CP8800</b>	Warden Cereals II, Resonate® 480 ST
Shoreview, MN 55126-2910	<b>CROPLAN CP9415</b>	Warden Cereals II, Resonate® 480 ST
	<b>CROPLAN CP9606</b>	Warden Cereals II, Resonate® 480 ST

Released cultivars are shown in bold print.

**Table 24. Summary of performance of entries in the Virginia Tech Wheat Test over location, 2019 harvest.**

Line	Grain Yield (Bu/a)		Test Weight (Lb/bu)		Date Headed (Julian)		Mature Height (In)		Plant Lodging (0-9)		Leaf Rust (0-9)		Powdery Mildew (0-9)		BYD Virus <sup>1</sup> (0-9)		Deer Damage (%)		FHB Index <sup>2</sup> (0-9)		Hessian Fly Res. <sup>3</sup>		Awns <sup>4</sup>	
	(6)		(6)		(2)		(3)		(5)		(2)		(1)		(1)		(1)		(1)		(1)			
<b>SY Viper</b>	92.6	+	59.2	+	118	-	34	+	1		4	+	0		2		0		1		None		AL	
<b>Pioneer 26R59</b>	91.8	+	57.4		120		30	-	0		5	+	0		3		0		3		None		AL	
PGX 18-8	91.6	+	57.9		121	+	31		0		3	+	0		1		0		2		---		A	
KWS19X09	90.2	+	57.3	-	119	-	32		1		4	+	0		1		0		2		BCD		A	
Dyna-Gro WX19712	89.9	+	57.0	-	120		32		0		1		0		1		0		2		---		A	
<b>USG 3316</b>	89.8	+	57.7		122	+	32		1		4	+	3	+	3		0		1		None		A	
PGX 18-7	89.8	+	58.6	+	120		32		0		2		0		3		0		2		---		A	
Armor ARW1813	89.7	+	57.1	-	120		32		0		4	+	0		3		0		1		---		A	
<b>SY 100</b>	89.3	+	55.8	-	121	+	31		1		4	+	1		2		0		2		---		TA	
SR 8144	89.2	+	57.1	-	117	-	32		1		1	-	1		1		0		3		---		TA-AL	
VA15W-86	89.1	+	57.7		119	-	32		1		1	-	0		1		0		5	+	None		A	
<b>USG 3790</b>	89.0	+	58.0		122	+	31		0		4	+	0		1		1		2		None		A	
<b>#Warrior</b>	89.0	+	57.0	-	120		31		0		4	+	1		2		5		3		BDL		AL	
<b>Pioneer 26R36</b>	88.7	+	57.8		121	+	31		1		1	-	4	+	1		0		1		BDL		A	
<b>MBX 17-M-245</b>	88.5	+	57.1	-	120		32		0		4	+	0		2		0		3		BCDL		AL	
15VDH-FHB-MAS25-08	88.5	+	58.6	+	117	-	31		1		1	-	0		1		0		1		BCDL		A	
<b>Dyna-Gro 9941</b>	88.5	+	56.4	-	122	+	33		0		4	+	1		2		0		1		BDL		A	
L11814	88.4	+	56.5	-	118	-	29	-	2	+	1	-	0		2		0		1		B		AL	
<b>Pioneer 26R10</b>	88.4	+	57.3	-	121	+	32		0		4	+	1		2		0		2		BCDL		A	
VA17W-176	88.3	+	58.6	+	119	-	31		0		1	-	3	+	1		3		2		None		TA-AL	
VA16W-148	88.3	+	59.0	+	123	+	33		1		2		1		2		0		2		B		AL	
<b>USG 3458</b>	88.1	+	56.9	-	120		31		1		4	+	0		2		6	+	3		BDL		AL	
VA17W-75	88.1	+	58.7	+	118	-	33		1		1		0		2		0		1		BCD		TA	
VA09MAS1-12-5-1-1	88.0	+	59.4	+	121	+	32		1		1	-	0		1		0		4		None		A	
AgriMAXX Exp 1902	87.9	+	56.9	-	121	+	31		0		3	+	3	+	2		0		1		---		A	
VA17W-167	87.9	+	57.6		122	+	33	+	1		1	-	0		2		0		5	+	None		TA-AL	
<b>#Blaze</b>	87.8	+	57.5		120		33		1		4	+	1		3	+	0		2		None		A	
<b>USG 3329</b>	87.7	+	57.6		119	-	33		0		4	+	0		3		0		4		Het-B		A	

**Table 24. Summary of performance of entries in the Virginia Tech Wheat Test over location, 2019 harvest.**

Line	Grain Yield (Bu/a)		Test Weight (Lb/bu)		Date Headed (Julian)		Mature Height (In)		Plant Lodging (0-9)		Leaf Rust (0-9)		Powdery Mildew (0-9)		BYD Virus <sup>1</sup> (0-9)		Deer Damage (%)		FHB Index <sup>2</sup> (0-9)		Hessian Fly Res. <sup>3</sup>		Awns <sup>4</sup>	
	(6)		(6)		(2)		(3)		(5)		(2)		(1)		(1)		(1)		(1)		(1)			
<b>AgriMAXX 486</b>	87.3	+	57.2	-	123	+	33		0		4	+	1		2		0		4		BDL		A	
VA16W-149	87.3	+	58.0		122	+	31		1		1	-	0		2		0		2		None		AL	
<b>MAS #86</b>	87.0		56.7	-	121	+	33		1		3		1		1		0		1		BCDL		A	
15VDH-FHB-MAS41-13	86.8		61.1	+	117	-	35	+	0		1	-	0		1		0		2		BCDL		A	
13VTK429-3	86.8		58.4	+	122	+	32		0		1		0		1	-	0		3		BC		A	
<b>USG 3895</b>	86.6		57.2	-	121	+	30	-	1		1		3	+	2		0		3		Het BC		A	
VA16W-202	86.6		56.7	-	119	-	31	-	0		1	-	0		1		0		2		BCDL		TA	
<b>USG 3197</b>	86.5		56.1	-	119	-	33	+	1		1		2		1		0		0		None		A	
<b>USG 3404</b>	86.4		57.1	-	122	+	32		1		3	+	2	+	1		0		1		None		A	
VA09MAS2-131-6-2	86.3		58.1		118	-	28	-	0		1	-	0		1		0		1		None		AL	
Armor ARW1819	86.3		57.9		121	+	31		1		3		0		1		0		1		---		A	
Dyna-Gro WX19714	86.2		56.6	-	121	+	32		0		5	+	0		3	+	0		1		---		A	
<b>Armor Velocity</b>	86.1		58.2		119	-	32		1		3		3	+	3		0		1		BCDL		A	
KY07C-1145-94-12-5	86.0		59.0	+	119	-	33		1		4	+	0		2		0		3		Het-C		TA	
L11718	86.0		56.2	-	120		33		1		1		0		2		0		1		None		TA	
<b>MAS #61</b>	85.7		57.5		119	-	31	-	2	+	2		2		2		0		1		None		A	
DH13SRW022-23	85.7		58.0		122	+	32		1		1	-	0		1	-	0		1		None		TA	
<b>AgriMAXX 495</b>	85.6		58.6	+	121		32		0		3		1		3		0		1		BDL		A	
<b>LW2958</b>	85.5		58.1		121	+	34	+	1		2		0		3		0		1		---		A	
<b>AgriMAXX 415</b>	85.5		58.9	+	120		33		1		3	+	2		2		0		2		None		A	
<b>Dyna-Gro 9600</b>	85.5		56.7	-	119	-	33		0		1		0		2		0		1		B		A	
<b>Dyna-Gro 9811</b>	85.3		57.6		120		33		1		1	-	0		3		0		2		BCD		A	
<b>CROPLAN CP9606</b>	85.2		56.8	-	120		32		0		3		0		3		0		3		BDL		A	
<b>SY 007</b>	85.2		58.1		118	-	32		0		2		0		3		0		2		---		A	
<b>Pioneer 26R45</b>	85.1		58.0		121	+	34	+	1		2		2		3		0		0		BDL		TA-AL	
<b>MAS #35</b>	85.0		57.0	-	122	+	32		1		4	+	1		2		0		1		---		A	
VA17W-74	84.8		58.8	+	118	-	33		1		1	-	0		1		1		1		BCD		AL	
VA16W-29	84.8		57.2	-	123	+	33		0		4	+	0		1		0		1		BCDL		AL	

**Table 24. Summary of performance of entries in the Virginia Tech Wheat Test over location, 2019 harvest.**

Line	Grain Yield (Bu/a)	Test Weight (Lb/bu)	Date Headed (Julian)	Mature Height (In)	Plant Lodging (0-9)	Leaf Rust (0-9)	Powdery Mildew (0-9)	BYD Virus <sup>1</sup> (0-9)	Deer Damage (%)	FHB Index <sup>2</sup> (0-9)	Hessian Fly Res. <sup>3</sup>	Awns <sup>4</sup>
	(6)	(6)	(2)	(3)	(5)	(2)	(1)	(1)	(1)	(1)	(1)	
L11719	84.7	57.8	122 +	30 -	0	3	0	2	0	0	None	A
VA16W-224	84.6	56.5 -	123 +	34 +	1	2	0	1	0	2	None	TA
<b>Shirley</b>	84.6	56.9 -	121 +	31	1	1	0	2	1	3	None	AL
<b>#Berkeley</b>	84.6	57.0 -	118 -	32	1	1	0	2	0	3	BCDL	A
DH12SRW057-006	84.4	59.8 +	122 +	30 -	0	1 -	0	1 -	0	4	None	AL
VA16W-108†	84.4	57.7	121	33	1	1	1	1	0	1	BL	AL
PGX 17-16	84.4	58.6 +	120	32	0	3	1	2	0	1	BDL	A
<b>AgriMAXX 463</b>	84.4	56.4 -	119 -	31	0	3	1	1	1	0	None	TA
<b>Liberty 5658</b>	84.3	58.6 +	118 -	33	1	1	0	1	0	1	None	A
<b>Pioneer 26R41</b>	84.3	57.5	122 +	31 -	1	1 -	1	1	0	2	BCDL	A
15VDH-SRW02-075	84.3	57.7	122 +	33	1	1 -	0	1	0	2	None	A
<b>MBX 969</b>	84.2	56.5 -	121 +	32	0	4 +	1	2	0	1	---	A
<b>Dyna-Gro 9772</b>	84.0	56.4 -	119 -	32	1	1 -	1	2	0	1	None	A
DH12SRW057-081	83.9	59.0 +	119 -	31 -	1	1 -	1	2	3	2	None	TA
<b>LW2937</b>	83.9	56.6 -	122 +	32	1	4 +	2	3	0	1	---	A
PGX 18-2	83.8	58.7 +	118 -	32	0	1	0	2	0	1	None	A
VA16W-124†	83.7	58.2	119 -	31	1	1 -	0	1	0	1	BCDL	A
<b>Hilliard</b>	83.7	57.6	120	34 +	0	1	0	1	0	1	BCD	A
<b>Dyna-Gro 9980</b>	83.5	58.8 +	118 -	31	0	5 +	1	2	0	0	None	A
15VDH-FHB-MAS22-15	83.5	59.0 +	115 -	32	1	1 -	0	1	0	1	BCDL	TA
Dyna-Gro WX19711	83.3	58.2 +	122 +	31	0	3 +	0	3	0	1	None	A
<b>Featherstone 31</b>	83.2	58.1	121 +	31	1	1 -	0	2	0	5 +	BCD	A
GA09129-16E55	83.2	59.0 +	117 -	33	0	1	1	3	0	3	BCD	A
<b>MBX 932</b>	83.1	57.9	123 +	31	1	4 +	2	2	16 +	1	---	AL
<b>AgriMAXX 473</b>	83.0	56.9 -	121 +	34 +	0	1 -	0	2	0	1	BDL	A
<b>SH 7510</b>	83.0	58.0	121 +	32	1	2	1	2	0	2	None	A
VA17W-79	83.0	57.8	119 -	33	1	1 -	1	1	0	2	None	A
<b>Dyna-Gro 9932</b>	82.8	58.3 +	121 +	33	0	3	0	1	0	1	BDL	A

**Table 24. Summary of performance of entries in the Virginia Tech Wheat Test over location, 2019 harvest.**

	Grain Yield	Test Weight	Date Headed	Mature Height	Plant Lodging	Leaf Rust	Powdery Mildew	BYD Virus <sup>1</sup>	Deer Damage	FHB Index <sup>2</sup>	Hessian Fly Res. <sup>3</sup>							
Line	(Bu/a)	(Lb/bu)	(Julian)	(In)	(0-9)	(0-9)	(0-9)	(0-9)	(%)	(0-9)		Awns <sup>4</sup>						
	(6)	(6)	(2)	(3)	(5)	(2)	(1)	(1)	(1)	(1)	(1)							
Dyna-Gro 9701	82.6	57.0	-	122	+	34	+	1	2	0	2	0	1	BDL	A			
VA16W-105†	82.6	56.8	-	121		32		1	1	0	2	0	4	BCDL	A			
KWS19X03	82.6	56.8	-	124	+	30	-	1	2	1	2	0	2	CD	TA			
GA071518-16E39	82.5	58.3	+	119	-	32		0	2	0	2	0	7	+	BCDL	A		
MAS #105	82.5	57.8		122	+	31		0	3	1	3	8	+	1	---	AL		
USG 3228	82.4	56.4	-	119	-	31		0	3	3	+	2	3	0	None	TA		
DH11SRW066-153†	82.3	59.2	+	123	+	33		1	2	0	1	3	3		BDL	A		
AgriMAXX Exp 1906	82.2	57.5		119	-	32		0	1	-	0	3	0	1	---	A		
15VDH-FHB-MAS22-14	82.1	60.5	+	119	-	32		1	1	-	0	1	0	0	None	TA		
AgriMAXX 485	82.1	57.7		122	+	30	-	0	3	+	2	+	2	11	+	BDL	TA	
LW2848	82.1	56.8	-	122	+	34	+	1	2		1	1	0	0	---	A		
KY09C-1245-99-12-3	82.0	57.4		119	-	32		0	2		0	3	+	0	1	None	AL	
USG 3118	81.8	58.6	+	118	-	30	-	0	1	-	0	3		0	2	BCDL	Long AL	
CROPLAN CP9415	81.8	57.4		122	+	31		0	5	+	2	+	4	+	0	3	BDL	A
LW2867	81.8	57.7		123	+	32		1	4	+	0	3	+	0	1	---	TA	
VA13W-38	81.7	58.3	+	117	-	31		0	1		0	1		0	0	None	A	
Dyna-Gro 9750	81.5	56.2	-	119	-	31		0	3		2	3		0	0	None	TA	
VA12MAS7-519-1-3WS	81.5	55.8	-	123	+	32		1	1		1	1		0	2	None	A	
MAS #108	81.4	57.6		119	-	31		1	1		0	3		0	3	---	A	
#Bullet	81.3	56.7	-	122	+	33		1	1		0	2		0	0	BDL	A	
SH 4400	81.1	57.7		123	+	33		1	5	+	3	+	3		0	2	BCDL	TA
MAS #7	81.0	57.4		119	-	33		1	2		1	5	+	0	5	+	None	TA
TX15D9597	81.0	58.5	+	118	-	33	+	1	1		0	3	+	0	5	+	BCDL	A
DH13SRW021-70	81.0	56.9	-	120		30	-	0	1	-	0	1		0	1		None	TA
VA16W-196	80.9	57.6		125	+	29	-	0	1	-	0	1		0	2	B	TA	
Armor Mayhem	80.9	57.6		121	+	32		1	3		0	3		0	1		BCDL	A
TX15D9253	80.8	55.8	-	118	-	32		1	1	-	0	2		0	6	+	None	A
MAS #67	80.8	56.4	-	120		31	-	0	2		1	2		0	0		---	TA

**Table 24. Summary of performance of entries in the Virginia Tech Wheat Test over location, 2019 harvest.**

	Grain Yield	Test Weight	Date Headed	Mature Height	Plant Lodging	Leaf Rust	Powdery Mildew	BYD Virus <sup>1</sup>	Deer Damage	FHB Index <sup>2</sup>	Hessian Fly Res. <sup>3</sup>	
Line	(Bu/a)	(Lb/bu)	(Julian)	(In)	(0-9)	(0-9)	(0-9)	(0-9)	(%)	(0-9)		Awns <sup>4</sup>
	(6)	(6)	(2)	(3)	(5)	(2)	(1)	(1)	(1)	(1)	(1)	
13VTK434-89	80.6	59.5	+ 119 -	35 +	0	1 -	0	2	0	2	BCD	A
VA11MAS2-92-3-2-2	80.6	58.8	+ 123 +	31	1	1 -	2 +	1	0	2	BCD	AL
15VDH-FHB-MAS33-30	80.6	59.7	+ 117 -	31	1	1 -	0	2	0	3	None	A
MAS #316	80.4	57.1	- 123 +	33	1	4 +	2	3	0	1	BDL	A
VA17W-126	80.3	57.7	119 -	34 +	1	1 -	0	2	0	1	None	AL
VA11MAS2-68-4-1-3	80.2	58.5	+ 118 -	27 -	0	1 -	0	1	0	4 +	BCDL	AL
CROPLAN CP8800	80.1	56.5	- 121	33	0	1	1	2	0	3	BDL	A
KWS19X08	80.0	58.1	121 +	33	0	1 -	0	3	0	3	CD	A
SH 7200	80.0	58.0	118 -	33	1	1 -	0	3	0	6 +	BCDL	A
USG 3536	79.9	56.6	- 121 +	33	1	1	0	2	0	3	BDL Het-C	A
MAS #116	79.9	57.4	122 +	34 +	1	1	0	3	0	1	BDL	A
Armor Venom	79.7	- 57.8	121 +	32	1	3	1	3	0	1	BCDL	A
13VTK59-55	79.6	- 58.7	+ 121	30 -	0	1 -	1	1	6	3	BCDL	TA
12VTK17-159	79.5	- 57.0	- 120	33	1	1	0	1	0	3	B	A
12VTK17-132	79.3	- 58.5	+ 119 -	32	0	1	0	1	0	2	None	AL
DH13SRW025-14	79.2	- 56.4	- 118 -	30 -	0	1 -	0	1	0	1	None	A
MBX 17-P-275	79.2	- 56.3	- 120	31	1	3	1	2	0	0	B	TA
NC14-20369	79.1	- 58.6	+ 119 -	35 +	2 +	1 -	0	1	0	3	BCDL	AL
14VDH-SRW06-207	79.1	- 58.1	122 +	32	1	1 -	0	1	0	2	None	AL
VA12MAS11-779-5-2	79.0	- 58.1	121 +	32	1	2	0	1	0	2	None	Long-AL
TX15D9579	78.7	- 57.1	- 119 -	33	0	1 -	0	2	0	5 +	None	A
12VTK17-55	78.4	- 58.1	123 +	31	0	1 -	0	1	0	1	None	A
SY 576	77.9	- 56.2	- 125 +	33 +	0	1	4 +	1	0	1	---	A
AgriMAXX 480	77.8	- 59.3	+ 117 -	33	0	2	0	4 +	0	1	None	A
#Turbo	77.7	- 56.7	- 118 -	32	0	2	0	1	0	2	BCDL	TA
SY 547	77.3	- 57.8	120	33 +	1	2	0	3	0	2	C	TA
MAS #106	76.5	- 57.8	115 -	31	0	3	3 +	3	0	0	---	AL
CROPLAN CP8550	76.2	- 56.8	- 122 +	34 +	1 +	2	0	3 +	0	1	BDL	A

**Table 24. Summary of performance of entries in the Virginia Tech Wheat Test over location, 2019 harvest.**

Line	Grain Yield (Bu/a)		Test Weight (Lb/bu)		Date Headed (Julian)		Mature Height (In)		Plant Lodging (0-9)		Leaf Rust (0-9)		Powdery Mildew (0-9)		BYD Virus <sup>1</sup> (0-9)		Deer Damage (%)		FHB Index <sup>2</sup> (0-9)		Hessian Fly Res. <sup>3</sup>		Awns <sup>4</sup>
	(6)		(6)		(2)		(3)		(5)		(2)		(1)		(1)		(1)		(1)		(1)		
TX15D9608	76.0	-	57.4		116	-	30	-	1		1	-	0		4	+	0		5	+	BCD		A
GA09436-16LE12	75.9	-	60.5	+	119	-	33	+	1		1	-	0		2		0		6	+	None		A
<b>MAS #6</b>	75.9	-	56.5	-	120		30	-	0		3	+	1		4	+	0		2		---		A
DH13SRW023-201	74.3	-	61.3	+	121	+	33		0		1	-	0		2		0		1		None		A
NC15-21834	72.8	-	59.0	+	121	+	34	+	1	+	1	-	0		2		0		2		Het-B		A
NC13-21213	72.5	-	58.3	+	120		33		1		1		0		3		0		4		BCDL		TA
<b>Massey</b>	72.4	-	58.6	+	120		35	+	1		7	+	0		1		0		2		B		AL
NC14-23372	70.0	-	59.3	+	123	+	33		1		1		0		3		0		3		BCD		A
Average	83.4		57.7		120		32		1		2		0		2		0		2				
LSD (0.05)	3.7		0.4		1		1		1		1		1		1		5		2				
C.V.	7.6		1.3		1		5		202		43		125		37		848		80				

Released cultivars are shown in bold print.

Varieties are ordered by descending yield averages.

A plus or minus sign indicates a performance significantly above or below the test average.

The 0-9 ratings indicate a genotype's response to disease or lodging where 0 = highly resistant and

9 = highly susceptible.

The number in parentheses below column headings indicates the number of locations on which data are based.

<sup>1</sup> BYD = Barley Yellow Dwarf Virus.

<sup>2</sup> FHB (fusarium head blight) Index is an overall indicator of scab resistance/susceptibility level and takes into account both incidence and severity; 0 = highly resistant and 9 = highly susceptible.

<sup>3</sup> Seedlings were screened for resistance to biotypes B, C, D, O, and L of Hessian Fly. Letter in column indicates varietal resistance.

"---" indicates seed either had been treated with insecticide or was otherwise unavailable for screening.

<sup>4</sup> A=awned, AL=awnletted, LAL=long awnletted, TA=tip awned.

**Table 25. Two-year average summary of performance of entries in the Virginia Tech Wheat Tests, 2018 and 2019 harvests.**

Line	Grain Yield (Bu/a)		Test Weight (Lb/bu)		Date Headed (Julian)		Mature Height (In)		Plant Lodging (0-9)		Powdery Mildew (0-9)		FHB Index <sup>1</sup> (0-9)
	(10)		(11)		(4)		(6)		(8)		(5)		(2)
<b>SY Viper</b>	84.1	+	57.6	+	121	-	36	+	3	+	1		3
<b>Pioneer 26R59</b>	84.0	+	55.7		123	-	31	-	1	-	1	-	4 +
VA16W-148	82.5	+	57.1	+	125	+	34		2		1	-	2
L11719	82.3	+	56.4		124	+	31	-	2		1	-	3
<b>MBX 17-M-245</b>	82.2	+	55.1	-	122	-	33		1		1		4
<b>USG 3316</b>	82.1	+	55.6	-	124	+	34		1		5	+	2 -
USG 3329	81.9	+	55.8		123	-	34		2		1		3
13VTK429-3	81.9	+	57.1	+	124	+	33		1		1	-	3
VA16W-202	81.8	+	54.8	-	122	-	31	-	2		0	-	3
<b>#Warrior</b>	81.7	+	55.3	-	122	-	33		1		2		4 +
<b>MAS #86</b>	81.7	+	55.0	-	123		35	+	2		2		1 -
<b>Dyna-Gro 9941</b>	81.6	+	54.8	-	124	+	33		1		3	+	2
<b>AgriMAXX 486</b>	81.6	+	55.8		125	+	35	+	2		2	+	2 -
<b>USG 3895</b>	81.5	+	55.5	-	123		31	-	1		4	+	4 +
<b>AgriMAXX 415</b>	81.2	+	57.5	+	123	-	34		2		3	+	3
<b>#Berkeley</b>	81.1	+	55.7		122	-	33		2		1		4 +
<b>Pioneer 26R10</b>	81.0	+	55.9		124	+	34		1		3	+	3
VA09MAS2-131-6-2	80.7		56.5	+	121	-	29	-	1	-	1	-	3
<b>USG 3197</b>	80.7		54.5	-	122	-	34		1		3	+	1 -
<b>USG 3458</b>	80.5		55.2	-	122	-	33		2		2		5 +
<b>Liberty 5658</b>	80.4		57.0	+	122	-	35	+	2		2		2
<b>#Blaze</b>	80.3		55.6		123	-	34		3	+	2		2
VA16W-149	80.3		55.8		124	+	33		2		1		3
<b>Dyna-Gro 9772</b>	80.1		54.7	-	122	-	34		2		3	+	1 -
VA16W-224	79.7		55.0	-	125	+	35	+	1		1	-	4
PGX 17-16	79.7		56.9	+	124		34		1		1	-	2
<b>Shirley</b>	79.3		55.4	-	124	+	33		1		0	-	4 +
<b>CROPLAN CP9606</b>	79.2		55.2	-	122	-	34		1		3	+	4
VA09MAS1-12-5-1-1	79.0		58.3	+	124	+	33		2		3	+	5 +
DH12SRW057-081	78.8		57.7	+	122	-	32	-	2		3	+	3
<b>Pioneer 26R41</b>	78.8		55.7		124	+	32	-	1		2		3
<b>AgriMAXX 495</b>	78.5		55.9		123	-	33		1		2		3
VA16W-29	78.4		56.0		125	+	34		1		0	-	4 +
<b>MAS #61</b>	78.4		55.6	-	122	-	32	-	3	+	3	+	2
<b>Pioneer 26R36</b>	78.2		56.2		124	+	33		2		6	+	2
<b>AgriMAXX 473</b>	78.2		55.3	-	124	+	34		2		1	-	2
<b>USG 3404</b>	77.9		55.4	-	125	+	33		1		3	+	2
VA16W-124†	77.9		56.6	+	122	-	33		3		1	-	4 +
<b>AgriMAXX 463</b>	77.8		54.6	-	123	-	32	-	2		4	+	1 -
<b>USG 3228</b>	77.7		54.6	-	122	-	32	-	2		4	+	1 -

**Table 25. Two-year average summary of performance of entries in the Virginia Tech Wheat Tests, 2018 and 2019 harvests.**

Line	Grain Yield (Bu/a)	Test Weight (Lb/bu)	Date Headed (Julian)	Mature Height (In)	Plant Lodging (0-9)	Powdery Mildew (0-9)	FHB Index <sup>1</sup> (0-9)
	(10)	(11)	(4)	(6)	(8)	(5)	(2)
<b>MAS #316</b>	77.7	55.8	125 +	34 +	2	3 +	3
<b>Hilliard</b>	77.7	55.9	123 -	35 +	1	1 -	2 -
<b>Pioneer 26R45</b>	77.7	56.3	124	34	2	3 +	2
<b>Dyna-Gro 9811</b>	77.5	56.1	122 -	34	1	1 -	3
DH12SRW057-006	77.5	58.6 +	124 +	31 -	1	1 -	4 +
<b>Dyna-Gro 9600</b>	77.3	54.3 -	122 -	34	1	1	2
CROPLAN CP9415	77.3	56.1	125 +	33	1 -	4 +	5 +
<b>Featherstone 31</b>	77.2	56.7 +	124 +	33	3 +	1	5 +
<b>SH 7510</b>	76.9	55.8	124 +	34	2	2	3
<b>MAS #7</b>	76.8	56.1	123	34	2	2	4 +
<b>MAS #116</b>	76.8	55.8	124 +	35 +	1	1	3
<b>Dyna-Gro 9701</b>	76.7	55.4 -	124 +	35 +	2	1	2
<b>MBX 17-P-275</b>	76.6	54.4 -	123 -	32 -	2	4 +	1 -
<b>#Bullet</b>	76.5	55.3 -	124 +	34 +	2	1 -	2
<b>SY 547</b>	76.4	56.1	123 -	35 +	2	1 -	2
DH13SRW021-70	76.4	55.8	122 -	32 -	2	2	3
DH11SRW066-153†	76.2	57.9 +	125 +	34 +	2	1 -	3
VA16W-105†	76.1	54.6 -	124	33	2	1 -	3
<b>Dyna-Gro 9750</b>	75.9	54.5 -	123 -	33	2	4 +	2 -
<b>AgriMAXX 480</b>	75.6	57.7 +	119 -	34	2	1 -	4
<b>Armor Mayhem</b>	75.5	55.7	124 +	35 +	2	1 -	3
<b>DH13SRW025-14</b>	75.3	55.5 -	121 -	31 -	2	1 -	2 -
13VTK434-89	75.1 -	57.8 +	122 -	36 +	2	1 -	2
<b>USG 3118</b>	75.1 -	56.8 +	121 -	31 -	2	0 -	3
<b>SH 7200</b>	75.0 -	56.8 +	122 -	34	2	2	6 +
AgriMAXX 485	75.0 -	55.9	125 +	32 -	2	3 +	2 -
VA16W-196	74.9 -	55.9	127 +	32 -	1	1	3
<b>CROPLAN CP8550</b>	74.0 -	55.1 -	124 +	35 +	2	1	2
<b>#Turbo</b>	74.0 -	55.6 -	121 -	33	2	1	3
<b>SH 4400</b>	73.6 -	55.7	125 +	34 +	2	5 +	4
DH13SRW023-201	72.7 -	60.4 +	124 +	34	1	0 -	2
NC13-21213	69.0 -	56.8 +	123 -	34	3 +	2	5 +
<b>NC14-23372</b>	66.8 -	58.3 +	125 +	34	2	0 -	3
<b>Massey</b>	65.7 -	56.9 +	123	36 +	3 +	1 -	3
Average	78.0	56.0	123	33	2	2	3
LSD (0.05)	2.7	0.4	0	1	1	1	1
C.V.	8.4	1.8	1	5	92	40	32

Released cultivars are shown in bold print.

Varieties are ordered by descending yield averages.

A plus or minus sign indicates a performance significantly above or below the test average.

**Table 25. Two-year average summary of performance of entries in the Virginia Tech Wheat Tests, 2018 and 2019 harvests.**

Line	Grain Yield (Bu/a)	Test Weight (Lb/bu)	Date Headed (Julian)	Mature Height (In)	Plant Lodging (0-9)	Powdery Mildew (0-9)	FHB Index <sup>1</sup> (0-9)
	(10)	(11)	(4)	(6)	(8)	(5)	(2)

The 0-9 ratings indicate a genotype's response to disease or lodging where 0 = highly resistant and 9 = highly susceptible.

The number in parentheses below column headings indicates the number of location-years on which data are based.

<sup>1</sup> FHB (fusarium head blight) Index is an overall indicator of scab resistance/susceptibility level and takes into account both incidence and severity; 0 = highly resistant and 9 = highly susceptible.

**Table 26. Three-year average summary of performance of entries in the Virginia Tech Wheat Tests, 2017, 2018, and 2019 harvests.**

Line	Grain Yield (Bu/a)		Test Weight (Lb/bu)		Date Headed (Julian)		Mature Height (In)		Plant Lodging (0-9)		Leaf Rust (0-9)		Powdery Mildew (0-9)		BYD Virus <sup>1</sup> (0-9)		Stripe Rust (0-9)		Early Height (In)		FHB Index <sup>2</sup> (0-9)	
	(16)		(17)		(6)		(9)		(13)		(5)		(8)		(4)		(2)		(1)		(3)	
<b>MBX 17-M-245</b>	82.0	+	54.8	-	119	-	33		1	-	5	+	1	-	1		0		9		3	
<b>Pioneer 26R59</b>	81.2	+	55.5		119	-	31	-	1	-	4	+	1	-	2	+	0		9		3	
<b>USG 3458</b>	80.7	+	54.5	-	119	-	33		1		5	+	2		2		0		9		4	
<b>#Warrior</b>	79.9	+	54.9	-	119	-	33		1	-	5	+	2		1		0		9		4	
<b>AgriMAXX 415</b>	79.7	+	57.1	+	119	-	34		1		3		3	+	1		0		9		2	
<b>USG 3895</b>	79.5	+	55.2		120		32	-	1		1	-	4	+	1	-	0		9		3	
<b>AgriMAXX 473</b>	79.1	+	55.4		120	+	34	+	2		1	-	1	-	2		1		10		2	
<b>Pioneer 26R45</b>	78.8	+	55.8		120		34		2	+	2	-	2		2		0		8	-	2	
<b>#Berkeley</b>	78.7		55.4		118	-	33		2		2		1	-	1		0		11		3	
<b>CROPLAN CP9606</b>	78.4		55.1	-	119	-	33		2		3		2		1		0		9		3	
<b>Pioneer 26R10</b>	78.3		55.4		121	+	33		1	-	5	+	3	+	2		0		10		2	
<b>SY Viper</b>	78.3		57.2	+	118	-	35	+	3	+	4	+	1	-	2		0		11		3	
<b>VA09MAS1-12-5-1-1</b>	78.1		58.2	+	121	+	33		3	+	1	-	3	+	1		0		11		4	
<b>VA09MAS2-131-6-2</b>	78.1		55.9		117	-	28	-	1	-	1	-	1	-	1		0		10		3	
<b>#Blaze</b>	77.8		55.4		119		34		3	+	5	+	2	-	2	+	0		8	-	2	
<b>USG 3316</b>	77.8		55.2		121	+	34	+	1		6	+	5	+	2		3	+	9		1	
<b>MAS #116</b>	77.7		55.8		121	+	35	+	2		1	-	1	-	1		0		10		2	
<b>Pioneer 26R41</b>	77.6		55.5		121	+	32	-	1	-	2	-	1	-	1		0		10		3	
<b>Dyna-Gro 9701</b>	77.6		55.5		120	+	35	+	2		2	-	1	-	2		0		10		2	
<b>#Bullet</b>	77.5		55.3		121	+	35	+	2		1	-	1	-	1		0		9		2	
<b>USG 3404</b>	77.5		55.3		121	+	33		1		3		2		1	-	0		10		2	
<b>MAS #61</b>	77.5		55.2		118	-	32	-	3	+	2		3	+	1		1		9		2	
<b>CROPLAN CP9415</b>	77.3		55.9		122	+	33		1	-	4	+	3	+	2		0		9		3	
<b>SH 7510</b>	77.3		56.1	+	121	+	33		2	+	1	-	2		1		0		10		2	
<b>Armor Mayhem</b>	77.3		55.7		121	+	35	+	2		2		1	-	2		0		10		2	
<b>USG 3197</b>	77.1		53.8	-	119	-	34	+	2		1	-	3	+	1	-	1	+	10		1	-
<b>Shirley</b>	77.1		55.0	-	120	+	32	-	1		1	-	0	-	1		5	+	11		4	+
<b>Hilliard</b>	76.7		55.8		119		34	+	1		2	-	1	-	1	-	0		11		2	

**Table 26. Three-year average summary of performance of entries in the Virginia Tech Wheat Tests, 2017, 2018, and 2019 harvests.**

Line	Grain Yield (Bu/a)	Test Weight (Lb/bu)	Date Headed (Julian)	Mature Height (In)	Plant Lodging (0-9)	Leaf Rust (0-9)	Powdery Mildew (0-9)	BYD Virus <sup>1</sup> (0-9)	Stripe Rust (0-9)	Early Height (In)	FHB Index <sup>2</sup> (0-9)
	(16)	(17)	(6)	(9)	(13)	(5)	(8)	(4)	(2)	(1)	(3)
<b>CROPLAN CP8550</b>	76.7	55.3	121 +	35 +	2	1 -	1 -	1	0	10	2
<b>Dyna-Gro 9772</b>	76.7	53.9 -	119 -	34 +	2	2	3 +	2	0	10	1 -
<b>Featherstone 31</b>	76.6	56.4 +	120 +	33	3 +	1 -	1 -	2	1	9	4 +
<b>AgriMAXX 463</b>	76.5	54.3 -	119 -	32 -	2	3	4 +	1	0	9	1 -
<b>Liberty 5658</b>	76.4	56.8 +	119 -	34 +	2	1 -	2	1	0	12 +	2
<b>Dyna-Gro 9811</b>	76.2	55.9	119 -	34	1	1 -	1 -	2	0	12 +	3
<b>MAS #316</b>	76.0	55.6	122 +	35 +	2	4 +	3 +	2	0	8 -	2
<b>DH12SRW057-006</b>	75.7	58.5 +	121 +	31 -	1	1 -	0 -	1	0	9	3
<b>Dyna-Gro 9600</b>	75.6	53.9 -	118 -	34	1	1 -	1 -	2	3 +	10	2
<b>MAS #7</b>	75.2	56.0	120 +	34 +	2	4 +	1 -	2 +	0	8 -	3
<b>Pioneer 26R36</b>	75.2	55.9	120 +	33	2	2	6 +	1 -	0	9	2
<b>USG 3228</b>	74.8	54.4 -	119 -	32 -	2	2	4 +	1	0	11	0 -
<b>Dyna-Gro 9750</b>	74.6	54.3 -	119 -	32 -	2	3	3 +	2	0	10	1
<b>MBX 17-P-275</b>	74.3	54.2 -	119 -	32 -	2	3	3 +	1	0	11	0 -
<b>SH 7200</b>	72.9 -	56.5 +	118 -	34	2	1 -	2	2	2 +	13 +	5 +
<b>SY 547</b>	72.7 -	56.1 +	119 -	34 +	2	2	0 -	3 +	1	11	2
<b>USG 3118</b>	72.0 -	56.4 +	118 -	30 -	2	0 -	0 -	2	0	13 +	3
<b>#Turbo</b>	71.6 -	55.6	118 -	32 -	2	1 -	1 -	1 -	0	12 +	2
<b>SH 4400</b>	69.6 -	55.6	122 +	35 +	2	4 +	4 +	2	0	9	3
<b>NC13-21213</b>	65.7 -	56.7 +	119	33	3 +	1 -	1 -	2	0	11	4 +
<b>Massey</b>	57.2 -	55.8	120	35 +	4 +	8 +	1 -	2	0	14 +	2
Average	76.3	55.6	120	33	2	3	2	2	0	10	2
LSD (0.05)	2.5	0.4	0	1	1	1	0	1	1	1	1
C.V.	9.4	2.2	1	5	81	44	39	45	221	10	74

Released cultivars are shown in bold print.

Varieties are ordered by descending yield averages.

A plus or minus sign indicates a performance significantly above or below the test average.

The 0-9 ratings indicate a genotype's response to disease or lodging where 0 = highly resistant and

**Table 26. Three-year average summary of performance of entries in the Virginia Tech Wheat Tests, 2017, 2018, and 2019 harvests.**

Line	Grain Yield (Bu/a)	Test Weight (Lb/bu)	Date Headed (Julian)	Mature Height (In)	Plant Lodging (0-9)	Leaf Rust (0-9)	Powdery Mildew (0-9)	BYD Virus <sup>1</sup> (0-9)	Stripe Rust (0-9)	Early Height (In)	FHB Index <sup>2</sup> (0-9)
	(16)	(17)	(6)	(9)	(13)	(5)	(8)	(4)	(2)	(1)	(3)

9 = highly susceptible.

The number in parentheses below column headings indicates the number of location-years on which data are based.

<sup>1</sup> BYD = Barley Yellow Dwarf Virus.

<sup>2</sup> FHB (fusarium head blight) Index is an overall indicator of scab resistance/susceptibility level and takes into account both incidence and severity; 0 = highly resistant and 9 = highly susceptible.

**Table 27. Summary of performance of entries in the Virginia Tech Wheat Test, Eastern VA AREC in Warsaw, VA, 2019 harvest.**

Line	3-year Av. Yield (Bu/a)		2-year Av. Yield (Bu/a)		Grain Yield (Bu/a)		Test Weight (Lb/bu)		Date Headed (Julian)		Mature Height (In)		Plant Lodging (0-9)	
<b>Pioneer 26R59</b>	91.9	+	87.5	+	99.6	+	56.5	-	116		29	-	1	
PGX 18-8	---		---		97.9	+	57.6		118	+	30		1	
VA17W-167	---		---		97.4	+	57.4		118	+	35	+	2	+
VA17W-176	---		---		96.1	+	58.4	+	116		32		1	
Armor ARW1819	---		---		95.7	+	57.4		118	+	31		0	-
SR 8144	---		---		93.9	+	57.4		112	-	33		1	
<b>#Warrior</b>	87.1	+	84.1	+	93.8	+	56.8		116		31		1	
VA17W-74	---		---		93.8	+	58.5	+	114	-	33		1	
DH13SRW022-23	---		---		93.4	+	58.0		117		33		1	
L11814	---		---		93.4	+	55.3	-	114	-	29	-	2	+
KWS19X03	---		---		93.2	+	57.4		120	+	29	-	0	-
VA16W-108†	---		---		93.0	+	58.1	+	116		34	+	2	+
VA16W-148	---		81.1		92.9	+	59.8	+	119	+	32		0	-
USG 3329	---		88.7	+	92.9	+	57.3		116		33		1	
DH12SRW057-081	---		83.3	+	92.8	+	58.9	+	114	-	30	-	1	
<b>USG 3316</b>	81.5		85.2	+	92.7	+	57.8		119	+	31		1	
<b>SY Viper</b>	87.2	+	82.6	+	92.6	+	59.6	+	113	-	34	+	1	
15VDH-SRW02-075	---		---		92.6	+	55.6	-	117		34	+	1	
KWS19X09	---		---		92.3	+	57.1		115	-	32		1	
VA16W-202	---		87.3	+	92.2	+	55.7	-	115	-	31		1	
VA15W-86	---		---		91.6	+	57.4		114	-	32		1	
<b>USG 3790</b>	---		---		91.5	+	57.1		118	+	31		0	
<b>Dyna-Gro 9600</b>	86.4	+	84.1	+	91.5	+	57.0		114	-	34	+	1	
VA17W-75	---		---		91.1	+	57.9		114	-	33		2	
VA16W-149	---		82.7	+	90.6	+	59.4	+	118	+	32		1	
<b>MBX 17-M-245</b>	88.3	+	83.9	+	90.5	+	56.4	-	116		31		1	
<b>USG 3458</b>	88.3	+	83.0	+	90.4		56.5	-	116		32		1	
15VDH-FHB-MAS41-13	---		---		90.0		62.2	+	113	-	36	+	1	
Dyna-Gro WX19712	---		---		89.9		55.7	-	116		31		1	
15VDH-FHB-MAS22-15	---		---		89.8		59.0	+	110	-	32		1	
<b>Pioneer 26R10</b>	86.7	+	84.1	+	89.6		57.4		118	+	32		0	
13VTK434-89	---		78.7		89.3		60.1	+	114	-	36	+	0	
<b>Liberty 5658</b>	84.2		81.9		89.2		58.3	+	114	-	33		1	
<b>#Blaze</b>	85.1		82.3		88.8		57.2		116		33		1	
AgriMAXX 485	---		78.9		88.5		57.0		119	+	30	-	1	
<b>Armor Velocity</b>	---		---		88.5		57.7		115	-	32		1	
<b>USG 3895</b>	88.1	+	84.8	+	88.4		57.2		117		31		0	
<b>Pioneer 26R45</b>	87.7	+	81.7		88.1		57.8		117	+	33		2	
DH12SRW057-006	84.7		81.6		88.1		60.2	+	118	+	30	-	1	
<b>Pioneer 26R36</b>	81.7		77.6		88.0		56.1	-	117		31		1	
VA16W-124†	---		78.0		87.8		57.7		115	-	32		2	+

**Table 27. Summary of performance of entries in the Virginia Tech Wheat Test, Eastern VA AREC in Warsaw, VA, 2019 harvest.**

	3-year		2-year	Grain	Test	Date	Mature	Plant	
Line	Av. Yield	Av. Yield		Yield	Weight	Headed	Height	Lodging	
	(Bu/a)	(Bu/a)		(Bu/a)	(Lb/bu)	(Julian)	(In)	(0-9)	
AgriMAXX 463	85.5	81.5		87.7	56.0	- 115	- 31	1	
VA09MAS2-131-6-2	83.2	80.3		87.5	58.4	+ 114	- 28	-	0
SY 100	---	---		87.3	55.3	- 117	31	1	
USG 3197	84.3	82.7	+	87.3	55.5	- 115	- 34	+	1
CROPLAN CP9606	87.6	+	81.4	87.0	55.5	- 116	32	1	
AgriMAXX 495	---	79.6		87.0	58.7	+	117	32	0
15VDH-FHB-MAS25-08	---	---		87.0	58.3	+	112	- 30	1
14VDH-SRW06-207	---	---		86.9	59.3	+	118	+	2
LW2867	---	---		86.7	57.3	120	+	32	1
Hilliard	81.9	78.5		86.7	57.1	115	- 34	+	0
L11719	---	86.9	+	86.7	57.7	118	+	29	0
DH11SRW066-153†	---	82.0		86.5	59.6	+	119	+	1
VA09MAS1-12-5-1-1	77.2	-	73.1	- 86.3	60.4	+	118	+	1
MAS #86	---	81.6		86.2	55.2	- 117	+	32	1
USG 3404	82.1	76.9		86.1	57.4	119	+	30	1
PGX 18-7	---	---		85.9	57.6	117	+	33	0
VA17W-79	---	---		85.9	57.7	115	- 34	+	1
Dyna-Gro 9750	82.8	78.8		85.8	55.6	- 115	- 30	1	
KY09C-1245-99-12-3	---	---		85.7	56.9	115	32	1	
AgriMAXX 486	---	82.2		85.6	56.4	- 119	+	34	1
PGX 17-16	---	83.2	+	85.5	58.8	+	116	33	1
VA11MAS2-92-3-2-2	---	---		85.5	59.7	+	119	+	1
CROPLAN CP9415	85.4	83.2	+	85.4	56.7	118	+	31	0
Armor Mayhem	87.4	+	78.8	85.3	57.5	118	+	33	1
Dyna-Gro 9932	---	---		85.2	58.3	+	117	+	0
15VDH-FHB-MAS33-30	---	---		85.1	60.6	+	113	- 30	0
VA16W-224	---	81.2		84.9	56.5	120	+	34	1
LW2958	---	---		84.9	58.5	+	116	34	1
Dyna-Gro 9772	84.2	81.6		84.8	55.5	- 116	32	0	
MAS #61	80.0	74.8		84.8	57.5	115	- 31	2	
USG 3118	78.3	-	75.2	84.7	59.8	+	114	- 29	1
VA17W-126	---	---		84.7	56.3	- 114	- 33	3	
L11718	---	---		84.5	56.2	- 116	33	1	
Dyna-Gro 9980	---	---		84.2	59.1	+	115	- 30	1
Dyna-Gro WX19711	---	---		84.2	57.7	118	+	31	0
Dyna-Gro 9941	---	80.5		84.2	55.2	- 118	+	31	0
AgriMAXX Exp 1902	---	---		84.2	54.1	- 118	+	30	0
13VTK59-55	---	---		84.0	59.4	+	117	29	1
NC14-20369	---	---		83.9	59.3	+	115	- 37	3
KY07C-1145-94-12-5	---	---		83.8	59.3	+	115	32	2
LW2937	---	---		83.7	55.0	- 118	+	31	1

**Table 27. Summary of performance of entries in the Virginia Tech Wheat Test, Eastern VA AREC in Warsaw, VA, 2019 harvest.**

Line	3-year Av. Yield (Bu/a)	2-year Av. Yield (Bu/a)	Grain Yield (Bu/a)	Test Weight (Lb/bu)	Date Headed (Julian)	Mature Height (In)	Plant Lodging (0-9)
Dyna-Gro WX19714	---	---	83.7	55.0 -	117 +	30	0
VA16W-196	---	78.4	83.4	57.0	121 +	29 -	0
<b>AgriMAXX 415</b>	85.4	80.6	83.2	58.1 +	116	33	1
<b>Pioneer 26R41</b>	84.8	79.5	83.1	56.9	117 +	30 -	1
TX15D9579	---	---	82.9	56.6	114 -	32	1
Armor ARW1813	---	---	82.8	55.5 -	116	33	0
DH13SRW021-70	---	74.1 -	82.7	52.3 -	117	30 -	2
PGX 18-2	---	---	82.5	59.9 +	114 -	32	1
<b>Featherstone 31</b>	80.7	76.8	82.5	58.0	118 +	32	1
<b>MAS #105</b>	---	---	82.5	56.4 -	119 +	31	1
TX15D9253	---	---	82.5	55.0 -	113 -	32	2 +
GA071518-16E39	---	---	82.4	58.8 +	115 -	32	1
<b>#Berkeley</b>	84.3	78.3	82.3	57.4	114 -	32	1
<b>MBX 932</b>	---	---	82.3	56.6	120 +	31	1
13VTK429-3	---	78.4	82.3	57.0	119 +	33	0
VA16W-105†	---	76.3	82.3	57.2	117	32	1
VA16W-29	---	79.4	82.0	56.9	119 +	31	0 -
<b>Shirley</b>	80.6	81.0	81.8	57.7	117	31	1
VA13W-38	---	---	81.7	57.8	112 -	33	0 -
<b>SY 007</b>	---	---	81.7	57.7	114 -	32	1
<b>MBX 969</b>	---	---	81.7	55.1 -	118 +	32	0 -
<b>SH 4400</b>	77.5 -	73.2 -	81.7	57.3	119 +	34 +	1
<b>Armor Venom</b>	---	---	81.6	57.1	118 +	32	2 +
<b>MAS #7</b>	80.9	74.4 -	81.4	57.3	114 -	34	1
<b>Dyna-Gro 9811</b>	81.0	75.2	81.3	56.7	115	32	1
<b>CROPLAN CP8800</b>	---	---	81.2	54.6 -	117	33	1
<b>AgriMAXX 480</b>	---	76.4	81.1	59.9 +	112 -	32	1
<b>LW2848</b>	---	---	80.8	53.6 -	119 +	34 +	2 +
<b>SH 7510</b>	79.7	72.9 -	80.6	57.6	118 +	32	1
GA09129-16E55	---	---	80.6	59.5 +	113 -	34 +	1
<b>MAS #316</b>	84.3	79.2	80.6	56.7	119 +	33	0
<b>MAS #108</b>	---	---	80.5	57.6	114 -	31	1
<b>USG 3228</b>	84.2	79.2	80.5	55.9 -	115 -	30	1
<b>AgriMAXX Exp 1906</b>	---	---	80.5	57.3	115 -	31	1
<b>#Turbo</b>	81.0	77.5	80.3	57.9	114 -	32	1
12VTK17-159	---	---	80.3	57.8	116	32	1
<b>MBX 17-P-275</b>	82.3	77.7	80.2	56.0 -	116	32	1
VA11MAS2-68-4-1-3	---	---	79.9	58.5 +	114 -	25 -	0 -
TX15D9597	---	---	79.0	58.7 +	114 -	33	1
KWS19X08	---	---	79.0	57.4	117	33	2
<b>VA12MAS11-779-5-2</b>	---	---	78.7	58.4 +	117	32	1

**Table 27. Summary of performance of entries in the Virginia Tech Wheat Test, Eastern VA AREC in Warsaw, VA, 2019 harvest.**

Line	3-year Av. Yield (Bu/a)	2-year Av. Yield (Bu/a)	Grain Yield (Bu/a)	Test Weight (Lb/bu)	Date Headed (Julian)	Mature Height (In)	Plant Lodging (0-9)
12VTK17-55	---	---	78.1 -	58.2 +	120 +	30 -	0
<b>#Bullet</b>	83.2	73.4 -	78.0 -	53.8 -	118 +	34 +	2 +
<b>SY 576</b>	---	---	77.4 -	54.8 -	122 +	33	0
VA12MAS7-519-1-3WS	---	---	77.3 -	48.9 -	120 +	32	1
<b>MAS #6</b>	---	---	76.8 -	56.6	116	29 -	0 -
<b>SY 547</b>	78.1 -	73.8 -	76.5 -	56.3 -	116	34 +	2 +
<b>MAS #106</b>	---	---	76.3 -	58.1 +	112 -	32	1
<b>MAS #67</b>	---	---	76.2 -	55.9 -	116	31	0
<b>DH13SRW025-14</b>	---	70.3 -	76.2 -	51.5 -	114 -	28 -	1
<b>SH 7200</b>	75.1 -	71.0 -	75.4 -	58.6 +	113 -	33	2
<b>Dyna-Gro 9701</b>	83.5	73.2 -	75.3 -	54.1 -	118 +	33	2
12VTK17-132	---	---	75.2 -	58.6 +	115 -	31	1
NC15-21834	---	---	75.0 -	59.9 +	118 +	36 +	2 +
GA09436-16LE12	---	---	75.0 -	61.7 +	114 -	33	1
USG 3536	---	---	74.9 -	53.5 -	118 +	33	1
15VDH-FHB-MAS22-14	---	---	74.2 -	60.5 +	114 -	31	1
DH13SRW023-201	---	71.9 -	73.4 -	61.8 +	116	33	0 -
NC13-21213	72.3 -	67.7 -	73.3 -	59.3 +	115 -	34	2 +
<b>MAS #35</b>	---	---	72.9 -	55.6 -	119 +	31	0
<b>AgriMAXX 473</b>	83.4	72.8 -	72.9 -	54.1 -	118 +	34	1
<b>Massey</b>	58.8 -	63.9 -	72.1 -	58.9 +	116	37 +	2 +
TX15D9608	---	---	71.9 -	57.8	111 -	29 -	0
<b>MAS #116</b>	80.8	69.3 -	68.4 -	54.3 -	119 +	34 +	1
<b>NC14-23372</b>	---	66.0 -	67.0 -	59.9 +	118 +	32	1
<b>CROPLAN CP8550</b>	80.2	67.9 -	64.6 -	54.1 -	118 +	35 +	2
Average	82.7	78.6	84.3	57.3	116	32	1
LSD (0.05)	3.7	3.9	6.2	0.8	1	2	1
C.V.	5.3	5.0	5.2	1.0	1	4	66

Released cultivars are shown in bold print.

Varieties are ordered by descending one-year yield averages.

A plus or minus sign indicates a performance significantly above or below the test average.

The 0-9 ratings indicate a genotype's response to disease or lodging where 0 = highly resistant and 9 = highly susceptible.

**Table 28. Summary of performance of entries in the Virginia Tech Wheat Test, Eastern Shore AREC, Painter, VA, 2019 harvest.**

Line	3-year Av. Yield (Bu/a)	2-year Av. Yield (Bu/a)	Grain Yield (Bu/a)	Test Weight (Lb/bu)	Plant Lodging (0-9)	Leaf Rust (0-9)	Powdery Mildew (0-9)
15VDH-FHB-MAS25-08	---	--	87.6 +	58.5	0	0	0
<b>SY Viper</b>	74.8	89.5 +	87.1 +	60.0 +	0	1	0
Dyna-Gro WX19712	---	--	86.8 +	57.9	0	0	0
<b>Pioneer 26R59</b>	75.4 +	83.0 +	86.5 +	57.8	0	1	0
Armor ARW1813	---	--	86.3 +	57.9	0	2 +	0
SR 8144	---	--	85.3 +	58.1	0	0	1
<b>Pioneer 26R10</b>	66.5	79.6	84.7 +	58.0	0	2 +	1
PGX 18-8	---	--	84.1 +	58.1	0	1	0
PGX 18-7	---	--	84.0 +	59.1 +	0	0	0
VA15W-86	---	--	84.0 +	58.2	0	0	0
<b>#Blaze</b>	73.4	85.4 +	82.8 +	58.0	0	2 +	1
<b>AgriMAXX 415</b>	71.9	80.6	81.9 +	59.7 +	0	1	2
<b>AgriMAXX Exp 1902</b>	---	--	81.5	57.9	0	1	3 +
15VDH-FHB-MAS33-30	---	--	81.5	59.6 +	0	0	0
KWS19X08	---	--	81.4	59.3 +	0	0	0
VA13W-38	---	--	80.8	59.2 +	0	0	0
VA11MAS2-92-3-2-2	---	--	80.8	59.5 +	0	1	2 +
<b>Dyna-Gro 9600</b>	70.4	77.1	80.7	56.8 -	0	0	0
DH11SRW066-153†	---	80.0	80.6	60.3 +	0	0	0
<b>Hilliard</b>	77.9 +	83.7 +	80.3	58.2	0	0	0
<b>USG 3316</b>	67.4	82.3	80.3	57.7	0	2 +	3 +
VA16W-149	---	79.7	80.0	58.5	0	0	0
KWS19X03	---	--	79.9	56.9 -	0	0	1
VA11MAS2-68-4-1-3	---	--	79.6	58.7	0	0	0
<b>USG 3197</b>	74.3	81.4	79.6	56.4 -	2 +	0	2
<b>AgriMAXX Exp 1906</b>	---	--	79.5	58.7	0	0	0
<b>Dyna-Gro 9980</b>	---	--	79.4	59.3 +	0	2 +	1
<b>USG 3228</b>	74.6	82.6	79.4	56.5 -	0	1	3 +
Dyna-Gro WX19711	---	--	79.2	58.1	0	1	0
<b>Dyna-Gro 9811</b>	77.8 +	81.5	79.2	58.3	0	0	0
USG 3329	---	82.1	79.2	57.9	0	1	0
DH12SRW057-006	70.9	82.1	79.2	60.4 +	0	0	0
DH13SRW022-23	---	--	79.1	58.2	1 +	0	0
<b>MAS #35</b>	---	--	78.6	57.1 -	0	1	1
13VTK429-3	---	86.2 +	78.5	59.4 +	0	0	0
15VDH-FHB-MAS41-13	---	--	78.4	61.3 +	0	0	0
VA16W-148	---	83.7 +	78.2	59.8 +	0	1	1
L11814	---	--	78.1	57.3 -	1 +	0	0
VA12MAS7-519-1-3WS	---	--	77.5	58.3	0	0	1
<b>#Berkeley</b>	77.0 +	83.5 +	77.5	57.4 -	0	0	0
<b>USG 3790</b>	---	--	77.4	57.8	0	1	0

**Table 28. Summary of performance of entries in the Virginia Tech Wheat Test, Eastern Shore AREC, Painter, VA, 2019 harvest.**

Line	3-year Av. Yield (Bu/a)	2-year Av. Yield (Bu/a)	Grain Yield (Bu/a)	Test Weight (Lb/bu)	Plant Lodging (0-9)	Leaf Rust (0-9)	Powdery Mildew (0-9)
KWS19X09	---	--	77.3	57.8	0	3 +	0
<b>MBX 17-M-245</b>	71.2	81.0	77.0	57.6	0	1	0
VA17W-75	---	--	76.7	59.0	0	0	0
L11719	---	82.2	76.7	58.0	0	1	0
DH13SRW021-70	---	81.1	76.7	58.3	0	0	0
<b>DH13SRW025-14</b>	---	79.0	76.6	56.9 -	0	0	0
15VDH-FHB-MAS22-15	---	--	76.5	59.5 +	0	0	0
<b>MBX 969</b>	---	--	76.4	57.5	0	1	1
Armor ARW1819	---	--	76.4	57.8	0	1	0
<b>MAS #108</b>	---	--	76.1	57.6	0	0	0
VA17W-176	---	--	76.1	58.8	0	0	3 +
15VDH-SRW02-075	---	--	76.1	59.1 +	0	0	0
TX15D9608	---	--	76.0	57.6	1 +	0	0
15VDH-FHB-MAS22-14	---	--	76.0	60.9 +	0	0	0
<b>SY 100</b>	---	--	75.7	57.1 -	0	1	1
VA16W-202	---	83.9 +	75.7	57.6	0	0	0
PGX 18-2	---	--	75.5	60.0 +	0	0	0
VA17W-79	---	--	75.5	58.1	0	0	1
<b>Featherstone 31</b>	71.0	74.1	75.4	58.5	0	0	0
<b>LW2937</b>	---	--	75.3	56.8 -	0	1	2
<b>USG 3118</b>	74.8	81.2	75.2	59.2 +	0	0	0
KY07C-1145-94-12-5	---	--	75.2	58.2	0	2 +	0
<b>AgriMAXX 495</b>	---	80.2	74.8	58.9	0	1	1
<b>SY 007</b>	---	--	74.6	59.1 +	0	0	0
VA17W-74	---	--	74.6	59.3 +	0	0	0
VA16W-196	---	77.9	74.6	58.2	0	0	0
<b>CROPLAN CP9606</b>	70.7	79.4	74.5	57.0 -	0	1	0
<b>MAS #7</b>	68.3	78.0	74.4	58.5	0	0	1
VA09MAS2-131-6-2	74.7	77.3	74.0	58.2	0	0	0
<b>Armor Velocity</b>	---	--	73.9	58.3	0	0	3 +
<b>MAS #86</b>	---	82.3	73.8	57.3 -	0	1	1
Dyna-Gro WX19714	---	--	73.5	57.1 -	0	2 +	0
VA16W-224	---	87.8 +	73.3	57.1 -	0	1	0
<b>MAS #61</b>	72.6	75.1	73.0	58.0	0	0	2
<b>USG 3458</b>	70.0	76.7	72.7	57.2 -	0	1	0
VA17W-167	---	--	72.7	58.0	0	0	0
KY09C-1245-99-12-3	---	--	72.6	58.2	0	0	0
<b>Dyna-Gro 9941</b>	---	79.5	72.5	56.5 -	0	1	1
<b>Dyna-Gro 9772</b>	71.7	75.5	72.4	57.0 -	0	0	1
VA16W-124†	---	76.9	72.1	59.2 +	0	0	0
13VTK59-55	---	--	72.1	58.9	0	0	1

**Table 28. Summary of performance of entries in the Virginia Tech Wheat Test, Eastern Shore AREC, Painter, VA, 2019 harvest.**

Line	3-year Av. Yield (Bu/a)	2-year Av. Yield (Bu/a)	Grain Yield (Bu/a)	Test Weight (Lb/bu)	Plant Lodging (0-9)	Leaf Rust (0-9)	Powdery Mildew (0-9)
<b>USG 3404</b>	67.1	74.2	72.0	56.5	- 0	1	2 +
<b>Pioneer 26R41</b>	70.2	74.4	71.9	58.6	0	0	1
PGX 17-16	---	78.8	71.9	59.2	+ 0	1	1
TX15D9597	---	--	71.8	58.9	0	0	0
GA09129-16E55	---	--	71.7	59.3	+ 0	0	1
<b>Pioneer 26R45</b>	71.2	74.0	71.6	58.7	0	0	2
<b>USG 3895</b>	72.4	76.1	71.5	57.2	- 0	0	3 +
GA071518-16E39	---	--	71.3	59.1	+ 0	0	0
<b>#Warrior</b>	69.2	76.0	71.3	56.7	- 0	2 +	1
DH12SRW057-081	---	78.0	70.6	59.8	+ 2 +	0	1
VA09MAS1-12-5-1-1	70.7	72.7	70.4	60.6	+ 0	0	0
VA16W-29	---	78.8	69.9	57.3	- 0	0	0
<b>MBX 17-P-275</b>	73.1	84.4 +	69.8	56.5	- 0	0	1
<b>Dyna-Gro 9932</b>	---	--	69.7	58.7	0	0	0
<b>Liberty 5658</b>	69.8	77.8	69.6	58.9	0	0	0
<b>LW2848</b>	---	--	69.4	57.6	0	0	1
<b>AgriMAXX 480</b>	---	77.0	69.3	60.1	+ 0	1	0
<b>Dyna-Gro 9701</b>	73.4	71.9	68.9	57.9	0	0	0
<b>#Turbo</b>	65.3 -	73.8	68.8	57.4	- 0	0	0
GA09436-16LE12	---	--	68.4	61.1	+ 0	0	0
<b>SH 7200</b>	71.4	77.0	68.2	59.3	+ 0	0	0
L11718	---	--	68.1	56.3	- 0	0	0
<b>AgriMAXX 486</b>	---	71.8	68.1	57.3	- 0	1	1
<b>Shirley</b>	73.9	81.4	68.1	57.7	0	0	0
TX15D9253	---	--	68.0	57.0	- 0	1	0
<b>Dyna-Gro 9750</b>	71.0	75.1	67.9	57.1	- 0	0	2
12VTK17-159	---	--	67.7	57.2	- 0	0	0
TX15D9579	---	--	67.6	57.7	0	0	0
<b>LW2958</b>	---	--	67.6	57.3	- 0	1	0
DH13SRW023-201	---	78.6	67.6	61.7	+ 0	0	0
<b>Pioneer 26R36</b>	63.6 -	67.6 -	67.5	58.1	0	0	4 +
<b>MAS #106</b>	---	--	67.0	58.2	0	1	3 +
<b>Armor Mayhem</b>	72.6	73.5	66.9	58.1	0	2 +	0
<b>AgriMAXX 473</b>	74.1	73.1	66.4	57.9	0	0	0
<b>Armor Venom</b>	---	--	66.4	57.9	0	1	1
<b>AgriMAXX 463</b>	72.0	76.5	66.4	56.1	- 0	0	1
<b>SH 7510</b>	70.6	73.5	66.4	58.9	0	0	1
NC14-20369	---	--	66.3	59.1	+ 0	0	0
<b>SY 576</b>	---	--	65.8	55.9	- 0	0	4 +
<b>MAS #67</b>	---	--	65.5	56.9	- 0	0	1
AgriMAXX 485	---	70.2 -	65.3	57.9	0	2 +	2 +

**Table 28. Summary of performance of entries in the Virginia Tech Wheat Test, Eastern Shore AREC, Painter, VA, 2019 harvest.**

Line	3-year Av. Yield (Bu/a)	2-year Av. Yield (Bu/a)	Grain Yield (Bu/a)	Test Weight (Lb/bu)	Plant Lodging (0-9)	Leaf Rust (0-9)	Powdery Mildew (0-9)
USG 3536	---	--	64.6	57.5	0	0	0
VA16W-105†	---	74.7	64.5	57.2 -	0	0	0
<b>SH 4400</b>	56.5 -	65.5 -	63.4	57.9	0	2 +	3 +
<b>MAS #105</b>	---	--	62.6 -	57.9	0	1	1
<b>MBX 932</b>	---	--	62.3 -	58.2	1 +	1	2
12VTK17-132	---	--	62.3 -	58.8	0	0	0
<b>MAS #116</b>	73.9	75.3	62.2 -	58.0	0	0	0
NC13-21213	64.2 -	69.0 -	62.1 -	59.6 +	1 +	0	0
VA16W-108†	---	--	61.9 -	58.6	0	0	1
<b>VA12MAS11-779-5-2</b>	---	--	61.8 -	57.9	0	1	0
13VTK434-89	---	73.8	61.5 -	60.1 +	0	0	0
<b>Massey</b>	49.2 -	63.0 -	61.1 -	59.6 +	0	5 +	0
14VDH-SRW06-207	---	--	60.7 -	58.6	0	0	0
<b>SY 547</b>	66.7	74.7	59.9 -	58.7	0	1	0
<b>CROPLAN CP8800</b>	---	--	59.8 -	57.4 -	0	0	1
<b>NC14-23372</b>	---	68.9 -	59.6 -	59.9 +	0	0	0
<b>#Bullet</b>	68.3	67.6 -	59.6 -	57.4 -	0	0	0
VA17W-126	---	--	59.5 -	58.8	0	0	0
<b>LW2867</b>	---	--	59.4 -	57.7	1	1	0
CROPLAN CP9415	62.7 -	67.2 -	59.1 -	57.9	0	4 +	2 +
<b>MAS #6</b>	---	--	59.0 -	56.8 -	0	1	1
12VTK17-55	---	--	58.8 -	57.4 -	0	0	0
<b>MAS #316</b>	64.5 -	71.4 -	57.8 -	57.0 -	0	2 +	2
<b>CROPLAN CP8550</b>	67.5	69.3 -	57.5 -	57.5	0	0	0
NC15-21834	---	--	45.9 -	60.0 +	0	0	0
Average	70.2	77.3	72.4	58.2	0	0	0
LSD (0.05)	4.7	5.7	9.2	0.8	1	1	1
C.V.	8.1	7.3	8.5	0.9	821	127	125

Released cultivars are shown in bold print.

Varieties are ordered by descending one-year yield averages.

A plus or minus sign indicates a performance significantly above or below the test average.

The 0-9 ratings indicate a genotype's response to disease or lodging where 0 = highly resistant and 9 = highly susceptible.

**Table 29. Summary of performance of entries in the Virginia Tech Wheat Test, Southern Piedmont AREC, Blackstone, VA, 2019 harvest.**

Line	3-year Av. Yield (Bu/a)		2-year Av. Yield (Bu/a)		Grain Yield (Bu/a)		Test Weight (Lb/bu)		BYD Virus <sup>1</sup> (0-9)	
SR 8144	---		---		67.8	+	54.2	-	1	
<b>MAS #86</b>	---		68.3	+	67.7	+	55.0		1	
PGX 18-8	---		---		67.1	+	56.4		1	
<b>USG 3790</b>	---		---		66.8	+	56.8		1	
15VDH-FHB-MAS25-08	---		---		65.7	+	56.9		1	
<b>#Warrior</b>	65.5	+	61.1		65.5	+	55.5		2	
L11814	---		---		65.5	+	54.4	-	2	
VA16W-224	---		68.5	+	65.5	+	55.7		1	
L11719	---		69.3	+	65.4	+	56.6		2	
12VTK17-132	---		---		64.6	+	57.3		1	
DH12SRW057-006	64.1		64.9		64.4	+	59.2	+	1	-
VA16W-202	---		68.8	+	64.4	+	54.6	-	1	
15VDH-FHB-MAS41-13	---		---		64.3	+	60.5	+	1	
<b>AgriMAXX 486</b>	---		66.0	+	64.1		55.8		2	
<b>Pioneer 26R36</b>	56.4		60.5		63.5		56.8		1	
GA09129-16E55	---		---		63.5		57.3		3	
15VDH-FHB-MAS22-15	---		---		63.2		58.1	+	1	
<b>SY 100</b>	---		---		62.9		54.1	-	2	
<b>Pioneer 26R59</b>	65.2	+	64.8		62.7		56.2		3	
TX15D9579	---		---		62.7		54.7		2	
VA17W-176	---		---		62.6		57.4		1	
<b>MAS #105</b>	---		---		62.5		56.7		3	
<b>SH 4400</b>	59.9		60.5		62.5		56.0		3	
<b>USG 3316</b>	63.8		64.2		62.5		56.3		3	
15VDH-FHB-MAS22-14	---		---		62.4		59.2	+	1	
<b>Armor Velocity</b>	---		---		62.3		56.7		3	
13VTK434-89	---		61.2		62.2		57.3		2	
<b>USG 3895</b>	63.3		65.5		62.2		56.3		2	
VA16W-108†	---		---		62.1		57.0		1	
DH12SRW057-081	---		64.5		62.1		58.0	+	2	
VA17W-75	---		---		61.7		57.3		2	
VA17W-74	---		---		61.6		57.2		1	
<b>USG 3458</b>	67.6	+	66.0	+	61.6		55.7		2	
VA11MAS2-92-3-2-2	---		---		61.5		57.7		1	
<b>SY Viper</b>	68.0	+	69.9	+	61.5		57.4		2	
Dyna-Gro WX19712	---		---		61.4		54.6		1	
<b>MAS #67</b>	---		---		61.3		54.6		2	
<b>Dyna-Gro 9932</b>	---		---		61.0		56.7		1	
Dyna-Gro WX19714	---		---		61.0		56.4		3	+
Armor ARW1819	---		---		60.9		56.5		1	
<b>AgriMAXX Exp 1902</b>	---		---		60.3		55.2		2	

**Table 29. Summary of performance of entries in the Virginia Tech Wheat Test, Southern Piedmont AREC, Blackstone, VA, 2019 harvest.**

Line	3-year Av. Yield (Bu/a)	2-year Av. Yield (Bu/a)	Grain Yield (Bu/a)	Test Weight (Lb/bu)	BYD Virus <sup>1</sup> (0-9)
PGX 18-7	---	---	59.9	57.2	3
13VTK59-55	---	---	59.9	57.5	1
<b>Dyna-Gro 9941</b>	---	61.1	59.8	55.6	2
<b>AgriMAXX 415</b>	61.6	59.6	59.6	57.6	2
GA071518-16E39	---	---	59.6	57.8 +	2
VA16W-148	---	64.4	59.5	57.0	2
<b>#Blaze</b>	65.7 +	65.0	59.4	56.6	3 +
<b>Hilliard</b>	62.8	62.1	59.2	56.0	1
VA12MAS7-519-1-3WS	---	---	59.1	51.5 -	1
PGX 18-2	---	---	59.0	55.0	2
<b>MBX 969</b>	---	---	58.8	55.6	2
VA17W-167	---	---	58.7	55.4	2
VA15W-86	---	---	58.5	57.1	1
<b>MAS #61</b>	62.3	60.6	58.5	56.3	2
<b>#Berkeley</b>	60.3	62.0	58.4	55.5	2
Armor ARW1813	---	---	58.4	55.1	3
KWS19X09	---	---	58.2	56.0	1
<b>Shirley</b>	62.0	59.5	58.2	55.4	2
VA09MAS2-131-6-2	60.8	62.8	58.1	56.9	1
14VDH-SRW06-207	---	---	58.1	55.9	1
13VTK429-3	---	64.3	57.9	56.5	1 -
12VTK17-55	---	---	57.9	57.0	1
<b>USG 3404</b>	59.5	57.8	57.8	55.9	1
VA16W-149	---	63.3	57.7	57.0	2
VA16W-29	---	59.4	57.5	55.9	1
<b>MBX 17-P-275</b>	58.6	59.5	57.4	54.4 -	2
<b>USG 3118</b>	62.4	63.6	57.3	56.5	3
NC15-21834	---	---	57.3	57.4	2
<b>SY 007</b>	---	---	57.2	56.6	3
15VDH-SRW02-075	---	---	56.9	55.2	1
KY09C-1245-99-12-3	---	---	56.9	55.2	3 +
VA17W-126	---	---	56.9	56.1	2
<b>Pioneer 26R45</b>	62.7	60.1	56.8	56.8	3
<b>MAS #316</b>	63.4	61.8	56.8	55.8	3
VA09MAS1-12-5-1-1	64.1	61.7	56.5	56.2	1
<b>Dyna-Gro 9772</b>	58.1	60.2	56.5	55.1	2
VA16W-124†	---	62.3	56.4	56.8	1
<b>AgriMAXX 463</b>	60.1	60.4	56.2	54.9	1
<b>AgriMAXX 495</b>	---	58.2	56.2	56.9	3
L11718	---	---	56.2	54.3 -	2
<b>LW2958</b>	---	---	56.2	56.9	3

**Table 29. Summary of performance of entries in the Virginia Tech Wheat Test, Southern Piedmont AREC, Blackstone, VA, 2019 harvest.**

Line	3-year Av. Yield (Bu/a)	2-year Av. Yield (Bu/a)	Grain Yield (Bu/a)	Test Weight (Lb/bu)	BYD Virus <sup>1</sup> (0-9)
<b>Dyna-Gro 9811</b>	63.4	63.1	56.1	55.9	3
<b>MAS #108</b>	---	---	56.0	56.6	3
TX15D9253	---	---	55.8	53.8	- 2
AgriMAXX 485	---	56.8	55.8	56.9	2
<b>Pioneer 26R10</b>	63.2	62.9	55.7	55.7	2
<b>MBX 932</b>	---	---	55.6	56.0	2
<b>Liberty 5658</b>	57.2	58.9	55.5	57.4	1
VA13W-38	---	---	55.2	55.5	1
<b>AgriMAXX 473</b>	61.1	59.8	55.1	55.3	2
KWS19X03	---	---	54.9	54.6	- 2
<b>MAS #35</b>	---	---	54.9	55.3	2
USG 3536	---	---	54.8	55.3	2
<b>VA12MAS11-779-5-2</b>	---	---	54.4	56.5	1
<b>AgriMAXX Exp 1906</b>	---	---	54.4	55.6	3
<b>USG 3228</b>	57.5	57.2	54.3	54.7	2
USG 3329	---	60.3	54.1	56.3	3
KY07C-1145-94-12-5	---	---	53.8	57.3	2
<b>CROPLAN CP8800</b>	---	---	53.8	55.2	2
<b>CROPLAN CP9606</b>	62.7	59.9	53.8	55.8	3
VA16W-105†	---	56.7	53.7	55.4	2
PGX 17-16	---	57.3	53.7	57.0	2
VA11MAS2-68-4-1-3	---	---	53.6	57.7	1
<b>#Bullet</b>	58.8	56.5	53.6	55.6	2
DH13SRW021-70	---	56.0	53.5	55.6	1
<b>LW2848</b>	---	---	53.5	55.8	1
VA17W-79	---	---	53.5	56.2	1
<b>SH 7200</b>	60.5	60.8	53.3	53.8	- 3
DH13SRW022-23	---	---	53.2	56.2	1 -
GA09436-16LE12	---	---	53.2	59.4	+ 2
NC14-20369	---	---	53.0	56.6	1
<b>SY 576</b>	---	---	53.0	54.0	- 1
<b>USG 3197</b>	60.4	61.2	52.8	55.0	1
<b>SH 7510</b>	63.5	60.2	52.8	56.1	2
<b>MAS #116</b>	61.4	60.5	52.1	56.1	3
Dyna-Gro WX19711	---	---	52.1	57.0	3
TX15D9608	---	---	51.7	55.8	4 +
<b>SY 547</b>	58.3	59.5	51.6	56.5	3
<b>LW2937</b>	---	---	51.6	55.7	3
<b>Armor Mayhem</b>	56.2	- 52.8	- 51.4	56.0	3
NC13-21213	55.1	- 59.4	51.4	55.6	3
KWS19X08	---	---	51.4	56.5	3

**Table 29. Summary of performance of entries in the Virginia Tech Wheat Test, Southern Piedmont AREC, Blackstone, VA, 2019 harvest.**

Line	3-year Av. Yield (Bu/a)		2-year Av. Yield (Bu/a)		Grain Yield (Bu/a)	Test Weight (Lb/bu)	BYD Virus <sup>1</sup> (0-9)	
<b>Armor Venom</b>	---		---		51.3	56.9	3	
<b>Massey</b>	47.8	-	49.9	-	51.3	56.9	1	
12VTK17-159	---		---		51.2	55.3	1	
CROPLAN CP9415	62.6		59.3		51.1	56.5	4	+
<b>Dyna-Gro 9750</b>	59.1		58.6		50.6	53.9	-	3
<b>Pioneer 26R41</b>	58.9		59.2		50.4	54.6	1	
<b>MAS #7</b>	59.5		55.9		50.2	55.7	5	+
VA16W-196	---		57.9		50.1	55.9	1	
DH11SRW066-153†	---		56.6		50.1	58.2	+	1
<b>Dyna-Gro 9701</b>	57.9		55.7		50.0	55.4	2	
<b>Featherstone 31</b>	59.8		58.2		49.8	57.0	2	
<b>AgriMAXX 480</b>	---		61.6		49.7	58.1	+	4
<b>LW2867</b>	---		---		49.3	56.5	3	+
<b>MAS #106</b>	---		---		49.3	56.9	3	
<b>Dyna-Gro 9980</b>	---		---		49.1	58.2	+	2
15VDH-FHB-MAS33-30	---		---		48.3	59.2	+	2
TX15D9597	---		---		47.8	56.9	3	+
<b>MBX 17-M-245</b>	62.4		54.4	-	47.6	55.9	2	
<b>MAS #6</b>	---		---		46.8	55.3	4	+
<b>Dyna-Gro 9600</b>	54.1	-	51.1	-	46.0	55.3	2	
DH13SRW023-201	---		54.7	-	44.7	60.0	+	2
<b>DH13SRW025-14</b>	---		56.9		44.2	53.1	-	1
<b>#Turbo</b>	55.6	-	54.0	-	44.0	52.7	-	1
<b>CROPLAN CP8550</b>	56.0	-	51.1	-	42.2	55.4	3	+
<b>NC14-23372</b>	---		52.4	-	41.8	57.6	3	
Average	60.6		60.3		56.6	56.2	2	
LSD (0.05)	4.2		5.3		7.5	1.6	1	
C.V.	8.4		8.7		9.1	2.0	37	

Released cultivars are shown in bold print.

Varieties are ordered by descending one-year yield averages.

A plus or minus sign indicates a performance significantly above or below the test average.

The 0-9 ratings indicate a genotype's response to disease or lodging where 0 = highly resistant and 9 = highly susceptible.

<sup>1</sup> BYD = Barley Yellow Dwarf Virus.

**Table 30. Summary of performance of entries in the Virginia Tech Wheat Test, Northern Piedmont Center, Orange, VA, 2019 harvest.**

Line	3-year Av. Yield (Bu/a)	2-year Av. Yield (Bu/a)	Grain Yield (Bu/a)	Test Weight (Lb/bu)	Mature Height (In)	Plant Lodging (0-9)
<b>MBX 17-M-245</b>	99.5 +	100.2 +	120.1 +	59.2	33	1
KY07C-1145-94-12-5	---	---	118.1 +	60.7	36	3
<b>SY 100</b>	---	---	117.9	58.2	32	2
GA071518-16E39	---	---	117.5	59.9	35	1
VA09MAS1-12-5-1-1	96.0	92.8	117.2	59.9	32	4
<b>Dyna-Gro 9811</b>	90.8	95.4	117.2	58.5	35	2
<b>SY 007</b>	---	---	116.2	60.2	33	0
VA16W-149	---	90.1	116.1	59.5	34	3
<b>LW2958</b>	---	---	115.8	59.5	37	2
TX15D9253	---	---	115.6	58.5	33	3
<b>Pioneer 26R36</b>	98.6 +	95.4	115.1	59.4	34	2
<b>AgriMAXX 495</b>	---	89.2	114.5	59.3	34	2
<b>MAS #35</b>	---	---	114.4	59.1	34	3
VA16W-148	---	94.4	114.3	60.4	36	2
VA17W-75	---	---	114.0	60.2	34	4
<b>#Berkeley</b>	95.3	97.2 +	114.0	58.3	34	3
VA17W-167	---	---	113.9	59.9	34	2
<b>USG 3458</b>	93.3	88.4	113.8	58.8	32	2
<b>Shirley</b>	94.6	98.8 +	113.8	59.3	34	3
CROPLAN CP9415	99.9 +	95.5	113.7	59.4	32	1
VA16W-196	---	85.3	113.7	59.4	32	1
<b>SH 7510</b>	96.0	93.6	113.2	59.4	35	4
15VDH-FHB-MAS33-30	---	---	113.0	59.4	34	3
<b>Pioneer 26R41</b>	92.9	96.5	113.0	60.2	33	2
PGX 18-8	---	---	112.9	59.9	35	0
13VTK429-3	---	91.3	112.7	59.6	34	1
GA09129-16E55	---	---	112.5	59.8	34	1
<b>USG 3790</b>	---	---	112.2	60.1	34	1
<b>Dyna-Gro 9600</b>	91.3	92.4	112.1	58.3	34	1
<b>SY Viper</b>	87.1	90.8	111.9	60.3	33	3
L11718	---	---	111.9	58.4	34	4
<b>MBX 932</b>	---	---	111.9	59.8	33	2
VA15W-86	---	---	111.8	59.0	33	4
VA09MAS2-131-6-2	93.7	96.6	111.8	59.9	33	1
<b>USG 3316</b>	96.8	93.1	111.7	59.4	35	2
<b>MAS #116</b>	93.3	91.8	111.7	60.0	36	2
<b>Dyna-Gro 9701</b>	92.3	92.7	111.7	59.4	38 +	2
VA16W-105†	---	87.9	111.4	58.9	35	5 +
Dyna-Gro WX19712	---	---	111.0	58.9	34	1
VA16W-29	---	95.2	111.0	59.1	36	1
<b>Featherstone 31</b>	93.5	91.4	110.9	59.9	33	3

**Table 30. Summary of performance of entries in the Virginia Tech Wheat Test, Northern Piedmont Center, Orange, VA, 2019 harvest.**

Line	3-year Av. Yield (Bu/a)	2-year Av. Yield (Bu/a)	Grain Yield (Bu/a)	Test Weight (Lb/bu)	Mature Height (In)	Plant Lodging (0-9)
Armor ARW1813	---	---	110.7	58.9	33	2
<b>LW2867</b>	---	---	110.4	58.7	34	1
<b>AgriMAXX 463</b>	88.3	85.1	110.4	58.7	35	1
PGX 17-16	---	90.7	110.3	59.7	33	1
<b>AgriMAXX 473</b>	90.6	89.8	110.1	59.4	35	1
<b>CROPLAN CP8550</b>	95.1	91.8	110.1	58.9	34	6 +
DH11SRW066-153†	---	87.0	110.0	58.8	35	3
PGX 18-2	---	---	109.9	59.3	34	1
<b>AgriMAXX 486</b>	---	90.8	109.8	58.8	33	2
15VDH-FHB-MAS41-13	---	---	109.4	60.1	35	0
<b>Dyna-Gro 9941</b>	---	93.6	109.3	58.6	36	1
<b>USG 3404</b>	97.1 +	91.7	109.2	59.3	35	4
PGX 18-7	---	---	109.1	60.9 +	33	0
USG 3329	---	92.3	108.8	60.0	34	1
<b>Pioneer 26R59</b>	91.6	93.3	108.7	59.0	32	1
<b>Pioneer 26R10</b>	91.6	89.5	108.6	58.1	35	1
Dyna-Gro WX19714	---	---	108.2	58.7	35	1
<b>USG 3118</b>	79.5 -	80.6	108.2	59.6	33	1
VA16W-202	---	89.1	107.7	59.3	33	1
15VDH-FHB-MAS22-14	---	---	107.6	60.0	36	2
TX15D9597	---	---	107.6	59.7	36	3
VA16W-224	---	83.9	107.6	58.6	36	2
<b>SH 7200</b>	80.8 -	82.7	107.6	59.3	34	2
<b>AgriMAXX Exp 1902</b>	---	---	107.3	59.5	34	1
NC14-20369	---	---	107.2	59.7	35	4
12VTK17-132	---	---	107.1	59.1	34	1
VA16W-124†	---	81.3	106.9	59.3	32	3
<b>LW2937</b>	---	---	106.7	59.5	36	3
VA17W-79	---	---	106.7	59.2	34	3
DH13SRW023-201	---	80.5	106.5	60.7	37	1
<b>CROPLAN CP9606</b>	94.0	89.5	106.5	58.9	35	1
VA16W-108†	---	---	106.2	58.8	34	2
<b>USG 3228</b>	86.6	89.0	106.2	58.8	34	0
Dyna-Gro WX19711	---	---	105.8	59.6	34	0
<b>#Blaze</b>	86.0	84.6	105.7	58.7	35	4
KY09C-1245-99-12-3	---	---	105.7	59.4	33	1
<b>#Bullet</b>	95.4	95.8	105.5	58.6	34	1
14VDH-SRW06-207	---	---	105.4	59.6	35	3
<b>AgriMAXX 480</b>	---	81.2	105.4	59.9	36	2
<b>Liberty 5658</b>	86.8	88.0	105.2	59.6	36	3
<b>#Turbo</b>	88.7	88.7	105.0	58.6	35	1

**Table 30. Summary of performance of entries in the Virginia Tech Wheat Test, Northern Piedmont Center, Orange, VA, 2019 harvest.**

Line	3-year Av. Yield (Bu/a)	2-year Av. Yield (Bu/a)	Grain Yield (Bu/a)	Test Weight (Lb/bu)	Mature Height (In)	Plant Lodging (0-9)
#Warrior	94.6	96.4	104.8	59.3	34	2
Hilliard	85.2	83.4	104.7	58.8	35	0
AgriMAXX Exp 1906	---	---	104.5	58.9	34	1
DH13SRW025-14	---	85.8	104.5	59.5	33	1
USG 3536	---	---	104.3	58.9	34	2
USG 3895	94.6	92.6	104.1	59.1	31 -	5
VA17W-74	---	---	103.6	59.5	35	1
L11814	---	---	103.3	58.4	29 -	4
DH12SRW057-006	86.0	81.2	103.3	59.8	33	1
Dyna-Gro 9772	87.9	89.5	103.2	58.1	33	2
MBX 17-P-275	87.2	85.1	103.1	58.4	33	3
VA17W-176	---	---	103.0	60.3	33	1
CROPLAN CP8800	---	---	103.0	58.5	35	1
NC14-23372	---	80.8	102.7	59.9	35	2
USG 3197	86.5	84.5	102.7	58.4	34	0
MAS #61	89.0	86.3	102.7	59.0	31 -	6 +
KWS19X09	---	---	102.6	58.9	34	2
MAS #86	---	89.8	102.5	59.1	34	3
VA13W-38	---	---	102.2	59.8	31	2
DH12SRW057-081	---	86.0	102.2	60.2	33	1
Armor Velocity	---	---	102.1	60.0	34	2
12VTK17-55	---	---	102.1	59.2	36	1
LW2848	---	---	101.7	58.3	35	1
MBX 969	---	---	101.5	59.0	34	2
Dyna-Gro 9750	85.9	80.7	101.5	57.9	35	1
VA17W-126	---	---	101.5	59.0	35	1
TX15D9579	---	---	101.4	60.4	36	1
12VTK17-159	---	---	101.3	58.5	36	3
MAS #316	85.0	83.8	101.2	58.7	35	3
Dyna-Gro 9980	---	---	101.2	58.7	33	1
MAS #67	---	---	101.1	58.7	34	2
15VDH-SRW02-075	---	---	101.0	58.9	33	2
15VDH-FHB-MAS25-08	---	---	100.8	60.1	33	2
DH13SRW022-23	---	---	100.8	58.8	33	2
MAS #7	89.2	91.3	100.7	58.7	34	2
GA09436-16LE12	---	---	100.6	61.0 +	36	2
MAS #108	---	---	100.3	59.2	34	2
Pioneer 26R45	86.6	84.5	100.3	59.6	35	4
SR 8144	---	---	100.2	58.6	34	2
AgriMAXX 415	95.8	92.1	100.1	60.3	35	2
TX15D9608	---	---	100.0	59.1	31	2

**Table 30. Summary of performance of entries in the Virginia Tech Wheat Test, Northern Piedmont Center, Orange, VA, 2019 harvest.**

Line	3-year Av. Yield (Bu/a)	2-year Av. Yield (Bu/a)	Grain Yield (Bu/a)	Test Weight (Lb/bu)	Mature Height (In)	Plant Lodging (0-9)
DH13SRW021-70	---	89.6	99.6	59.1	32	0
<b>VA12MAS11-779-5-2</b>	---	---	99.1	59.7	33	3
Armor ARW1819	---	---	98.7	59.7	34	4
VA11MAS2-92-3-2-2	---	---	98.4	59.7	34	2
13VTK59-55	---	---	98.0	59.2	34	1
VA11MAS2-68-4-1-3	---	---	98.0	59.9	30	0
<b>MAS #105</b>	---	---	97.5	59.4	32	1
15VDH-FHB-MAS22-15	---	---	97.3	59.5	34	3
KWS19X08	---	---	97.1	59.5	36	1
<b>Armor Mayhem</b>	83.5	78.9	- 96.9	58.7	32	3
KWS19X03	---	---	96.9	59.0	35	3
<b>SY 547</b>	83.7	87.0	96.8	59.5	35	3
<b>Armor Venom</b>	---	---	96.5	59.7	33	2
13VTK434-89	---	77.6	- 96.2	60.3	37	1
<b>Massey</b>	71.1	- 76.9	- 96.2	59.4	33	3
NC15-21834	---	---	96.1	59.4	34	5
L11719	---	86.6	96.1	58.8	32	2
NC13-21213	79.9	- 79.9	- 95.2	59.6	35	2
VA12MAS7-519-1-3WS	---	---	95.2	58.7	35	3
<b>SY 576</b>	---	---	94.6	58.8	35	2
AgriMAXX 485	---	80.8	93.3	- 58.6	32	1
<b>Dyna-Gro 9932</b>	---	---	92.7	- 59.4	35	2
<b>MAS #106</b>	---	---	92.6	- 58.5	32	0
<b>MAS #6</b>	---	---	91.2	- 59.1	32	0
<b>SH 4400</b>	79.4	- 79.4	- 84.7	- 59.4	35	3
Average	89.9	88.6	105.9	59.3	34	2
LSD (0.05)	7.1	8.2	12.1	1.5	3	3
C.V.	9.3	8.8	7.6	1.8	7	128

Released cultivars are shown in bold print.

Varieties are ordered by descending one-year yield averages.

A plus or minus sign indicates a performance significantly above or below the test average.

The 0-9 ratings indicate a genotype's response to disease or lodging where 0 = highly resistant and 9 = highly susceptible.

**Table 31. Summary of performance of entries in the Virginia Tech Wheat Test, Kentland farm, Blacksburg, VA, 2019 harvest.**

Line	Grain Yield (Bu/a)		Test Weight (Lb/bu)		Date Headed (Julian)		Mature Height (In)		Plant Lodging (0-9)	Leaf Rust (0-9)	Deer Damage (%)	
KWS19X09	104.9	+	57.4		124		32		0	6	+	0
<b>SY Viper</b>	101.6	+	59.3	+	122	-	34	+	0	6	+	0
<b>Dyna-Gro 9941</b>	100.4	+	56.7	-	125	+	31		0	7	+	0
Armor ARW1813	100.2	+	57.4	-	124		31		0	7	+	0
<b>USG 3895</b>	99.9	+	57.7		125	+	28		0	3		0
<b>Dyna-Gro 9701</b>	99.8	+	57.9		126	+	32		0	4		0
VA17W-167	99.7	+	59.0	+	126	+	32	+	0	1	-	0
VA09MAS1-12-5-1-1	99.6	+	60.6	+	125	+	31		1	1	-	0
<b>#Warrior</b>	99.4	+	56.9	-	123		30		0	6	+	5
USG 3329	98.7	+	57.4		123	-	31		1	8	+	0
13VTK429-3	98.3	+	60.7	+	125	+	31		0	2		0
VA16W-148	97.9		59.8	+	127	+	31		1	+	4	0
L11718	97.8		56.8	-	124		31		0	2		0
L11814	97.8		58.4		122	-	28		1	+	2	0
<b>USG 3404</b>	97.4		57.5		125	+	31		0	6	+	0
<b>MBX 17-M-245</b>	97.0		57.1	-	123		31		0	7	+	0
<b>Pioneer 26R59</b>	96.9		58.1		124		29		0	8	+	0
<b>Pioneer 26R41</b>	96.6		58.0		126	+	29		0	2		0
<b>AgriMAXX 486</b>	95.9		57.6		127	+	32	+	0	7	+	0
<b>USG 3197</b>	95.8		54.7	-	123	-	32	+	0	3		0
<b>MAS #61</b>	95.7		57.2	-	122	-	31		1	3		0
<b>Pioneer 26R10</b>	95.7		57.7		125		30		0	7	+	0
DH13SRW022-23	95.6		59.4	+	127	+	30		0	2		0
PGX 18-7	95.6		58.5		123	-	31		0	3		0
<b>AgriMAXX 473</b>	95.2		57.5		125		32	+	0	2		0
PGX 18-8	95.1		58.4		124		29		0	6	+	0
<b>MAS #35</b>	95.0		58.2		126	+	30		0	7	+	0
AgriMAXX 485	94.9		57.9		125	+	29		0	5		11
<b>Pioneer 26R45</b>	94.6		57.9		124		34	+	0	3		0
<b>#Bullet</b>	94.5		57.6		126	+	32		0	3		0
<b>CROPLAN CP9606</b>	94.4		57.1	-	123		30		0	5		0
<b>SH 4400</b>	94.3		58.2		126	+	31		0	8	+	0
<b>USG 3790</b>	93.9		58.7		125		30		0	7	+	1
<b>MAS #86</b>	93.9		57.0	-	124		32		0	6	+	0
<b>MAS #105</b>	93.8		58.0		126	+	30		0	5		8
VA16W-105†	93.5		56.9	-	125		30		0	3		0
VA16W-149	93.5		58.4		125	+	29		0	2		0
<b>Armor Velocity</b>	93.5		58.9		124		31		0	5		0
<b>Pioneer 26R36</b>	93.3		58.4		125	+	29		0	2		0
<b>Armor Mayhem</b>	93.2		57.9		125		31		0	4		0
VA17W-176	93.1		58.9		123	-	30		0	1	-	3

**Table 31. Summary of performance of entries in the Virginia Tech Wheat Test, Kentland farm, Blacksburg, VA, 2019 harvest.**

Line	Grain Yield (Bu/a)	Test Weight (Lb/bu)	Date Headed (Julian)	Mature Height (In)	Plant Lodging (0-9)	Leaf Rust (0-9)	Deer Damage (%)
VA16W-108†	92.9	57.7	125 +	32	0	2	0
<b>AgriMAXX Exp 1902</b>	92.9	57.1 -	125	30	0	6 +	0
<b>SH 7510</b>	92.8	58.7	125	30	0	4	0
<b>SY 100</b>	92.7	55.4 -	125	29	0	7 +	0
<b>Dyna-Gro 9932</b>	92.6	58.7	125 +	31	0	5	0
<b>MAS #316</b>	92.4	57.3 -	127 +	32	0	7 +	0
<b>LW2958</b>	92.4	58.3	126 +	32 +	0	4	0
<b>LW2848</b>	92.1	57.6	125 +	32	0	4	0
VA17W-75	91.8	59.5 +	123 -	31	0	2	0
<b>LW2937</b>	91.8	56.7 -	125 +	30	0	8 +	0
<b>#Blaze</b>	91.7	57.5	123	31	0	5	0
VA16W-124†	91.7	58.9	123 -	31	0	2	0
L11719	91.5	58.5	125 +	29	0	5	0
PGX 17-16	91.4	58.3	125	32	0	5	0
VA16W-202	91.2	56.7 -	124	29	0	1 -	0
<b>USG 3458</b>	91.1	57.1 -	123	29	0	8 +	6 +
Armor ARW1819	91.0	58.4	124	29	0	5	0
<b>Dyna-Gro 9980</b>	90.9	58.8	122 -	29	0	7 +	0
<b>CROPLAN CP8550</b>	90.8	57.4 -	126 +	33 +	0	4	0
<b>MBX 969</b>	90.8	56.3 -	124	31	0	6 +	0
<b>MBX 932</b>	90.6	58.2	126 +	30	0	7 +	16 +
VA12MAS7-519-1-3WS	90.2	59.9 +	127 +	30	0	2	0
<b>AgriMAXX 463</b>	90.0	56.3 -	124	28	0	6 +	1
<b>MAS #6</b>	89.7	56.0 -	123 -	29	0	6 +	0
<b>AgriMAXX 415</b>	89.7	58.8	123	30	0	6 +	0
<b>Shirley</b>	89.7	57.6	125 +	29	0	2	1
<b>SY 007</b>	89.7	57.4 -	122 -	31	0	4	0
<b>Armor Venom</b>	89.6	57.5	124	32 +	1 +	5	0
<b>CROPLAN CP8800</b>	89.4	57.0 -	124	32	0	2	0
<b>LW2867</b>	89.2	57.7	126 +	30	0	7 +	0
<b>MAS #116</b>	89.1	58.9	125 +	31	0	3	0
15VDH-FHB-MAS25-08	89.0	59.1 +	122 -	30	0	1 -	0
Dyna-Gro WX19712	88.8	57.3 -	123	30	0	3	0
<b>DH13SRW025-14</b>	88.8	59.5 +	122 -	28	0	1 -	0
VA09MAS2-131-6-2	88.7	58.3	122 -	25 -	0	1 -	0
<b>MAS #67</b>	88.7	56.0 -	124	28	0	4	0
<b>Dyna-Gro 9772</b>	88.7	55.6 -	123 -	31	0	2	0
CROPLAN CP9415	88.4	57.2 -	127 +	30	0	6 +	0
<b>SY 576</b>	88.4	58.0	128 +	32 +	0	2	0
KY07C-1145-94-12-5	88.2	59.0 +	123 -	31	0	6 +	0
<b>AgriMAXX 495</b>	88.2	59.1 +	125	31	0	4	0

**Table 31. Summary of performance of entries in the Virginia Tech Wheat Test, Kentland farm, Blacksburg, VA, 2019 harvest.**

Line	Grain Yield (Bu/a)	Test Weight (Lb/bu)	Date Headed (Julian)	Mature Height (In)	Plant Lodging (0-9)	Leaf Rust (0-9)	Deer Damage (%)
15VDH-SRW02-075	88.0	59.8 +	127 +	30	0	1 -	0
<b>Dyna-Gro 9600</b>	87.9	56.4 -	123	30	0	2	0
Dyna-Gro WX19714	87.8	56.6 -	125 +	30	0	8 +	0
<b>USG 3316</b>	87.8	57.2 -	126 +	31	0	6 +	0
VA16W-224	87.7	56.9 -	127 +	31	0	2	0
<b>Dyna-Gro 9811</b>	87.6	59.2 +	124	31	0	2	0
DH13SRW021-70	87.5	59.4 +	123 -	29	0	2	0
15VDH-FHB-MAS22-14	87.5	61.5 +	123	30	0	1 -	0
VA16W-29	87.4	58.0	127 +	32	0	8 +	0
<b>Featherstone 31</b>	87.3	59.2 +	125 +	29	0	2	0
<b>Dyna-Gro 9750</b>	86.9	56.5 -	124	29	0	5	0
<b>Liberty 5658</b>	86.9	59.0	123 -	31	0	3	0
VA15W-86	86.8	57.8	124	30	0	1 -	0
VA17W-79	86.6	58.2	123	31	0	1 -	0
NC14-20369	86.4	58.6	123	35 +	1 +	2	0
<b>MAS #108</b>	86.0	58.2	123 -	30	0	2	0
12VTK17-159	85.9	58.1	124	31	1	2	0
VA17W-126	85.7	58.5	123 -	33 +	0	2	0
<b>VA12MAS11-779-5-2</b>	85.7	58.5	125 +	30	0	3	0
DH11SRW066-153†	85.5	60.4 +	127 +	31	1 +	4	3
15VDH-FHB-MAS41-13	85.0	61.7 +	122 -	33 +	0	1 -	0
PGX 18-2	84.6	59.6 +	122 -	29	0	3	0
12VTK17-55	84.2	59.0 +	126 +	29	0	1 -	0
SR 8144	84.0	57.6	122 -	30	0	1 -	0
TX15D9597	83.9	59.2 +	123 -	31	0	3	0
VA17W-74	83.3	59.2 +	122 -	30	0	2	1
<b>Hilliard</b>	82.8	58.5	124	32	0	3	0
<b>#Turbo</b>	82.4	57.1 -	122 -	30	0	3	0
<b>SH 7200</b>	82.2	59.4 +	123 -	32	0	2	0
DH12SRW057-006	81.7	60.6 +	125 +	28	0	1 -	0
<b>AgriMAXX Exp 1906</b>	81.7	57.6	124	31	0	2	0
USG 3536	81.4	57.1 -	125	31	0	2	0
KWS19X08	81.2	58.9	125 +	31	0	2	0
VA16W-196	81.1	58.4	129 +	27	0	1 -	0
DH12SRW057-081	80.9	58.4	123 -	29	0	2	3
Dyna-Gro WX19711	80.7	58.8	126 +	27	0	6 +	0
<b>SY 547</b>	80.6	57.8	124	32	0	3	0
GA09129-16E55	80.4	59.6 +	122 -	31	0	2	0
<b>#Berkeley</b>	80.4	57.9	123 -	29	0	2	0
KY09C-1245-99-12-3	80.3	57.8	123 -	31	0	5	0
15VDH-FHB-MAS22-15	80.1	59.6 +	120 -	29	0	1 -	0

**Table 31. Summary of performance of entries in the Virginia Tech Wheat Test, Kentland farm, Blacksburg, VA, 2019 harvest.**

Line	Grain Yield (Bu/a)	Test Weight (Lb/bu)	Date Headed (Julian)	Mature Height (In)	Plant Lodging (0-9)	Leaf Rust (0-9)	Deer Damage (%)
13VTK434-89	79.2	59.9 +	124	32 +	0	2	0
GA09436-16LE12	79.1	60.7 +	124	31	0	1 -	0
<b>MAS #7</b>	79.0	57.3 -	123 -	30	0	4	0
14VDH-SRW06-207	78.2	58.9	127 +	30	0	1 -	0
<b>MAS #106</b>	77.5	58.3	119 -	30	0	5	0
<b>MBX 17-P-275</b>	77.1 -	56.5 -	124	29	0	5	0
TX15D9253	77.0 -	56.5 -	123 -	31	0	1 -	0
TX15D9579	76.9 -	58.7	124	30	0	1 -	0
GA071518-16E39	76.9 -	59.0	124	29	0	3	0
<b>USG 3228</b>	76.8 -	56.4 -	124	28	0	5	3
NC15-21834	76.8 -	59.3 +	125 +	33 +	1	2	0
VA11MAS2-68-4-1-3	76.1 -	58.3	122 -	26	0	2	0
12VTK17-132	75.2 -	58.8	123	30	0	2	0
DH13SRW023-201	75.2 -	63.1 +	127 +	29	0	2	0
TX15D9608	75.1 -	57.9	121 -	28	0	2	0
15VDH-FHB-MAS33-30	75.0 -	60.1 +	121 -	30	0	1 -	0
<b>AgriMAXX 480</b>	74.0 -	59.0	122 -	31	0	3	0
VA13W-38	73.7 -	58.6	121 -	29	0	2	0
<b>Massey</b>	73.5 -	58.2	124	33 +	1 +	9 +	0
13VTK59-55	72.6 -	60.0 +	124	29	0	2	6
KWS19X03	72.6 -	57.4 -	128 +	27	0	4	0
<b>USG 3118</b>	71.1 -	59.5 +	122 -	28	0	1 -	0
<b>NC14-23372</b>	69.5 -	60.1 +	127 +	32	0	2	0
NC13-21213	67.3 -	58.1	124	30	0	2	0
VA11MAS2-92-3-2-2	62.5 -	58.5	126 +	29	0	1 -	0
Average	87.8	58.2	124	30	0	3	0
LSD (0.05)	10.4	0.8	1	2	1	2	5
C.V.	8.0	0.9	1	4	640	30	848

Released cultivars are shown in bold print.

Varieties are ordered by descending yield averages.

A plus or minus sign indicates a performance significantly above or below the test average.

The 0-9 ratings indicate a genotype's response to disease or lodging where 0 = highly resistant and 9 = highly susceptible.

**Table 32. Summary of performance of entries in the Virginia Tech Wheat Test, planted No-Till at Tidewater AREC, Holland, VA, 2019 harvest.**

Line	Grain Yield (Bu/a)	Test Weight (Lb/bu)	
KWS19X09	60.8	56.5	+
15VDH-FHB-MAS33-30	57.4	58.9	+
Dyna-Gro WX19712	54.5	56.9	
<b>USG 3316</b>	53.7	57.1	
<b>#Blaze</b>	53.5	57.1	
VA17W-126	53.4	56.2	
USG 3536	52.7	57.8	
VA17W-79	51.9	56.1	
GA071518-16E39	51.6	57.2	
<b>USG 3790</b>	50.8	56.7	
KWS19X03	50.7	56.1	
<b>SY 100</b>	50.6	55.9	
L11718	50.5	55.3	
Armor ARW1819	50.2	56.5	
15VDH-FHB-MAS41-13	50.1	59.5	+
VA15W-86	50.0	57.2	
<b>Pioneer 26R45</b>	49.7	57.1	
VA17W-74	49.6	57.1	
<b>#Warrior</b>	49.5	54.1	-
<b>AgriMAXX 480</b>	49.3	58.4	+
VA17W-75	49.2	56.3	
VA17W-167	49.1	58.5	+
<b>Pioneer 26R59</b>	49.1	57.0	
<b>USG 3458</b>	48.8	55.1	
<b>CROPLAN CP9606</b>	48.7	56.2	
<b>Liberty 5658</b>	48.6	57.7	
GA09436-16LE12	48.6	60.9	+
<b>#Turbo</b>	48.5	55.8	
<b>MBX 17-M-245</b>	48.4	55.0	
<b>MBX 17-P-275</b>	48.2	53.5	-
USG 3329	48.1	56.3	
SR 8144	48.1	56.0	
Dyna-Gro WX19714	48.0	56.0	
<b>AgriMAXX 486</b>	47.9	57.2	
<b>SY Viper</b>	47.6	56.0	
15VDH-FHB-MAS22-15	47.6	58.0	
VA16W-202	47.2	54.7	-
<b>DH13SRW025-14</b>	47.0	57.4	
13VTK434-89	46.8	58.8	+
<b>MAS #86</b>	46.7	55.0	
<b>AgriMAXX 463</b>	46.7	54.1	-

**Table 32. Summary of performance of entries in the Virginia Tech Wheat Test, planted No-Till at Tidewater AREC, Holland, VA, 2019 harvest.**

Line	Grain Yield (Bu/a)	Test Weight (Lb/bu)	
PGX 18-8	46.7	56.1	
VA16W-149	46.6	56.2	
<b>USG 3118</b>	46.6	57.7	
VA16W-148	46.5	57.3	
DH12SRW057-006	46.3	58.6	+
KY07C-1145-94-12-5	46.2	58.1	
<b>AgriMAXX 473</b>	46.1	57.2	
GA09129-16E55	46.1	57.9	
L11719	45.9	56.3	
<b>Armor Mayhem</b>	45.8	55.9	
<b>Dyna-Gro 9811</b>	45.7	57.4	
<b>USG 3404</b>	45.6	56.1	
15VDH-FHB-MAS25-08	45.6	58.2	
L11814	45.6	54.1	-
Armor ARW1813	45.4	57.1	
VA16W-224	45.3	55.4	
VA13W-38	45.1	57.0	
<b>AgriMAXX Exp 1906</b>	45.1	56.5	
<b>#Bullet</b>	45.1	56.5	
DH13SRW021-70	44.7	55.3	
<b>Pioneer 26R10</b>	44.6	56.9	
VA17W-176	44.6	54.8	
15VDH-SRW02-075	44.5	57.8	
<b>Massey</b>	44.5	57.9	
VA11MAS2-68-4-1-3	44.4	56.6	
<b>Dyna-Gro 9772</b>	44.3	54.8	
VA11MAS2-92-3-2-2	44.3	57.6	
VA09MAS1-12-5-1-1	44.2	58.6	+
<b>MAS #116</b>	44.0	57.0	
<b>#Berkeley</b>	44.0	55.8	
VA16W-105†	43.9	55.8	
DH12SRW057-081	43.8	56.3	
PGX 18-7	43.7	56.9	
<b>MAS #108</b>	43.6	54.5	-
<b>USG 3197</b>	43.5	55.0	
PGX 17-16	43.4	57.8	
<b>SH 7200</b>	43.3	56.7	
<b>USG 3895</b>	43.2	56.2	
12VTK17-132	43.2	56.3	
<b>AgriMAXX 415</b>	43.1	57.8	
<b>AgriMAXX 495</b>	43.1	56.6	

**Table 32. Summary of performance of entries in the Virginia Tech Wheat Test, planted No-Till at Tidewater AREC, Holland, VA, 2019 harvest.**

	Grain Yield (Bu/a)	Test Weight (Lb/bu)
Line		
TX15D9597	43.1	57.9
KWS19X08	42.8	56.8
SH 4400	42.7	56.2
LW2848	42.6	57.3
VA09MAS2-131-6-2	42.6	55.3
VA16W-124†	42.5	57.1
Pioneer 26R36	42.2	56.4
AgriMAXX Exp 1902	42.2	57.2
LW2958	42.1	57.5
14VDH-SRW06-207	42.0	55.6
Pioneer 26R41	41.7	57.9
13VTK59-55	41.6	57.6
MAS #67	41.6	55.2
13VTK429-3	41.5	57.3
NC14-23372	41.4	57.5
CROPLAN CP8800	41.4	55.3
KY09C-1245-99-12-3	41.3	55.9
SY 007	41.3	56.4
SH 7510	41.2	56.8
TX15D9608	41.1	56.2
VA16W-108†	41.1	56.6
Hilliard	40.9	56.3
Armor Velocity	40.8	56.4
CROPLAN CP8550	40.7	56.5
Dyna-Gro 9750	40.5	54.6
VA12MAS7-519-1-3WS	40.5	58.8
LW2937	40.3	55.4
Armor Venom	40.2	56.1
DH11SRW066-153†	40.1	57.5
Dyna-Gro 9980	39.7	58.7
MAS #316	39.7	56.4
MAS #7	39.5	54.8
Dyna-Gro 9941	39.5	55.6
DH13SRW023-201	39.4	60.1
Dyna-Gro 9600	39.4	53.7
Dyna-Gro 9932	39.3	56.4
Featherstone 31	39.3	56.3
VA12MAS11-779-5-2	39.2	57.4
NC13-21213	39.1	58.3
MAS #106	39.0	56.5
MAS #35	38.8	54.9

**Table 32. Summary of performance of entries in the Virginia Tech Wheat Test, planted No-Till at Tidewater AREC, Holland, VA, 2019 harvest.**

Line	Grain Yield (Bu/a)	Test Weight (Lb/bu)	
NC15-21834	38.8	57.8	
CROPLAN CP9415	38.6	56.1	
Dyna-Gro WX19711	38.3	58.4	+
<b>Dyna-Gro 9701</b>	38.2	55.8	
12VTK17-55	37.8	55.0	
<b>SY 576</b>	37.7	55.1	
PGX 18-2	36.8	57.4	
<b>SY 547</b>	36.7	57.7	
NC14-20369	36.7	57.0	
DH13SRW022-23	36.6	54.8	
<b>LW2867</b>	36.6	53.7	-
<b>MAS #105</b>	36.5	56.6	
15VDH-FHB-MAS22-14	35.9	59.5	+
<b>MBX 969</b>	35.8	52.8	-
<b>Shirley</b>	35.4	54.7	
12VTK17-159	34.6	55.2	
<b>MAS #61</b>	34.5	55.6	
TX15D9253	33.6	55.3	
TX15D9579	33.0	54.8	
VA16W-196	33.0	55.5	
<b>USG 3228</b>	32.9	54.6	-
<b>MAS #6</b>	32.5	54.2	-
VA16W-29	29.5	-	55.1
<b>MBX 932</b>	29.1	-	56.0
AgriMAXX 485	28.5	-	56.5
Average	43.5	56.5	
LSD (0.05)	11.1	1.8	
C.V.	11.2	1.5	

Released cultivars are shown in bold print.

Varieties are ordered by descending yield averages.

A plus or minus sign indicates a performance significantly above or below the test average.

**Table 33. Summary of performance of entries in the Virginia Tech Wheat Test, Shenandoah Valley in Rockingham County, VA, 2019 harvest.**

Line	Grain Yield (Bu/a)		Test Weight (Lb/bu)		Plant Lodging (0-9)
KWS19X09	105.9	+	55.3	-	0
<b>Dyna-Gro 9941</b>	104.8	+	57.2		0
<b>Pioneer 26R36</b>	104.5	+	58.6	+	0
SR 8144	104.0	+	56.2	-	0
PGX 18-7	104.0	+	56.4	-	0
<b>USG 3316</b>	103.9	+	58.4	+	0
Dyna-Gro WX19714	102.8	+	55.7	-	0
Dyna-Gro WX19712	101.7		55.7	-	0
VA15W-86	101.7		57.1		0
<b>AgriMAXX Exp 1902</b>	101.3		57.2		0
VA16W-29	101.0		57.6		0
15VDH-FHB-MAS25-08	100.9		56.7		0
<b>SY Viper</b>	100.8		58.4	+	0
<b>USG 3197</b>	100.8		58.4	+	0
<b>AgriMAXX 486</b>	100.6		57.3		0
<b>MAS #7</b>	100.2		57.7		0
Armor ARW1813	99.9		55.4	-	0
<b>SH 4400</b>	99.8		58.5	+	0
<b>MAS #61</b>	99.6		58.3	+	0
<b>Liberty 5658</b>	99.5		58.1	+	0
USG 3536	99.5		57.1		0
<b>Pioneer 26R45</b>	99.5		57.9		0
<b>USG 3458</b>	99.3		57.7		0
<b>SY 100</b>	99.2		57.8		0
VA17W-176	99.1		56.8		0
<b>MBX 17-M-245</b>	99.1		57.7		0
<b>#Warrior</b>	99.0		58.0	+	0
<b>SY 547</b>	98.5		58.4	+	0
<b>AgriMAXX 415</b>	98.4		59.2	+	0
<b>AgriMAXX 473</b>	98.4		58.3	+	0
<b>#Blaze</b>	98.4		57.9		0
<b>Dyna-Gro 9772</b>	98.1		59.0	+	0
KWS19X03	98.1		55.3	-	0
VA09MAS2-131-6-2	98.0		58.2	+	0
VA09MAS1-12-5-1-1	97.8		58.2	+	0
Dyna-Gro WX19711	97.7		55.8	-	0
<b>MAS #86</b>	97.7		57.1		0
<b>USG 3228</b>	97.4		56.4	-	0
L11718	97.1		54.5	-	0
KY07C-1145-94-12-5	96.6		54.0	-	0
<b>#Bullet</b>	96.5		58.4	+	0

**Table 33. Summary of performance of entries in the Virginia Tech Wheat Test, Shenandoah Valley in Rockingham County, VA, 2019 harvest.**

Line	Grain Yield (Bu/a)	Test Weight (Lb/bu)	Plant Lodging (0-9)
VA13W-38	96.4	57.7	0
<b>Armor Velocity</b>	96.4	56.1	- 0
<b>Dyna-Gro 9750</b>	96.3	57.8	0
<b>Dyna-Gro 9980</b>	96.3	55.8	- 0
<b>Pioneer 26R59</b>	96.2	58.6	+ 0
<b>LW2958</b>	96.2	56.6	0
<b>MBX 932</b>	96.2	56.6	0
<b>MAS #106</b>	96.1	60.8	+ 0
<b>USG 3404</b>	96.0	58.8	+ 0
<b>Shirley</b>	96.0	60.7	+ 0
<b>MAS #116</b>	96.0	57.8	0
<b>MBX 969</b>	96.0	56.5	- 0
<b>MAS #105</b>	95.9	56.2	- 0
<b>Pioneer 26R10</b>	95.8	59.6	+ 0
TX15D9597	95.8	56.4	- 0
<b>LW2867</b>	95.5	56.6	0
<b>AgriMAXX 463</b>	95.5	57.9	0
<b>Dyna-Gro 9932</b>	95.4	55.8	- 0
13VTK434-89	95.3	57.4	0
Armor ARW1819	95.1	56.0	- 0
<b>CROPLAN CP9606</b>	95.1	57.6	0
DH12SRW057-081	95.0	57.6	0
<b>LW2848</b>	95.0	54.1	- 0
VA11MAS2-92-3-2-2	95.0	57.0	0
<b>#Berkeley</b>	94.8	58.8	+ 0
AgriMAXX 485	94.7	57.2	0
<b>VA12MAS11-779-5-2</b>	94.5	57.0	0
<b>Dyna-Gro 9600</b>	94.5	59.1	+ 0
<b>USG 3118</b>	94.5	58.8	+ 0
<b>MAS #35</b>	94.2	58.7	+ 0
<b>LW2937</b>	94.2	54.3	- 0
15VDH-FHB-MAS22-15	94.0	56.7	0
VA11MAS2-68-4-1-3	94.0	57.0	0
15VDH-FHB-MAS41-13	93.9	56.6	1 +
<b>CROPLAN CP8800</b>	93.6	56.0	- 0
<b>USG 3895</b>	93.5	58.4	+ 0
PGX 17-16	93.4	57.1	0
VA17W-126	93.4	56.9	0
<b>SH 7200</b>	93.4	58.7	+ 0
<b>MAS #316</b>	93.4	57.8	0
<b>Featherstone 31</b>	93.3	58.6	+ 0

**Table 33. Summary of performance of entries in the Virginia Tech Wheat Test, Shenandoah Valley in Rockingham County, VA, 2019 harvest.**

Line	Grain Yield (Bu/a)	Test Weight (Lb/bu)	Plant Lodging (0-9)
VA17W-75	93.2	56.9	0
<b>AgriMAXX 495</b>	93.1	57.2	0
CROPLAN CP9415	92.9	57.6	0
USG 3329	92.6	57.1	0
<b>Armor Venom</b>	92.5	56.1	- 0
L11814	92.5	54.4	- 0
<b>AgriMAXX Exp 1906</b>	92.4	57.1	0
PGX 18-8	92.4	56.4	- 0
<b>USG 3790</b>	92.2	56.3	- 0
VA17W-74	92.1	57.0	0
DH13SRW022-23	92.0	56.6	0
<b>SH 7510</b>	92.0	57.7	0
<b>MAS #6</b>	91.9	58.7	+ 0
<b>CROPLAN CP8550</b>	91.9	59.0	+ 0
<b>MAS #67</b>	91.7	58.3	+ 0
<b>Armor Mayhem</b>	91.7	58.0	+ 0
<b>SY 007</b>	91.6	58.8	+ 0
PGX 18-2	91.5	56.4	- 0
12VTK17-132	91.3	57.0	0
13VTK429-3	91.2	57.4	0
15VDH-SRW02-075	91.1	56.8	0
13VTK59-55	91.1	56.7	0
L11719	91.1	57.2	0
KY09C-1245-99-12-3	90.9	55.2	- 0
<b>Pioneer 26R41</b>	90.8	59.4	+ 0
12VTK17-159	90.4	57.0	0
<b>Dyna-Gro 9811</b>	90.4	58.4	+ 0
VA16W-108†	90.4	57.1	0
GA09129-16E55	90.3	55.7	- 0
VA16W-105†	90.2	57.6	0
<b>Dyna-Gro 9701</b>	90.1	56.5	- 0
DH12SRW057-006	89.9	58.1	+ 0
KWS19X08	89.9	55.3	- 0
VA17W-79	89.6	56.6	0
VA12MAS7-519-1-3WS	89.4	57.0	0
12VTK17-55	89.4	57.0	0
<b>MAS #108</b>	89.3	58.7	+ 0
VA16W-224	89.0	57.5	0
<b>SY 576</b>	88.3	56.2	- 0
<b>Hilliard</b>	88.3	58.8	+ 0
VA16W-202	88.2	57.5	0

**Table 33. Summary of performance of entries in the Virginia Tech Wheat Test, Shenandoah Valley in Rockingham County, VA, 2019 harvest.**

Line	Grain Yield (Bu/a)	Test Weight (Lb/bu)	Plant Lodging (0-9)
<b>MBX 17-P-275</b>	87.6	57.7	0
<b>AgriMAXX 480</b>	87.6	57.2	0
GA071518-16E39	87.5	55.7	- 0
VA16W-124†	87.1	57.5	0
VA16W-148	87.0	57.5	0
VA16W-149	86.1	57.5	0
<b>#Turbo</b>	85.8	58.0	+ 0
NC13-21213	85.7	57.9	0
NC15-21834	85.7	56.5	- 0
TX15D9253	85.7	56.4	- 0
DH13SRW021-70	85.7	57.4	0
<b>DH13SRW025-14</b>	85.1	57.3	0
15VDH-FHB-MAS22-14	85.1	56.7	4 +
VA17W-167	85.1	56.8	0
14VDH-SRW06-207	85.0	56.8	0
VA16W-196	82.7	- 57.5	0
TX15D9608	81.3	- 56.3	- 0
DH11SRW066-153†	81.1	- 57.6	0
TX15D9579	80.5	- 56.4	- 0
15VDH-FHB-MAS33-30	80.4	- 56.7	0
<b>Massey</b>	80.1	- 58.7	+ 0
GA09436-16LE12	79.2	- 55.4	- 0
<b>NC14-23372</b>	79.1	- 57.1	0
DH13SRW023-201	78.5	- 57.4	0
NC14-20369	78.0	- 60.9	+ 0
Average	93.4	57.3	0
LSD (0.05)	9.3	0.7	1
C.V.	7.1	0.9	1230

Released cultivars are shown in bold print.

Varieties are ordered by descending yield averages.

A plus or minus sign indicates a performance significantly above or below the test average.

The 0-9 ratings indicate a genotype's response to disease or lodging where 0 = highly resistant and 9 = highly susceptible.

## Section 4: Milling and Baking Quality

Grain samples of 74 entries in Virginia's 2018 State Wheat Test grown at Warsaw, VA were submitted to the USDA-ARS Soft Wheat Quality Lab in Wooster, OH for advanced milling and baking quality evaluations. Wheat cultivars and experimental lines (collectively referred to as "varieties" herein) are listed in Table 34 from highest to lowest T-scores for overall milling and baking quality. The soft red winter cultivar Shirley that has historically had good milling and pastry baking quality was used as the quality standard check and has an overall quality T-score of zero. Wheat cultivars or experimental lines with T-scores greater than zero have overall quality that is similar to or exceeds that of Shirley, while those with T-scores less than zero have overall quality that is similar to or less than that of Shirley. Quality grades (A-F) were also assigned (see Tables below) for flour yield (a key indicator of milling quality) and cookie diameter (a key indicator of pastry baking quality) as varieties having good milling quality may or may not have good pastry baking quality and vice versa.

### Adjusted Flour Yield Grade (Based on Samples between 2009 and 2017)

Grade	Range	Percent
A	>70.76	15
B	69.60 to 70.76	20
C	68.11 to 69.60	30
D	66.71 to 68.11	20
F	<66.71	15

### Cookie Diameter (Based on Samples Between 2009 and 2017)

Grade	Range	Percent
A	>19.21	15
B	18.78 to 19.21	20
C	18.26 to 18.78	30
D	17.72 to 18.26	20
F	<17.72	15

## **Additional Information on Quality Analysis**

Of the quality characteristics measured at the Soft Wheat Quality Laboratory, flour milling yield is the most reproducible and perhaps most important because it is genetically and environmentally associated with good soft wheat flour quality. Flour yields of the 74 varieties ranged from 63.1% to 73.6 % and 45 varieties had flour yields and grades (A-C) that were similar to (20 varieties) or higher (25 varieties) than that of Shirley (69.4 %) the quality standard check (Table 34).

After flour yield, the second quality trait that we recommend for use in selection is softness equivalent. It tends to have high heritability and is an important predictor of milling break flour yield. Overall the 74 varieties varied more for softness equivalence scores (43.3 to 66.7 %) in 2018 than in 2017 (49.1 to 62.5 %) or 2016 (43.6 to 60.0%). Higher values are preferred for most soft wheat manufactured goods, particularly cakes and other high sugar baked products. Softness equivalence scores of 30 varieties were numerically higher than that of Shirley (60.8 %).

Flour protein concentration of Shirley was 7.7 % and considerably lower than most of the 74 varieties, which ranged from 6.8 % to 10.8 % protein. Gluten strength is measured as lactic acid Solvent Retention Capacity (SRC) and is also correlated to flour protein concentration, but the effect is dependent on variety and growing conditions. Weaker gluten strength is desired for most pastry products, such as cookies and cakes, while stronger gluten strength is desired in production of crackers and some bread type products. Lactic acid SRC values of 10 varieties including Shirley (95.3 %) were less than 100 %, while the remaining 64 varieties had values ranging from 102 % to 150 % with a test average of 117 %. Ten varieties had Lactic acid SRC values (129 to 150%) and flour protein concentrations (9.0 to 10.6%), and may have potential in blends to produce crackers or some bread type products.

Pastry baking quality was assessed via measurement of sugar cookie spread diameter, which ranged from 15.9 to 19.5 cm with a test average of 18.4 cm that was similar to that of the quality standard Shirley (18.3 cm). Twenty-seven of the 74 varieties had cookie spread diameters similar to that of Shirley, while 19 varieties had cookie spread diameters (18.8 to 19.5 cm) and scores (A-B) that exceeded those of Shirley. Twenty-nine varieties had overall quality T-scores (0.0 to 0.9) that were similar to or higher than that of Shirley.

**Table 34. Milling and baking quality of entries in the Virginia Tech Official Variety Test based on evaluation of the 2018 Warsaw harvest.**

Entry	Adjusted Flour Yield (%)	Adjusted Flour Yield % Grade	Soft- ness Equiv (%)	Flour Protein (at 14%)	Lactic Acid SRC (%)	Cookie Diam- eter (cm)	Cookie Diam Grade	Total T- Score
<b>USG 3316</b>	71.5	A	65.2	8.2	117.6	19.4	A	0.9
<b>CROPLAN CP9415</b>	70.7	B	66.7	6.8	105.6	19.2	B	0.6
DH12SRW056-058	71.2	A	60.9	8.5	139.3	18.8	C	0.6
<b>AgriMAXX 444</b>	70.9	A	63.4	7.2	106.6	18.9	B	0.6
<b>AgriMAXX 415</b>	70.4	B	60.7	8.3	119.5	19.0	B	0.6
<b>AgriMAXX 446</b>	70.5	B	65.9	8.1	109.0	19.2	B	0.5
<b>USG 3458</b>	70.4	B	60.7	8.6	102.7	18.6	C	0.5
<b>MAS #86</b>	70.2	B	62.9	8.0	112.5	19.1	B	0.4
<b>USG 3329</b>	69.8	B	64.1	9.3	137.4	19.1	B	0.4
<b>#Blaze</b>	69.6	C	63.3	9.6	141.6	18.6	C	0.4
<b>USG 3895</b>	70.3	B	62.1	7.7	95.4	19.5	A	0.4
<b>CROPLAN CP9606</b>	70.8	A	61.7	8.1	99.8	19.1	B	0.4
<b>Pioneer 26R45</b>	69.4	C	57.1	9.0	91.8	18.9	B	0.4
DH11SRW066-153	69.6	C	62.3	9.1	139.0	18.4	C	0.4
VA09MAS1-12-5-1-1	69.6	B	55.0	9.6	121.8	18.8	C	0.4
<b>USG 3404</b>	70.3	B	61.9	8.2	113.5	19.2	B	0.3
<b>MBX 14-S-210</b>	69.6	C	64.8	8.9	125.3	18.3	C	0.3
VA16W-29	70.8	A	60.3	8.0	87.7	19.2	B	0.3
DH12SRW057-006	69.6	C	58.2	10.0	129.2	18.2	D	0.3
<b>#Warrior</b>	70.7	B	62.0	7.9	101.8	19.0	B	0.3
<b>Pioneer 26R41</b>	70.5	B	62.5	8.1	132.1	18.7	C	0.3
<b>AgriMAXX 474</b>	70.2	B	62.9	8.0	102.7	18.5	C	0.2
VA16W-31	70.1	B	56.1	9.5	95.8	18.2	D	0.2
<b>MBX 17-M-245</b>	70.0	B	61.9	7.9	98.1	18.4	C	0.2
<b>Pioneer 26R10</b>	69.2	C	64.3	8.5	117.2	18.3	C	0.1
DH12SRW057-081	69.4	C	61.4	8.2	116.1	18.2	D	0.1
<b>CROPLAN CP8415</b>	70.1	B	59.8	8.8	126.4	18.2	D	0.0
L11719	68.9	C	63.6	7.7	125.1	19.1	B	0.0
<b>MAS #87</b>	70.0	B	56.2	9.0	113.9	19.3	A	0.0
<b>Shirley (Standard)</b>	<b>69.4</b>	<b>C</b>	<b>60.8</b>	<b>7.7</b>	<b>95.3</b>	<b>18.3</b>	<b>C</b>	<b>0.0</b>
VA16W-196	68.7	C	64.4	8.4	120.2	18.2	D	-0.1
<b>Pioneer 26R59</b>	69.2	C	63.3	7.5	99.5	18.6	C	-0.1
VA09MAS2-131-6-2-4	68.2	C	58.7	8.8	110.4	18.4	C	-0.1
<b>MAS #316</b>	73.6	A	49.3	8.3	96.2	16.6	F	-0.1
13VTK434-89	67.0	D	59.4	9.4	131.1	18.6	C	-0.2
<b>Armor Mayhem</b>	70.0	B	57.9	8.3	107.2	18.5	C	-0.2
<b>MAS #116</b>	69.4	C	58.1	8.8	109.9	18.5	C	-0.2
<b>AgriMAXX 473</b>	69.4	C	57.8	8.7	113.3	18.6	C	-0.2
<b>Dyna-Gro 9701</b>	69.4	C	57.2	9.3	116.7	17.8	D	-0.2
<b>SH 4300</b>	68.7	C	62.0	8.2	116.7	18.4	C	-0.2
13VTK429-3	68.7	C	58.2	8.5	132.4	18.2	D	-0.2

**Table 34. Milling and baking quality of entries in the Virginia Tech Official Variety Test based on evaluation of the 2018 Warsaw harvest.**

Entry	Adjusted Flour Yield (%)	Adjusted Flour Yield % Grade	Soft- ness Equiv (%)	Flour Protein (at 14%)	Lactic Acid SRC (%)	Cookie Diam- eter (cm)	Cookie Diam Grade	Total T- Score
WX17775	69.3	C	57.1	8.4	113.1	18.5	C	-0.3
<b>CROPLAN CP8550</b>	69.4	C	57.8	9.7	117.2	18.6	C	-0.3
<b>#Bullet</b>	69.2	C	57.0	9.6	119.7	18.8	B	-0.3
SR 8483 (VA12W-68)	67.4	D	59.4	9.9	110.3	18.3	C	-0.3
VA16W-149	67.2	D	61.0	8.8	143.2	18.2	D	-0.4
<b>USG 3536</b>	69.2	C	58.3	8.8	113.2	18.1	D	-0.4
<b>AgriMAXX 486</b>	72.7	A	51.5	8.0	97.1	16.8	F	-0.4
VA09MAS2-131-6-2	67.6	D	56.4	8.9	106.5	18.1	D	-0.4
<b>Dyna-Gro 9811</b>	67.1	D	60.1	9.2	130.3	18.0	D	-0.5
<b>#BERKELEY</b>	66.8	D	59.9	9.7	111.9	18.9	B	-0.5
<b>USG 3228</b>	67.6	D	60.4	8.3	113.1	19.1	B	-0.5
13VTK128-75	66.9	D	62.4	8.8	125.2	18.6	C	-0.5
DH13SRW021-70	67.7	D	55.4	9.4	102.9	18.0	D	-0.5
<b>Hilliard</b>	67.3	D	58.9	8.9	120.8	18.4	C	-0.6
<b>MAS #61</b>	67.1	D	57.1	10.0	142.6	17.9	D	-0.7
<b>MBX 17-P-275</b>	67.4	D	59.7	8.1	107.8	18.9	B	-0.7
<b>AgriMAXX 463</b>	67.7	D	61.4	8.3	115.6	18.4	C	-0.7
VA16W-224	66.4	F	59.7	8.3	110.2	18.7	C	-0.7
<b>Featherstone 31</b>	66.5	F	56.4	8.8	125.3	17.8	D	-0.8
13VTK59-148	66.6	F	59.9	8.1	120.2	18.7	C	-0.8
DH13SRW023-201	66.0	F	51.3	10.6	129.0	17.7	F	-0.8
<b>MAS #7</b>	67.5	D	55.7	8.8	129.7	17.8	D	-0.8
<b>Luisa</b>	67.0	D	60.5	8.8	110.7	18.3	C	-0.9
<b>Dyna-Gro 9772</b>	66.6	F	61.4	8.6	140.7	18.4	C	-0.9
VA16W-202	68.0	D	64.0	8.8	136.4	17.8	D	-0.9
<b>SY Viper</b>	66.4	F	58.3	9.5	110.9	18.2	D	-0.9
VA16W-105	66.3	F	61.7	9.0	143.2	18.2	D	-1.0
<b>USG 3197</b>	66.3	F	62.0	8.2	142.6	18.2	D	-1.0
<b>AgriMAXX 480</b>	65.9	F	58.3	10.1	149.9	17.7	F	-1.1
VA16W-148	65.1	F	57.6	8.4	101.6	17.0	F	-1.4
VA16W-124	70.9	A	43.3	9.7	115.8	15.9	F	-1.5
L11550	63.4	F	56.6	10.8	116.6	17.3	F	-1.9
DH13SRW025-14	63.1	F	51.6	9.9	110.5	17.6	F	-2.0
Average (N=74)	67.8		59.6	8.7	117.0	18.4		
Standard Deviation	1.9		3.9	0.8	14.4	0.6		

Varieties are ordered by descending Total T-score, which accounts for overall milling and baking quality. Variety Shirley is used as the quality standard.

\* Total T-Score = Sum of (0.15 x Test Weight), (-0.1 x SKCS Kernel Hardness), (0.4 x Flour Yield), (0.15 x Softness Equivalent) and (-0.2 x Sodium Carbonate SRC)

## Section 5: Wheat Scab Research

One of the primary research objectives of the Virginia Tech wheat breeding program is to identify and develop cultivars possessing resistance to Fusarium Head Blight (FHB) or scab. In 2019, all wheat entries in Virginia's Official State Variety Trials were evaluated for FHB resistance in an inoculated, irrigated nursery at the Virginia Crop Improvement Association (VCIA) test site in Mt. Holly, VA. Data from this test for the current crop year and two- and three-year averages for FHB incidence, FHB severity and FHB Index are included in this bulletin (Tables 35-37) to aid producers in selection of cultivars on the basis of FHB resistance. Cultivars possessing complete resistance or immunity to FHB have not been identified and resistance levels in currently available cultivars vary from moderately resistant to highly susceptible.

A major goal of the breeding program is to identify and incorporate unique and complementary types of FHB resistance into cultivars to enhance the overall level of resistance. Genes controlling FHB resistance have been identified on more than six chromosomes in wheat and some of these genes are complementary in nature and effect different disease resistance components such as FHB incidence, severity, and DON toxin content. Incorporating such multiple resistance genes having additive effects on FHB resistance into cultivars will enhance the overall level of resistance. Because the individual resistance genes are located on different wheat chromosomes and each gene confers only partial resistance to FHB, identifying wheat lines having multiple resistance genes is difficult using traditional breeding techniques. To overcome this limitation, our program is currently identifying and using DNA markers located close to these resistance genes on the same chromosome as "tags" for selecting wheat lines possessing different combinations of these complementary resistance genes in a process called Marker-Assisted Selection (MAS). In 2019, several lines, among the Virginia State test, developed through our MAS program have shown significantly improved levels of FHB resistance to year's past and good overall quality. These include 15VDH-FHB-MAS22-14, 15VDH-FHB-MAS22-15 and 15VDH-FHB-MAS25-08 along with other lines exhibiting good native resistance to FHB including VA13W-38, VA17W-75 and Hilliard.

In 2019, entries were inoculated by spreading scabby corn kernels (50g/4-rows) in plots at the booting stage. Overall, the wheat lines exhibited a moderately severe level of infection and expressed a good distribution of FHB related traits in the misted nursery. Among 148 lines and varieties tested in 2019, the FHB index varied from 0.1 to 6.9 with FHB incidence ranging from 7.5% to 100% and FHB severity ranging from 9.0% to 80.8% (Table 35). Eighty-seven lines and varieties had FHB index values lower than the mean (<2.0) and expressed moderate resistant to FHB in 2019. Based on two year mean data for 2018 and 2019 (Table 36), fourteen lines and 33 varieties had FHB index values lower than the test mean (<3.0).

**Table 35. Summary of reaction of entries in the Virginia Tech State Wheat Test to Fusarium head blight (scab), 2019 harvest.**

Line	FHB Incidence <sup>1</sup> (%)	FHB Severity <sup>2</sup> (%)	FHB Index <sup>3</sup> (0-9)	Flowering Date (Julian)
<b>MAS #67</b>	7.5	-	9.0	120
15VDH-FHB-MAS22-14	7.5	-	9.5	118
<b>MAS #106</b>	7.5	-	10.0	116
<b>Dyna-Gro 9750</b>	10.0	-	11.3	118
<b>MBX 17-P-275</b>	10.0	-	12.3	120
<b>AgriMAXX 463</b>	10.0	-	13.8	118
<b>USG 3228</b>	12.5	-	12.5	118
<b>MAS #86</b>	17.5	-	16.5	122
<b>USG 3197</b>	17.5	-	17.5	122
<b>Dyna-Gro 9980</b>	22.5	-	17.5	122
<b>LW2848</b>	27.5	-	16.8	121
VA13W-38	25.0	-	20.0	119
<b>Pioneer 26R45</b>	25.0	-	19.5	123
<b>#Bullet</b>	35.0	-	15.5	123
<b>USG 3536</b>	30.0	-	18.0	122
<b>AgriMAXX 485</b>	30.0	-	18.3	122
<b>Dyna-Gro 9701</b>	35.0	-	15.8	122
<b>Armor Venom</b>	32.5	-	18.5	122
VA17W-75	27.5	-	22.0	119
<b>Dyna-Gro 9600</b>	32.5	-	18.8	118
<b>MAS #105</b>	30.0	-	21.8	123
<b>Armor Velocity</b>	35.0	-	18.3	120
<b>SY 576</b>	37.5	-	17.8	124
<b>MAS #316</b>	47.5	-	14.5	124
<b>CROPLAN CP8550</b>	40.0	-	18.0	124
<b>Dyna-Gro 9772</b>	30.0	-	24.3	122
AgriMAXX Exp 1902	32.5	-	22.0	123
<b>LW2867</b>	35.0	-	21.3	123
<b>Armor Mayhem</b>	40.0	-	19.3	123
DH13SRW022-23	27.5	-	29.5	120
<b>MBX 969</b>	37.5	-	21.3	123
<b>AgriMAXX 486</b>	47.5	-	17.8	123
15VDH-FHB-MAS25-08	25.0	-	34.0	118
<b>Dyna-Gro 9932</b>	37.5	-	23.0	121
<b>LW2937</b>	55.0	-	16.0	123
Armor ARW1813	37.5	-	24.3	120
<b>AgriMAXX 473</b>	45.0	-	21.0	123
VA11MAS2-68-4-1-3	35.0	-	27.8	119
<b>Dyna-Gro 9941</b>	42.5	-	23.5	122
<b>Pioneer 26R36</b>	40.0	-	25.8	122
VA16W-148	50.0	-	21.0	123

**Table 35. Summary of reaction of entries in the Virginia Tech State Wheat Test to Fusarium head blight (scab), 2019 harvest.**

Line	FHB Incidence <sup>1</sup> (%)	FHB Severity <sup>2</sup> (%)	FHB Index <sup>3</sup> (0-9)	Flowering Date (Julian)	
Dyna-Gro WX19711	50.0	21.8	1.0	122	-
<b>MAS #116</b>	50.0	22.5	1.0	122	-
Dyna-Gro WX19714	50.0	22.8	1.1	120	-
KY09C-1245-99-12-3	32.5	35.8	1.1	120	-
<b>Liberty 5658</b>	40.0	29.3	1.1	119	-
<b>MBX 932</b>	40.0	29.3	1.1	123	
<b>LW2958</b>	42.5	27.5	1.1	122	-
L11814	32.5	33.5	1.1	115	-
<b>AgriMAXX 495</b>	45.0	27.5	1.1	121	-
<b>MAS #35</b>	45.0	28.0	1.1	123	
<b>MAS #61</b>	42.5	29.0	1.2	122	-
Aarmor ARW1819	42.5	30.0	1.2	122	-
DH13SRW025-14	35.0	32.3	1.2	120	-
15VDH-FHB-MAS22-15	27.5	41.8	1.2	115	-
DH12SRW057-081	30.0	43.5	1.2	119	-
L11718	42.5	32.0	1.2	119	-
VA17W-126	40.0	35.3	1.3	116	-
<b>SY Viper</b>	32.5	38.5	1.3	120	-
PGX 17-16	47.5	29.5	1.3	122	-
<b>USG 3316</b>	45.0	29.5	1.3	123	
VA09MAS2-131-6-2	40.0	32.0	1.3	118	-
VA15W-86	45.0	34.0	1.4	120	-
<b>USG 3404</b>	45.0	34.3	1.4	122	-
PGX 18-2	40.0	35.3	1.4	119	-
<b>Hilliard</b>	45.0	32.8	1.4	120	-
12VTK17-55	57.5	26.5	1.4	123	-
L11719	45.0	33.0	1.4	123	-
VA17W-74	42.5	37.5	1.5	118	-
DH13SRW023-201	55.0	29.3	1.5	122	-
<b>CROPLAN CP8800</b>	55.0	29.8	1.5	121	-
12VTK17-132	45.0	36.3	1.5	121	-
Dyna-Gro WX19712	45.0	37.3	1.5	121	-
<b>Pioneer 26R41</b>	50.0	33.5	1.6	121	-
<b>SY 547</b>	52.5	30.5	1.6	121	-
VA12MAS11-779-5-2	42.5	40.8	1.6	122	-
<b>USG 3118</b>	50.0	35.5	1.6	117	-
VA16W-196	55.0	33.5	1.7	123	
VA16W-149	65.0	29.0	1.7	123	
<b>SH 7510</b>	55.0	34.5	1.7	121	-
<b>#Blaze</b>	57.5	33.8	1.8	121	-
PGX 18-8	52.5	38.3	1.8	122	-

**Table 35. Summary of reaction of entries in the Virginia Tech State Wheat Test to Fusarium head blight (scab), 2019 harvest.**

Line	FHB Incidence <sup>1</sup> (%)	FHB Severity <sup>2</sup> (%)	FHB Index <sup>3</sup> (0-9)	Flowering Date (Julian)	
DH11SRW066-153†	47.5	38.8	1.8	122	-
<b>Massey</b>	62.5	32.5	1.9	120	-
<b>USG 3790</b>	57.5	36.8	1.9	122	-
<b>MAS #6</b>	55.0	37.5	1.9	121	-
KWS19X09	55.0	40.5	2.0	121	-
VA16W-202	52.5	42.0	2.1	118	-
VA17W-79	47.5	39.0	2.1	119	-
VA12MAS7-519-1-3WS	55.0	43.0	2.1	125	
<b>Pioneer 26R10</b>	60.0	37.8	2.2	121	-
<b>Dyna-Gro 9811</b>	52.5	40.5	2.2	122	-
<b>SY 007</b>	50.0	47.3	2.2	121	-
PGX 18-7	57.5	41.5	2.2	122	-
13VTK429-3	60.0	39.5	2.2	123	
15VDH-SRW02-075	60.0	41.5	2.3	123	-
<b>#Turbo</b>	57.5	43.0	2.3	121	-
<b>AgriMAXX 415</b>	55.0	45.8	2.3	120	-
VA17W-176	57.5	43.5	2.3	119	-
NC15-21834	55.0	45.0	2.3	121	-
<b>SH 4400</b>	60.0	43.5	2.4	123	
KWS19X03	60.0	43.3	2.4	124	
<b>SY 100</b>	67.5	39.5	2.5	124	
DH13SRW021-70	60.0	45.3	2.5	122	-
15VDH-FHB-MAS41-13	65.0	41.8	2.5	121	-
VA16W-224	65.0	42.5	2.5	124	
14VDH-SRW06-207	70.0	39.3	2.5	124	
13VTK59-55	62.5	44.5	2.6	120	-
<b>USG 3329</b>	62.5	43.0	2.6	122	-
NC14-23372	75.0	37.8	2.6	124	
13VTK434-89	62.5	46.8	2.7	121	-
<b>MBX 17-M-245</b>	57.5	51.0	2.7	122	-
GA09129-16E55	47.5	56.8	2.7	118	-
KY07C-1145-94-12-5	65.0	46.3	2.8	118	-
<b>CROPLAN CP9415</b>	67.5	42.5	2.8	124	
KWS19X08	67.5	46.0	2.8	122	-
<b>#Warrior</b>	65.0	50.5	3.0	123	
VA16W-105†	62.5	52.3	3.0	121	-
SR 8144	67.5	48.8	3.0	118	-
<b>CROPLAN CP9606</b>	72.5	47.0	3.1	119	-
<b>Pioneer 26R59</b>	75.0	45.8	3.1	119	-
12VTK17-159	75.0	46.0	3.2	122	-
<b>USG 3458</b>	70.0	48.8	3.2	122	-

**Table 35. Summary of reaction of entries in the Virginia Tech State Wheat Test to Fusarium head blight (scab), 2019 harvest.**

Line	FHB Incidence <sup>1</sup> (%)	FHB Severity <sup>2</sup> (%)	FHB Index <sup>3</sup> (0-9)	Flowering Date (Julian)	
NC14-20369	60.0	56.3	3.2	119	-
VA16W-29	67.5	49.3	3.2	124	
<b>#Berkeley</b>	82.5 +	43.0	3.3	117	-
<b>USG 3895</b>	70.0	51.3	3.3	122	-
<b>Shirley</b>	80.0	46.8	3.4	123	
<b>MAS #108</b>	77.5	48.5	3.4	119	-
15VDH-FHB-MAS33-30	60.0	63.3 +	3.5	116	-
<b>AgriMAXX 480</b>	60.0	66.0 +	3.6	116	-
VA16W-124†	70.0	57.5	3.7	121	-
AgriMAXX Exp 1906	70.0	57.8	3.7	120	-
VA09MAS1-12-5-1-1	72.5	58.5	3.9	119	-
DH12SRW057-006	67.5	65.3 +	4.0	121	-
NC13-21213	82.5 +	53.8	4.1	121	-
VA11MAS2-92-3-2-2	85.0 +	57.5	4.4 +	124	
VA16W-108†	75.0	65.5 +	4.5 +	121	-
<b>MAS #7</b>	70.0	74.8 +	4.7 +	118	-
TX15D9579	82.5 +	64.5 +	4.9 +	120	-
<b>Featherstone 31</b>	82.5 +	65.5 +	4.9 +	123	
TX15D9597	85.0 +	65.3 +	5.0 +	121	-
TX15D9608	82.5 +	67.3 +	5.1 +	120	-
VA17W-167	82.5 +	69.3 +	5.2 +	122	-
<b>SH 7200</b>	87.5 +	72.5 +	5.8 +	120	-
TX15D9253	90.0 +	72.0 +	5.9 +	121	-
GA09436-16LE12	92.5 +	75.0 +	6.3 +	121	-
GA071518-16E39	100.0 +	75.8 +	6.9 +	121	-
Average	51.1	37.1	2.0	124	
LSD (0.05)	30.1	24.7	2.2	1	
C.V.	42.4	48.0	80.2	1	

Released cultivars are shown in bold print.

Varieties are ordered by ascending FHB index averages.

A plus or minus sign indicates a performance significantly above or below the average.

Entries were planted in 2-row plots, 4ft in length at Mt. Holly, VA and were inoculated at booting stage with scabby corn kernels (50g/4-rows).

<sup>1</sup> Scab Incidence (0-10): Based on infected spikes within 4 ft row.

<sup>2</sup> Scab Severity (0-10): Based on infected spikelets in 10 spikes showing disease symptoms.

<sup>3</sup> FHB Index is an overall indicator of scab resistance/susceptibility level and takes into account both incidence and severity where 0 = highly resistant and 9 = highly susceptible.

**Table 36. Two-year summary of reaction of entries in the Virginia Tech State Wheat Test to Fusarium head blight (scab), 2018 and 2019 harvests.**

Line	FHB Incidence <sup>1</sup> (%)		FHB Severity <sup>2</sup> (%)		FHB Index <sup>3</sup> (0-9)		Flowering Date (Julian)	FDK <sup>4</sup> (%)	ISK Index <sup>5</sup> (0-9)	DON <sup>6</sup> (ppm)
Year	2018-19		2018-19		2018-19		2018-19	2018	2018	2018
<b>USG 3228</b>	40.0	-	14.4	-	0.6	-	122	-	15.0	2.3 - 11.2
<b>MBX 17-P-275</b>	35.0	-	16.0	-	0.6	-	123		10.0	2.2 - 19.5
<b>AgriMAXX 463</b>	38.8	-	20.1	-	0.9	-	122	-	20.0	2.6 - 5.6
<b>USG 3197</b>	45.0	-	20.9	-	0.9	-	124		30.0	2.6 - 15.5
<b>MAS #86</b>	47.5	-	20.6	-	1.0	-	125		10.0	2.8 - 11.8
<b>Dyna-Gro 9772</b>	52.5	-	25.8	-	1.3	-	124		15.0	2.8 - 15.3
<b>Dyna-Gro 9750</b>	47.5	-	26.1	-	1.6	-	122	-	10.0	3.4 20.8
AgriMAXX 485	60.0		26.4	-	1.7	-	126	+	20.0	3.4 14.1
<b>USG 3316</b>	63.8		30.1	-	1.8	-	126	+	20.0	3.1 - 16.6
<b>DH13SRW025-14</b>	62.5		32.1		1.9	-	122	-	35.0	3.3 14.9
<b>AgriMAXX 486</b>	71.3		27.1	-	2.0	-	126	+	15.0	3.6 10.6
<b>Hilliard</b>	63.8		33.5		2.0	-	123		30.0	3.2 - 14.3
PGX 17-16	66.3		33.5		2.1		125		15.0	3.3 8.4
<b>Dyna-Gro 9600</b>	62.5		31.3	-	2.2		122	-	25.0	3.7 5.2
<b>Pioneer 26R45</b>	61.3		31.5		2.2		125		40.0	3.9 7.3
<b>Pioneer 26R36</b>	63.8		34.0		2.2		124		50.0	3.6 10.4
VA16W-148	71.3		31.1	-	2.2		125		25.0	3.7 10.6
<b>Dyna-Gro 9701</b>	65.0		30.6	-	2.2		125		20.0	3.8 9.7
<b>AgriMAXX 473</b>	71.3		31.0	-	2.2		126	+	8.0	3.8 16.4
<b>#Blaze</b>	76.3		32.6		2.3		124		20.0	3.5 5.0
13VTK434-89	66.3		38.6		2.3		124		10.0	2.7 - 14.2
<b>MAS #61</b>	66.3		35.1		2.3		124		25.0	3.6 16.5
DH13SRW023-201	72.5		33.8		2.3		125		15.0	3.5 14.1
<b>Liberty 5658</b>	63.8		37.0		2.3		123		25.0	3.6 16.7
<b>CROPLAN CP8550</b>	67.5		32.0		2.3		127	+	30.0	3.9 7.6
<b>Dyna-Gro 9941</b>	71.3		32.4		2.3		126	+	10.0	3.9 11.1
<b>#Bullet</b>	66.3		31.8		2.4		127	+	15.0	4.0 12.4
<b>USG 3404</b>	67.5		38.0		2.4		125		10.0	3.6 13.2
<b>SY 547</b>	70.0		35.6		2.4		123		20.0	3.5 12.7
<b>Massey</b>	77.5		35.5		2.5		124		15.0	3.6 13.6
<b>Armor Mayhem</b>	67.5		35.0		2.6		126	+	10.0	4.0 14.0
<b>AgriMAXX 415</b>	73.8		39.8		2.6		123		20.0	3.5 12.7
USG 3329	73.8		38.3		2.6		124		15.0	3.2 - 10.4
DH13SRW021-70	72.5		40.4		2.6		124		15.0	3.3 - 15.4
DH12SRW057-081	60.0		46.6		2.6		123		15.0	3.8 9.8
DH11SRW066-153†	70.0		40.6		2.7		124		45.0	3.7 19.1
<b>Pioneer 26R41</b>	72.5		39.4		2.7		124		30.0	3.8 12.6
<b>MAS #316</b>	72.5		34.9		2.8		127	+	20.0	4.2 20.3
<b>#Turbo</b>	75.0		41.8		2.8		124		20.0	3.6 17.6
VA16W-196	76.3		39.4		2.8		125		20.0	3.9 5.7

**Table 36. Two-year summary of reaction of entries in the Virginia Tech State Wheat Test to Fusarium head blight (scab), 2018 and 2019 harvests.**

Line	FHB Incidence <sup>1</sup> (%)	FHB Severity <sup>2</sup> (%)	FHB Index <sup>3</sup> (0-9)	Flowering Date (Julian)	FDK <sup>4</sup> (%)	ISK Index <sup>5</sup> (0-9)	DON <sup>6</sup> (ppm)
Year	2018-19	2018-19	2018-19	2018-19	2018	2018	2018
VA16W-202	71.3	43.0	2.8	122 -	35.0	3.7	14.4
<b>SH 7510</b>	71.3	41.9	2.9	125	10.0	3.7	10.1
<b>Dyna-Gro 9811</b>	73.8	41.4	2.9	123	35.0	3.8	10.8
VA09MAS2-131-6-2	66.3	42.4	2.9	122 -	15.0	4.0	9.8
<b>SY Viper</b>	61.3	46.8	2.9	122 -	25.0	4.0	9.2
<b>Pioneer 26R10</b>	76.3	40.5	2.9	124	30.0	3.7	8.8
<b>AgriMAXX 495</b>	68.8	41.6	2.9	124	35.0	4.1	11.2
VA16W-105†	71.3	46.8	3.0	124	25.0	3.3	12.1
<b>MAS #116</b>	73.8	39.5	3.0	126 +	35.0	4.2	10.4
13VTK429-3	76.3	44.0	3.2	125	15.0	3.9	15.4
<b>NC14-23372</b>	85.0 +	41.0	3.2	126 +	15.0	3.8	10.0
<b>USG 3118</b>	73.8	46.0	3.3	122 -	40.0	4.2	17.2
VA16W-149	82.5	41.8	3.3	125	25.0	4.2	9.8
L11719	71.3	46.4	3.4	125	45.0	4.3 +	16.9
VA16W-224	81.3	48.1	3.6	126 +	35.0	4.1	6.7
<b>SH 4400</b>	77.5	51.1	3.7	126 +	20.0	4.2	8.8
<b>AgriMAXX 480</b>	77.5	55.9 +	3.8	120 -	20.0	3.8	24.8
<b>MBX 17-M-245</b>	75.0	55.3 +	3.9	124	25.0	4.2	9.4
<b>CROPLAN CP9606</b>	82.5	51.1	3.9	123	40.0	4.0	6.2
<b>Pioneer 26R59</b>	86.3 +	51.3	4.1 +	123	25.0	4.2	10.6
<b>USG 3895</b>	85.0 +	53.4 +	4.2 +	125	40.0	4.3 +	10.5
<b>#Berkeley</b>	88.8 +	52.3 +	4.3 +	121 -	40.0	4.3 +	10.6
VA16W-124†	80.0	59.0 +	4.3 +	124	40.0	4.1	7.0
<b>MAS #7</b>	81.3	61.4 +	4.4 +	123	30.0	3.8	11.4
<b>Shirley</b>	87.5 +	54.3 +	4.4 +	125	35.0	4.3 +	9.6
DH12SRW057-006	82.5	59.5 +	4.4 +	125	25.0	4.1	9.2
<b>#Warrior</b>	80.0	59.4 +	4.4 +	125	40.0	4.5 +	6.5
VA16W-29	83.8 +	56.3 +	4.5 +	126 +	45.0	4.5 +	14.2
CROPLAN CP9415	83.8 +	55.4 +	4.5 +	126 +	35.0	4.6 +	9.6
VA09MAS1-12-5-1-1	86.3 +	58.9 +	4.7 +	123	30.0	4.4 +	9.4
NC13-21213	90.0 +	56.4 +	4.7 +	124	20.0	4.3 +	13.2
<b>Featherstone 31</b>	90.0 +	58.3 +	4.7 +	126 +	30.0	4.1	13.4
<b>USG 3458</b>	83.8 +	60.4 +	4.8 +	124	20.0	4.6 +	6.1
<b>SH 7200</b>	92.5 +	68.0 +	5.7 +	123	35.0	4.4 +	9.7
Average	71.5	41.7	3.0	124	25.8	3.8	12.2
LSD (0.05)	11.5	10.5	0.9	1	0.0	0.5	0.0
C.V.	16.4	25.7	32.3	1	0.0	9.1	0.0

Released cultivars are shown in bold print.

Varieties are ordered by ascending two-year FHB index averages.

A plus or minus sign indicates a performance significantly above or below the average.

**Table 36. Two-year summary of reaction of entries in the Virginia Tech State Wheat Test to Fusarium head blight (scab), 2018 and 2019 harvests.**

Line	FHB Incidence <sup>1</sup> (%)	FHB Severity <sup>2</sup> (%)	FHB Index <sup>3</sup> (0-9)	Flowering Date (Julian)	FDK <sup>4</sup> (%)	ISK Index <sup>5</sup> (0-9)	DON <sup>6</sup> (ppm)
Year	2018-19	2018-19	2018-19	2018-19	2018	2018	2018

Entries were planted in 2-row plots, 4ft in length at Mt. Holly, VA and were inoculated at booting stage with scabby corn kernels (50g/4-rows).

<sup>1</sup> Scab Incidence (0-10): Based on infected spikes within 4 ft row.

<sup>2</sup> Scab Severity (0-10): Based on infected spikelets in 10 spikes showing disease symptoms.

<sup>3</sup> FHB Index is an overall indicator of scab resistance/susceptibility level and takes into account both incidence and severity where 0 = highly resistant and 9 = highly susceptible.

<sup>4</sup> FDK (%): Fusarium damaged kernels, visual assessment of the percent of infected kernels.

<sup>5</sup> ISK Index takes into account both incidence and severity and is a composite of head and kernel traits; 0 = highly resistant and 9 = highly susceptible.

<sup>6</sup> DON (ppm): Concentration of vomitoxin (deoxynivalenol).

**Table 37. Three-year summary of reaction of entries in the Virginia Tech State Wheat Test to Fusarium head blight (scab), 2017, 2018 and 2019 harvests.**

Line	FHB Incidence <sup>1</sup> (%)	FHB Severity <sup>2</sup> (%)	FHB Index <sup>3</sup> (0-9)	Flowering Date (Julian)	FDK <sup>4</sup> (%)	ISK Index <sup>5</sup> (0-9)	DON <sup>6</sup> (ppm)					
Year	2017-19	2017-19	2017-19	2017-19	2017-18	2017-18	2017-18					
USG 3228	39.2	-	12.0	-	0.5	-	117	19.5	2.2	-	5.7	
MBX 17-P-275	37.5	-	13.0	-	0.5	-	118	17.8	2.2	-	10.0	+
AgriMAXX 463	41.7	-	15.8	-	0.7	-	117	20.3	2.4	-	2.9	-
USG 3197	45.0	-	17.4	-	0.8	-	119	33.3	2.7	-	8.1	
Dyna-Gro 9772	44.2	-	22.8		1.0	-	118	18.3	2.4	-	7.8	
Dyna-Gro 9750	50.0		20.4	-	1.2		117	17.8	3.1		10.6	+
USG 3316	60.8		25.9		1.5		120	19.3	2.9		8.9	
Dyna-Gro 9600	57.5		24.6		1.6		117	26.8	3.2		2.9	-
AgriMAXX 473	65.0		23.6		1.6		120	16.5	-	3.2	8.7	
Pioneer 26R45	57.1		26.4		1.7		119	32.3	3.3		4.1	
MAS #61	56.7		28.3		1.7		119	24.3	2.9		8.6	
Dyna-Gro 9701	62.5		24.3		1.7		119	23.5	3.4		5.4	
Pioneer 26R36	61.7		27.3		1.7		119	40.5	+	3.3	5.6	
#Bullet	61.3		24.1		1.7		121	23.0	3.4		6.8	
#Blaze	71.7		25.8		1.7		119	23.8	3.2		3.2	-
CROPLAN CP8550	64.2		25.1		1.8		121	25.5	3.2		4.3	
SY 547	63.3		29.1		1.9		118	24.3	3.2		7.0	
Hilliard	59.2		34.2		1.9		118	30.3	3.3		7.8	
USG 3404	62.1		32.2		1.9		121	17.0	-	3.2	7.3	
Armor Mayhem	65.0		26.8		1.9		121	14.5	-	3.3	7.6	
Massey	66.7		29.8		1.9		118	25.8	3.3		7.4	
Liberty 5658	60.4		32.9		2.0		118	25.8	3.4		10.1	+
MAS #316	67.9		26.5		2.0		121	20.3	3.4		10.7	+
MAS #116	66.3		29.7		2.2		120	29.3	3.4		5.9	
AgriMAXX 415	68.8		35.0		2.2		118	22.8	3.3		7.3	
#Turbo	67.1		35.2		2.2		118	22.3	3.3		9.4	
Pioneer 26R10	68.8		37.9		2.5		119	27.8	3.5		5.0	
SH 7510	67.1		38.9		2.5		120	18.5	3.6		6.1	
VA09MAS2-131-6-2	64.6		39.2		2.6		116	17.3	-	3.6	5.6	
USG 3118	67.5		38.7		2.6		115	36.3	+	3.8	9.1	
SH 4400	76.3		36.5		2.7		116	25.0	3.8		5.8	
Dyna-Gro 9811	66.7		43.3		2.7		118	31.0	3.7		6.4	
Pioneer 26R41	68.8		43.4		2.8		119	28.5	3.9		7.8	
SY Viper	57.9		50.2		2.8		117	21.8	3.8		5.3	
#Berkeley	71.7		40.3		3.1		115	32.0	3.3		6.1	
CROPLAN CP9606	76.7		43.6		3.2		118	33.0	3.8		4.0	
MBX 17-M-245	73.3		46.7		3.2		119	24.3	3.9		5.6	
MAS #7	74.2		47.5		3.3		119	26.5	3.4		6.3	
USG 3895	76.3		45.2		3.3		119	39.0	+	4.0	6.2	
Pioneer 26R59	77.5		45.8		3.3		118	27.3	3.9		5.9	

**Table 37. Three-year summary of reaction of entries in the Virginia Tech State Wheat Test to Fusarium head blight (scab), 2017, 2018 and 2019 harvests.**

Line	FHB Incidence <sup>1</sup> (%)	FHB Severity <sup>2</sup> (%)	FHB Index <sup>3</sup> (0-9)	Flowering Date (Julian)	FDK <sup>4</sup> (%)	ISK Index <sup>5</sup> (0-9)	DON <sup>6</sup> (ppm)
Year	2017-19	2017-19	2017-19	2017-19	2017-18	2017-18	2017-18
CROPLAN CP9415	75.8	43.4	3.4	121	30.5	3.9	6.0
DH12SRW057-006	75.0	50.2 +	3.5	119	27.3	3.9	5.7
<b>#Warrior</b>	76.7	50.8 +	3.7	119	33.5	4.1	4.0
<b>USG 3458</b>	77.1	50.1 +	3.8	119	20.8	4.0	3.9
VA09MAS1-12-5-1-1	77.5	52.3 +	3.8	119	28.0	4.0	5.4
<b>Shirley</b>	78.8	53.8 +	3.9 +	119	42.3 +	4.6 +	5.8
NC13-21213	81.3	52.1 +	4.0 +	118	27.3	4.2 +	7.8
<b>Featherstone 31</b>	84.6	52.5 +	4.1 +	120	33.0	4.3 +	7.9
<b>SH 7200</b>	82.9	60.3 +	4.7 +	117	36.3 +	4.4 +	6.1
Average	65.7	35.3	2.4	119	26.1	3.5	6.6
LSD (0.05)	19.3	14.5	1.4	5	8.5	0.7	2.8
C.V.	36.6	51.1	74.0	5	33.3	19.5	43.1

Released cultivars are shown in bold print.

Varieties are ordered by ascending three-year FHB index averages.

A plus or minus sign indicates a performance significantly above or below the average.

Entries were planted in 2-row plots, 4ft in length at Mt. Holly, VA and were inoculated at booting stage with scabby corn kernels (50g/4-rows).

<sup>1</sup> Scab Incidence (0-10): Based on infected spikes within 4 ft row.

<sup>2</sup> Scab Severity (0-10): Based on infected spikelets in 10 spikes showing disease symptoms.

<sup>3</sup> FHB Index is an overall indicator of scab resistance/susceptibility level and takes into account both incidence and severity where 0 = highly resistant and 9 = highly susceptible.

<sup>4</sup> FDK (%): Fusarium damaged kernels, visual assessment of the percent of infected kernels.

<sup>5</sup> ISK Index takes into account both incidence and severity and is a composite of head and kernel traits; 0 = highly resistant and 9 = highly susceptible.

<sup>6</sup> DON (ppm): Concentration of vomitoxin (deoxynivalenol).



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