Wheat Tech Agronomy
2019-2020 Wheat Variety Performance Test Results

General Information:

The 2019-2020 soft red winter wheat variety performance tests were conducted at three different sites: Franklin, Kentucky; Hodgenville, Kentucky; and Bertrand, Missouri. The KY locations contained 55 and the MO location contained 50 different varieties.

Varieties were tested using no-till practices, however; the residue was burned off before planting in MO. The preceding crop for all locations was corn. Seeding rates used were as follows: MO was 325 s/yd^2, while both KY sites were 375 s/yd^2. Trials were planted using a Hege Drill with a row spacing of 7.5 inches and were harvested with a Kincaid 8-XP research combine with a HarvestMaster Classic GrainGage. Plot dimensions used were 5 feet wide by 20 feet long and were chemically end trimmed for uniform length. All sites contained four replications, and the experimental design used was randomized complete block.

All locations were managed intensively with split applications of nitrogen, insecticides, herbicide sprays in the fall and spring, and a Feekes 5 and Feekes 10.51 fungicide. Nitrogen applied to the KY locations was a January-February/March split application. Missouri was applied in a three-application split. The rate at Franklin, KY was 60/65 pounds per acre, the rate at Hodgenville, KY was 55/70 pounds per acre, and MO was 48/49/49 pounds per acre. At the Franklin, Kentucky site, there were four replications treated with a foliar fungicide at Feekes 5 and Feekes 10.51 and four without. The objective for having four untreated replications is to evaluate how each variety responds to the given level of head blight and foliar diseases, and then create a yield fungicide response column. At the Hodgenville, KY and Missouri sites all replications were sprayed with a fungicide at both timings. The MO site is irrigated, and the other locations are non-irrigated.

Growing Season:

Late summer of 2019 proved to be very dry, as the month of September produced a very productive corn crop, but also a total of only 0.4 inches of rainfall at our office in Schochoh, KY. While this did make for a much-needed speedy corn harvest, it caused some concerns about planting wheat. Planting of the wheat plots began on October 9th in Bertrand, MO after some much need rain fell on October 6th. This location would be followed by Hodgenville, KY on October 15th and finally the Franklin, KY location on October 19th. Emergence was normal for the earlier planted locations, however; the Franklin site experienced some delay. According to www.climate.com, high temperatures at this location would hold a 15-year average through the first 11 days of November in the low 60's. From October 31st – November 18th, highs stayed below that average. These colder temperatures during that time caused some concern over the delayed emergence. It took approximately 3 weeks after planting before all plants were out of the ground.

During the next 3 months, all locations experienced heavy amounts of rainfall and warmer temperatures. From October 1st – December 31st, the 15-year average rainfall amount for Schochoh, KY is 12.59", and it received 21.54" during that same time frame in 2019. While not as much rain fell during that same time in Missouri, it was still 3.22" over the 15-year average. Throughout late winter/early spring the warmer temperatures again caused some concern with the wheat crop. Wheat began to become much larger and advanced quicker than was expected. The Franklin, KY site had all wheat varieties at Feekes 6 on March 10th. The average date of all varieties reaching this growth stage, except for 2012 and 2017 (which were other warmer winters), from 2010-2019 is March 27th. Any time the wheat crop progresses to this growth stage by that early in the year, is always a major concern for potential freeze injury.

Both KY locations were negatively impacted by two freeze events in 2020, and the Missouri site had little or no issues. Wheat varieties were affected differently during both events depending on the growth stage they were at when each occurred. The varieties' own individual hardiness also played a role in its response to the low temperatures. The mornings of April 15th, April 16th and May 9th proved to be extremely hard on some wheat varieties. According to Table 3-3 from ID-125: A Comprehensive Guide to Wheat Management in Kentucky (University of Kentucky publication), wheat at Feekes 10 (Boot) exposed to approximately 2 hours at 28°F can cause moderate to severe yield effect, and if exposed at Feekes 10.1-10.5 (Heading) and Feekes 10.51-

10.54 (Flowering) to approximately 2 hours at 30°F can cause severe yield effect. A weather station located at our office in Schochoh, KY would take the following temperature recordings:

Date and Time	Temp. (*F)	Date and Time	Temp. (*F)	Date and Time	Temp. (*F)
4/15/2020 0:33	29.7	4/16/2020 5:33	30.6	5/9/2020 4:33	30.6
4/15/2020 1:33	28.9	4/16/2020 6:33	31.4	5/9/2020 5:33	30.6
4/15/2020 2:33	28.9				
4/15/2020 3:33	28.1				
4/15/2020 4:33	27.2				
4/15/2020 5:33	27.2				
4/15/2020 6:33	29.7				

Varieties of wheat that were much closer to having their heads exposed and out of the boot stage were the majority of the most negatively impacted. Although the wheat at the Hodgenville, KY site was not as far along as the wheat in Franklin, KY during the April event, that location experienced much colder temperatures during the May event. According to www.kymesonet.org, the Larue County, KY historical data shows a low temperature reading of 27.9°F. This location was sprayed for a Feekes 10.51 timing fungicide on May 6th which would indicate that the May event played a significantly more impactful role in the yield affected in Hodgenville, KY than in Franklin, KY. Nevertheless, yields would be impacted in both locations.

Since all locations were affected differently from the spring freezes, multiple location averages were not created. It is important to learn from each location's individual issues for the 2019-2020 wheat growing season and apply them accordingly.

Disease and insect pressure played a minimal role in the wheat crop this season. The Franklin, KY site did have a moderate amount of late season Septoria Leaf Blotch, and the Hodgenville, KY was also rated, however; the level of pressure was much lower.

Data Interpretation:

Maturity groups are separated out into the following classifications:

E = Early M = Medium L = Late
ME = Medium/Early ML = Medium/Late

The tables on the following pages have been prepared with the entries listed in order of performance, the highest-yielding entry being listed first. All yields presented have been adjusted to 13.5% moisture. At the bottom of the tables there are three different values: LSD (Least Significant Difference), CV (Coefficient of Variation), and Grand Mean. The mean yields of any two varieties being compared must differ by at least the LSD amount shown to be considered different in yielding ability at the 95% level of probability of significance. CV is a measure of the error variability found within each experiment. Grand Mean is the mean of all values in the group.

Acknowledgements

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Wheat Tech Research & Development Division:

Brad Wilks – Research Director
Matt Miller – Senior Research Associate/Soybean Manager
Kirsten Banks – Research Associate

Wheat Tech Owner:

Bill Brinkley

Participating Companies:

AgriMAXX Wheat Company
AgriPro - Syngenta
Corteva AgriScience
Dyna-Gro Seed
Erwin-Keith Inc. (Progeny Ag Products)
Kentucky American Seeds, LLC
KY Small Grain Growers Association
Limagrain Cereal Seed
Stratton Seed Company
UniSouth Genetics, Inc.
Winfield United

Supporting Chemical Companies:

BASF
Bayer CropScience
Corteva AgriScience
FMC Corporation
Syngenta Crop Protection, LLC

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Table 1

2019-2020 Missouri Winter Wheat Variety Performance Results

Bertrand, MO

Variety	Maturity	Yield (bu/ac)		TW (lb/bu)	Height (inches)
Progeny Ag PGX19-17	M	128.0	a*	58.0	32
KAS 19X27	M	124.9	ab	61.1	36
Limagrain LCS L11919	M	124.5	abc	62.4	35
AgriMAXX 454	M	124.1	abc	61.2	37
USG 3329	ME	123.8	abc	61.5	36
KAS 19X21	M	122.9	a-d	60.3	35
Progeny Ag #BLAZE	ME	122.8	a-d	61.5	35
Dyna-Gro 9692	M	122.1	a-d	61.0	38
KAS Rage	M	121.1	a-e	61.1	36
Progeny Ag PGX18-7	M	120.4	a-f	62.5	37
Pioneer variety 26R59	M	119.7	a-g	59.0	33
AgriMAXX 496	M	119.5	a-g	61.2	33
GoWheat 4010	E	119.1	a-g	62.1	36
AgriMAXX 505	M	118.9	b-h	63.9	35
Progeny Ag PGX18-9	M	118.2	b-i	60.1	36
Dyna-Gro 9151	M	117.9	b-i	63.9	36
Dyna-Gro WX20731	M	117.9	b-i	60.2	36
USG 3316	M	117.8	b-i	61.0	37
Dyna-Gro WX20737	M	117.8	b-j	62.6	35
Pioneer variety EXP XW18X	ME	117.7	b-j	63.0	37
Dyna-Gro 9941	ME	117.1	b-k	60.0	36
KAS Adams	ME	116.9	b-l	63.8	36
AgriMAXX EXP 2003	ML	116.1	b-m	60.4	35
Progeny Ag #BULLET	ME	115.7	c-m	62.2	38
Pioneer variety 26R10	L	114.4	d-n	60.9	36
AgriMAXX 473	ME	114.0	d-n	61.6	37
Progeny Ag #BERKELEY	M	112.4	e-n	61.7	35
Pembroke 2016	E	112.2	e-n	61.4	35
KAS Eisenhower	M	112.1	e-n	60.3	36
Pioneer variety 26R36	ML	111.5	f-o	62.0	37
GoWheat 5056	M	110.9	g-o	61.5	35
USG 3539	ME	110.9	g-o	62.4	38
Progeny Ag PGX18-8	M	110.8	g-o	61.5	35
Pioneer variety 26R45	M	110.1	h-o	59.8	35
Dyna-Gro 9070	E	109.8	i-o	62.1	36
AgriMAXX 492	E	109.8	i-o	62.7	35
AgriMAXX 495	M	109.6	i-o	62.1	37
Dyna-Gro 9522	ML	109.6	i-o	60.4	36
Progeny Ag PGX19-3	ME	108.8	j-o	61.6	36
Progeny Ag PGX18-11	M	108.7	k-o	61.8	36

Data provided by Wheat Tech R&D Division 270-586-1776/ www.wheattech.com

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Table 1 - Continued

2019-2020 Missouri Winter Wheat Variety Performance Results

Bertrand, MO

Variety	Maturity	Yield (bu/ac)		TW (lb/bu)	Height (inches)
AgriPro SY Viper	ME	108.6	k-o	61.4	38
AgriPro SY 547	ME	108.4	k-o	61.2	39
KAS 19X24	VE	108.0	l-o	62.6	34
Dyna-Gro 9002	M	107.7	mno	60.4	34
AgriMAXX 503	ME	107.5	mno	61.1	36
AgriMAXX 485	M	107.3	mno	61.4	36
GoWheat 2058	M	106.7	no	62.4	33
GoWheat 4059S	M	106.3	no	61.8	35
AgriPro SY Richie	E	102.8	o	61.2	35
Progeny Ag PGX18-2	E	92.8	p	62.9	34
LSD P=.05		9.0		.	.
CV		5.6		.	.
Grand Mean		**114.3**		**61.5**	**36**

Planted: October 9, 2019; Harvested: June 15, 2020

* - Means followed by same letter do not significantly differ (P=.05, LSD)

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Table 2

2019-2020 Larue County, KY Winter Wheat Variety Performance Results

Hodgenville, KY

		Fungicide Treated			Septoria[¥]
Variety	Maturity	Yield (bu/ac)	TW (lb/bu)	Height (inches)	(0-10) 6/5/20
Progeny Ag PGX18-7	M	98.7 a*	60.4	36	1
Dyna-Gro WX20731	M	94.4 ab	57.7	36	3
Progeny Ag #BULLET	ME	91.7 abc	59.4	39	4
AgriMAXX EXP 2003	ML	90.0 a-d	56.9	36	3
Dyna-Gro 9151	M	89.8 a-d	59.2	37	1
AgriPro SY Viper	ME	89.3 a-d	57.2	41	3
KAS 19X27	M	88.3 a-e	58.5	35	2
AgriMAXX 454	M	88.1 a-e	58.5	38	3
Pioneer variety 26R45	M	87.5 a-e	56.9	38	2
AgriMAXX 473	ME	87.0 a-f	57.2	39	3
GoWheat 4059S	M	86.9 a-f	59.4	35	3
USG 3329	ME	84.9 b-f	58.7	37	2
GoWheat 5056	M	84.9 b-f	57.8	35	3
Progeny Ag #BLAZE	ME	84.3 b-g	59.1	38	2
AgriMAXX 505	M	83.8 b-g	59.2	36	2
KAS Eisenhower	M	83.7 b-h	55.4	36	2
CROPLAN CP8800	M	83.7 b-h	57.3	36	3
USG 3316	M	83.3 b-h	57.9	37	2
AgriMAXX 485	M	83.3 b-h	58.5	35	2
CROPLAN CP8022	M	83.2 b-h	56.8	34	3
Progeny Ag PGX18-8	M	83.1 b-h	57.6	35	4
Progeny Ag PGX18-9	M	82.9 b-i	55.5	36	2
Dyna-Gro 9692	M	80.7 c-j	57.6	38	3
AgriMAXX 496	M	79.8 c-j	57.2	35	2
AgriPro SY 547	ME	77.5 d-k	55.2	41	1
KAS Rage	M	77.3 d-k	57.9	38	2
Progeny Ag PGX19-3	ME	77.1 d-k	55.9	38	2
Dyna-Gro 9522	ML	77.0 d-k	57.7	36	2
KAS Adams	ME	75.3 e-l	58.4	36	1
AgriMAXX 503	ME	74.7 e-l	56.2	39	2
AgriMAXX 495	M	73.8 f-l	59.9	36	3
CROPLAN CP8015	M	70.9 g-m	57.1	35	2
KY07C-1145-94-12-5	M	70.1 h-n	57.0	37	3
KAS 19X24	VE	69.4 i-n	59.1	37	3
KAS 19X21	M	69.2 j-o	54.8	37	3
Dyna-Gro 9941	ME	69.0 j-o	54.6	35	3
Dyna-Gro WX20737	M	68.1 j-o	58.4	36	2
Pioneer variety EXP XW18X	ME	67.3 j-o	58.2	39	4

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Table 2 - Continued

2019-2020 Larue County, KY Winter Wheat Variety Performance Results

Hodgenville, KY

Variety	Maturity	Fungicide Treated Yield (bu/ac)		TW (lb/bu)	Height (inches)	Septoria¥ (0-10) 6/5/20
CROPLAN CP8081	M	65.8	k-p	58.5	36	3
Pioneer variety 26R36	ML	63.9	k-q	55.3	38	3
GoWheat 4010	E	63.9	k-q	58.3	36	4
Dyna-Gro 9070	E	62.7	l-q	57.9	36	2
Pioneer variety 26R10	L	59.2	m-r	56.5	36	3
Dyna-Gro 9002	M	58.7	m-r	55.0	38	2
Pioneer variety 26R59	M	57.3	n-r	50.4	31	2
Progeny Ag PGX19-17	M	55.7	o-r	52.1	33	3
USG 3539	ME	52.5	pqr	53.5	37	4
Progeny Ag PGX18-2	E	51.5	qr	57.5	35	6
GoWheat 2058	M	48.3	r	55.0	31	3
AgriPro SY Richie	E	48.3	r	55.7	35	3
Pembroke 2016	E	45.7	r	57.1	35	4
Progeny Ag PGX18-11€	M	30.7	s	52.2	36	4
Progeny Ag #BERKELEY	M	29.4	s	49.3	36	4
Limagrain LCS L11919€	M	28.8	s	44.7	37	2
AgriMAXX 492€	E	21.8	s	n/a	37	8
LSD P=.05		13.6		.	.	.
CV		13.6		.	.	.
Grand Mean		**71.5**		**56.7**	**36**	**3**

Planted: October 15, 2019; Harvested: June 25, 2020

* - Means followed by same letter do not significantly differ (P=.05, LSD)

¥ - *Septoria tritici* ratings were taken from the flagleaf on a 0-10 scale where 0 equals no disease and 10 equals completely diseased. Ratings were taken from only one untreated replication.

€ - Some replications did not yield enough grain for GrainGage to cycle completely

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Table 3

2019-2020 Simpson County, KY Winter Wheat Variety Performance Results

Franklin, KY

		Fungicide Treated						
Variety	Maturity	Yield (bu/ac)		TW (lb/bu)	Height (inches)	Heading Date	Septoria[¥] (0-10) 5/28/20	Fungicide Response (bu/ac)
AgriMAXX 505	M	131.5	a*	62.4	39	4/21	4	13.4
USG 3316	M	128.2	ab	59.2	37	4/22	4	11.4
KAS 19X27	M	123.3	abc	59.5	38	4/23	4	20.6
KAS Rage	M	121.8	a-d	59.6	37	4/24	5	6.0
Dyna-Gro WX20731	M	121.6	a-e	59.1	36	4/23	4	16.3
GoWheat 5056	M	121.2	a-e	59.5	35	4/22	5	24.8
Pioneer variety 26R45	M	118.7	b-f	59.0	38	4/20	3	7.4
Progeny Ag PGX18-8	M	118.6	b-f	59.8	35	4/21	7	16.5
Pioneer variety 26R10	L	118.0	b-f	59.6	36	4/21	6	19.0
Dyna-Gro 9151	M	117.9	b-f	62.7	38	4/22	3	13.2
Dyna-Gro 9692	M	117.1	c-g	59.5	36	4/25	5	12.0
AgriMAXX 503	ME	116.8	c-h	59.1	39	4/21	3	10.8
Progeny Ag #BLAZE	ME	116.7	c-h	60.1	36	4/20	3	10.0
AgriMAXX 454	M	116.6	c-h	59.2	36	4/22	5	2.5
CROPLAN CP8022	M	116.6	c-h	58.6	35	4/23	4	7.7
KAS 19X21	M	116.0	c-h	59.0	36	4/23	4	16.4
KY07C-1145-94-12-5	M	115.0	c-i	61.3	37	4/21	4	10.4
KAS Adams	ME	114.9	c-j	61.8	36	4/22	3	14.5
Progeny Ag PGX19-17	M	114.1	c-k	57.4	32	4/20	2	2.7
Progeny Ag PGX19-3	ME	113.2	c-k	59.5	37	4/24	2	7.2
Pioneer variety 26R59	M	113.1	c-k	58.4	34	4/20	3	12.8
USG 3329	ME	113.1	c-k	60.2	36	4/20	4	14.0
AgriMAXX 485	M	112.8	c-k	60.3	36	4/24	2	7.9
KAS 19X24	VE	112.2	d-k	61.8	36	4/24	2	13.4
Pioneer variety EXP XW18X	ME	111.1	e-l	60.7	38	4/21	4	10.6
AgriPro SY 547	ME	109.4	f-m	60.1	39	4/19	3	7.3
AgriMAXX 496	M	109.1	f-m	58.9	34	4/22	4	7.0
GoWheat 4010	E	108.9	f-m	60.1	35	4/22	6	11.4
Progeny Ag PGX18-7	M	108.8	f-m	61.0	37	4/20	3	12.6
CROPLAN CP8015	M	108.5	f-m	59.2	36	4/24	3	9.0
GoWheat 4059S	M	108.5	f-m	60.9	34	4/27	2	7.0
Dyna-Gro 9522	ML	108.1	f-n	58.4	38	4/27	4	9.8
AgriPro SY Viper	ME	106.6	g-o	59.8	39	4/17	3	8.6
Progeny Ag #BULLET	ME	106.6	g-o	60.0	37	4/22	4	8.0
AgriMAXX EXP 2003	ML	106.5	h-p	58.1	37	4/22	4	11.8

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Table 3 - Continued

2019-2020 Simpson County, KY Winter Wheat Variety Performance Results

Franklin, KY

		Fungicide Treated						
Variety	**Maturity**	**Yield (bu/ac)**		**TW (lb/bu)**	**Height (inches)**	**Heading Date**	**Septoria¥ (0-10) 5/28/20**	**Fungicide Response (bu/ac)**
AgriMAXX 495	M	105.1	i-p	60.9	36	4/22	3	18.0
CROPLAN CP8800	M	104.4	j-p	58.3	38	4/22	5	12.0
KAS Eisenhower	M	104.0	k-p	57.8	36	4/23	4	9.6
CROPLAN CP8081	M	100.6	l-q	60.0	37	4/20	5	7.5
Progeny Ag PGX18-9	M	100.2	m-q	56.9	37	4/17	4	9.5
USG 3539	ME	99.4	m-q	59.7	36	4/22	3	5.1
Pioneer variety 26R36	ML	97.7	n-q	58.3	37	4/20	6	13.1
AgriMAXX 473	ME	97.4	opq	59.9	37	4/20	3	13.3
Dyna-Gro 9002	M	96.2	opq	57.7	37	4/20	2	4.3
Dyna-Gro 9070	E	95.8	pq	59.6	36	4/22	5	10.0
Dyna-Gro 9941	ME	93.3	qr	57.9	35	4/23	3	1.4
Dyna-Gro WX20737	M	84.7	rs	59.5	35	4/17	7	12.9
Progeny Ag PGX18-2	E	82.2	s	61.0	35	4/20	7	2.0
Limagrain LCS L11919	M	81.6	s	58.3	33	4/15	4	16.1
Pembroke 2016	E	75.8	st	60.1	34	4/15	8	9.2
AgriPro SY Richie	E	75.5	st	58.2	34	4/15	5	4.9
GoWheat 2058	M	68.8	t	56.1	32	4/20	5	0.2
Progeny Ag PGX18-11	M	51.4	u	56.6	36	4/16	9	5.8
AgriMAXX 492	E	48.9	u	59.2	32	4/15	9	7.3
Progeny Ag #BERKELEY	M	44.2	u	55.5	33	4/15	8	-2.1
LSD P=.05		10.7		.	.	.	.	.
CV		7.3		.	.	.	.	.
Grand Mean		**104.2**		**59.4**	**36**	**4/20**	**4**	**10.1**

Planted: October 19, 2019; Harvested: June 19, 2020

* - Means followed by same letter do not significantly differ (P=.05, LSD)

¥ - *Septoria tritici* ratings were taken from the flagleaf on a 0-10 scale where 0 equals no disease and 10 equals completely diseased. Ratings were taken from only one untreated replication.