

SOFT RED WINTER WHEAT

2020 Quality Survey



U.S. WHEAT
ASSOCIATES

SURVEY OVERVIEW

Summary:

The soft red wheat (SRW) production region experienced generally good growing conditions in the 2020 crop year. There were pockets of higher enzymatic activity (lower falling numbers) from the East Coast, but overall, buyers should be extremely happy with the quality of the entire 2020 SRW crop, with excellent characteristics for soft wheat products in Gulf supplies. Buyers are encouraged to review their quality specifications to ensure that their purchases meet their expectations.

Weather and Harvest:

SRW is grown over a wide area of the eastern United States. The area seeded to SRW in fall 2019 for the 2020 harvest is estimated by USDA at 5.63 million acres (2.28 million hectares), up from 5.54 million acres (2.24 million hectares) seeded for the 2019 harvest and below the 5-year average. The 2020 SRW production, estimate of 277 million bushels (7.54 million metric tons (MMT)), is up from 239 million bushels (6.50 MMT) in 2019 but below the five-year average of 304 million bushels (8.28 MMT).

Planting started at a normal pace the first week of September 2019 with similar progress as the five-year average. Crop emergence was slightly ahead of the prior year and about equal to the 5-year average. In the six SRW survey states where USDA estimates wheat crop conditions, by late fall the winter wheat crop was rated 51% good to excellent and 88% fair to excellent. Much of the SRW growing area received plentiful moisture through the winter and spring; late spring freezes impacted yields in Ohio, Kentucky and the East Coast states. Harvest began slowly

at the end of May due to a cool, wet spring. By mid-June, however, hot, dry conditions prevailed, and harvest proceeded rapidly, finishing in most areas somewhat ahead of the five-year average pace.

Survey Methods:

Great Plains Analytical Laboratory, Kansas City, Mo., collected and analyzed 191 samples from elevators in 18 reporting areas across 11 states; the decrease in samples collected this year is due to Covid-19 elevator restrictions. Test weight, moisture, protein, thousand kernel weight, wheat ash, falling number and DON were determined on individual samples; the remaining tests were determined on 18 composite samples. The results were weighted by the estimated production for each reporting area and combined into "Composite Average," "East Coast" and "Gulf Port" values. Gulf Port states include Alabama, Arkansas, Illinois, Indiana, Kentucky, Missouri, Ohio, and Tennessee, and account for 80% of the 2020 SRW production in the states surveyed. East Coast states include Maryland, North Carolina and Virginia and represent the remaining 20% of production in the states surveyed. The states surveyed account for an estimated 76% of total 2020 SRW production.

SURVEY OVERVIEW

Wheat and Grade Data:

- **GRADE** - overall sample average collected for the 2020 SRW harvest survey is U.S. No. 2 Soft Red Winter.
- **TEST WEIGHT** average for the Gulf Port of 59.8 lb/bu (78.7 kg/hl) and East Coast test weight average of 59.3 lb/bu (78.0 kg/hl) are both higher than 2019 and 5-year averages.
- **TOTAL DEFECTS** average for the East Coast of 2.0% is lower than last year and above the 5-year average, indicating that damaged and shrunken and broken kernels are slightly higher than usual in that portion of the crop. The Gulf Port Total Defects average is 0.6%, significantly lower than 2019 and 5-year averages.
- **DOCKAGE** and **MOISTURE** for both regions are lower than last year and 5-year average values.
- **WHEAT PROTEIN** content for the Composite average of 9.4% (12% mb) is lower than last year and the 5-year average. The Gulf Port protein average of 9.4% is equal to 2019 but slightly below the 5-year average. The East Coast average of 9.4% is significantly below the 2019 and 5-year average.
- **WHEAT FALLING NUMBER** Composite and Gulf Port averages of 319 and 329 seconds, respectively, are significantly higher than 2019 and 5-year averages. The East Coast average of 283 seconds is equal to 2019 but below the 5-year average.
- **VOMITOXIN (DON)** averages for Composite (0.5 ppm), East Coast (0.2 ppm) and Gulf Port (0.6 ppm) are significantly below 2019 and 5-year averages, despite a rainy spring and early summer, indicating that the crop sampled is relatively free of DON.

Flour and Baking Data:

- **LABORATORY MILL FLOUR EXTRACTION** averages for Composite (66.8%), East Coast (67.0%) and Gulf Port (66.7%) are below 2019 and the 5-year averages.
- **DOUGH PROPERTIES** suggest that this crop has slightly stronger protein qualities than last year.
- **FARINOGRAPH** peak and absorption values are similar to 5-year averages, but the stability values are all below the 5-year averages.
- **ALVEOGRAPH L** averages for Composite (78), East Coast (75) and Gulf Port (78) are lower than last year and the 5-year average and indicate low extensibility.
- **AMYLOGRAPH** Gulf average of 760 BU is significantly higher than last year and the 5-year average. The East Coast average of 322 BU indicates relatively high levels of amylase activity in the crop and is consistent with low falling numbers.
- **SOLVENT RETENTION CAPACITY (SRC)** values of the 2020 crop generally indicate excellent quality for cookies, cakes, pretzels and crackers.
- **COOKIE SPREAD** for Composite (10.2), East Coast (9.7) and Gulf Port (10.3) are all higher than last year and the 5-year averages, indicating good spreadability.
- **LOAF VOLUME** averages are significantly lower than last year and the 5-year averages.

SOFT RED WINTER

COMPETITIVE ADVANTAGE

Soft red winter (SRW) wheat is the third largest class of wheat grown in the United States with an annual average production over the last five years of 8.28 million metric tons (MMT), or just over 300 million bushels. Although SRW is the third largest class measured by production, it is the fourth largest as measured by export sales. U.S. SRW wheat is predominantly grown east of the Mississippi River and the South as far west as northeast Texas and southeast Kansas.

Importers of SRW are served from ports on the Lakes, East Coast, Gulf and Western Gulf. Mexico imports a substantial portion of its SRW purchases via direct rail shipment. Importers and the domestic milling and baking industries use SRW for specialty products such as cookies (biscuits), crackers, snack foods, and cake flour. SRW is a versatile wheat for blending with hard red spring (HRS) and hard red winter (HRW) wheat to lower grist cost and improve bread crumb texture, or to improve the quality and appearance of a wide variety of products.

Milling Advantages:

SRW can be challenging to mill. Some advantages to milling SRW are reduced energy requirements and fewer roller mills for mill flows designed specifically for soft wheat. The truth is, few mills are designed for only SRW as it is generally a specialty wheat used for specialty products. The real advantage for milling companies is in the cost reduction of the mill grist and increased diversity of products when SRW is included in a long term, strategic wheat procurement plan. SRW performs best on the mill at lower moisture content (14.5%) compared to hard wheat (16%) and requires increased sifter area per metric ton.

Baking Advantages:

As previously mentioned, the target market for SRW is confectionary products, but SRW performs well as a blending flour in a wider variety of products such as crackers and cookies. The lower moisture content of the flour creates an advantage for the baker by increasing the amount of water added while optimizing water absorption and product quality to the consumer. The finer particle size will generally increase the rate of water absorption, decreasing mix time and improving production efficiencies. As is the message with most of the U.S. wheat classes, blending SRW flour with other flour types creates opportunities to create the optimal flour type for any number of end-use

products. Some markets have found success blending SRW wheat flour with HRS and HRW wheat flour to improve crumb texture and even the loaf volume of pan bread by improving the dough development and mixing properties.

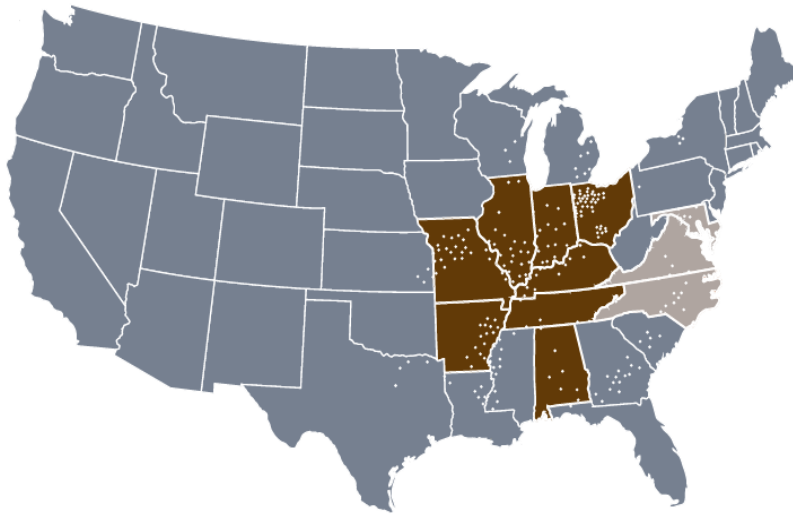
Sourcing Opportunities:

Soft red winter wheat is lower in protein as compared to hard wheat classes and is generally lower cost. It is most often available out of the Mississippi River for export, but at times can be shipped via rail to the center Gulf or Mexico. Another important factor to consider when purchasing SRW is to include a maximum value for deoxynivalenol (DON), particularly in years when SRW matured during wet, humid conditions.

Optimal purchases of SRW are in combination with HRW or HRS, to minimize storage constraints at the destination mill. There is a high demand for SRW in the domestic U.S. market. In years where acreage and production are lower than average, the price can be inverted in comparison to higher protein classes.

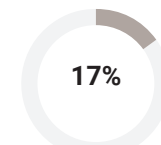


SOFT RED WINTER WHEAT PRODUCTION

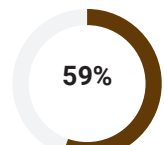


11
STATES SURVEYED

76%
OF TOTAL SRW PRODUCTION
REPRESENTED



EAST COAST



GULF PORT

PERCENTAGE OF TOTAL U.S. SRW
PRODUCTION BY EXPORT TRIBUTARY

For the major producing states (million metric tons)

	2020	2019	2018	2017	2016
<i>Alabama</i>	0.2	0.2	0.2	0.2	0.3
<i>Arkansas</i>	0.1	0.1	0.1	0.2	0.2
<i>Georgia</i>	0.1	0.1	0.1	0.1	0.1
<i>Illinois</i>	0.9	1.0	1.0	1.0	0.9
<i>Indiana</i>	0.6	0.4	0.5	0.5	0.6
<i>Kentucky</i>	0.7	0.7	0.5	0.6	0.9
<i>Maryland</i>	0.4	0.3	0.3	0.4	0.5
<i>Michigan</i>	0.6	0.6	0.6	0.5	0.8
<i>Missouri</i>	0.7	0.7	0.8	1.0	1.1
<i>New York</i>	0.2	0.1	0.2	0.2	0.2
<i>North Carolina</i>	0.6	0.3	0.6	0.6	0.4
<i>Ohio</i>	0.9	0.6	0.9	0.9	1.2
<i>Pennsylvania</i>	0.3	0.3	0.3	0.3	0.3
<i>Tennessee</i>	0.4	0.4	0.5	0.5	0.7
<i>Virginia</i>	0.3	0.2	0.3	0.3	0.3
<i>Wisconsin</i>	0.2	0.3	0.4	0.3	0.5
Surveyed-States Total*	5.7	4.8	5.8	6.1	7.0
Sixteen-State Total	7.1	6.1	7.3	7.5	9.0
Total SRW Production	7.5	6.5	7.8	8.0	9.4

Based on August 2020 estimates from USDA's National Agricultural Statistics Service.

*Eleven states denoted by italics were surveyed accounting for 76% of 2020 SRW production.

2020 SRW SURVEY

Soft Red Winter 2020 Survey

	Composite Average			East Coast*			Gulf Ports*		
	2020	2019	5-Year	2020	2019	5-Year	2020	2019	5-Year
WHEAT GRADE DATA									
Test Weight (lb/bu)	59.7	58.1	58.1	59.3	56.9	57.1	59.8	58.5	58.4
(kg/hl)	78.6	76.5	76.5	78.0	75.0	75.2	78.7	76.9	76.9
Damage - Total (%)	0.2	0.6	1.3	0.8	1.4	1.4	0.1	0.4	1.3
Foreign Material (%)	0.0	0.1	0.1	0.2	0.2	0.2	0.0	0.1	0.1
Shrunken and Broken (%)	0.5	0.8	0.6	0.5	1.5	0.8	0.5	0.6	0.5
Total Defects (%)	0.8	1.4	2.0	1.5	2.5	2.2	0.6	1.1	1.9
Grade	2	2	2	2	3	3	2	2	2
WHEAT NON-GRADE DATA									
Dockage (%)	0.3	0.4	0.5	0.3	0.4	0.5	0.3	0.4	0.4
Moisture (%)	13.4	13.7	13.0	13.6	13.6	13.0	13.3	13.7	13.0
Protein (%) 12%/0% mb	9.4/10.7	9.5/10.8	9.7/11.0	9.4/10.6	9.7/11.0	10.0/11.3	9.4/10.7	9.4/10.7	9.6/10.9
Wheat Ash (%) 14%/0% mb	1.32/1.53	1.37/1.59	1.43/1.67	1.24/1.44	1.39/1.62	1.44/1.67	1.34/1.56	1.37/1.59	1.43/1.66
1000 Kernel Weight (g)	34.0	31.8	32.0	36.5	31.7	32.0	33.2	31.8	32.0
Wheat Falling Number (sec)	319	288	305	283	283	306	329	289	305
Kernel Size (%) lg/med/sm	88/11/01	85/14/01	83/16/01	91/09/00	84/14/02	82/16/02	87/12/01	85/14/01	83/16/01
Single Kernel Hardness	24.7	18.7	20.6	25.2	17.5	18.1	24.5	19.0	21.2
Weight (mg)	34.4	33.7	34.1	37.0	34.0	34.4	33.7	33.7	34.0
Diameter (mm)	2.64	2.66	2.63	2.73	2.64	2.63	2.62	2.67	2.64
Sedimentation (cc)	11.0	10.5	11.9	11.2	10.5	12.5	11.0	10.5	11.7
DON (ppm)	0.5	1.3	1.0	0.2	0.5	0.8	0.6	1.5	1.1
FLOUR DATA									
Lab Mill Extraction (%)	66.8	67.5	68.9	67.0	67.6	68.9	66.7	67.4	68.9
Flour Color - *L	91.4	91.0	91.3	91.5	91.1	91.2	91.3	91.0	91.3
- *a	-2.4	-2.4	-2.4	-2.3	-2.4	-2.4	-2.4	-2.4	-2.4
- *b	9.2	9.1	8.7	8.9	8.9	8.8	9.3	9.1	8.7
Flour Protein (%) 14%/0% mb	7.5/8.7	7.5/8.7	8.0/9.3	7.6/8.8	7.7/9.0	8.2/9.6	7.5/8.7	7.4/8.6	7.9/9.2
Flour Ash (%) 14%/0% mb	0.41/0.47	0.44/0.51	0.46/0.53	0.42/0.49	0.44/0.51	0.45/0.53	0.40/0.47	0.44/0.51	0.46/0.53
Wet Gluten (%)	20.4	20.5	21.9	22.0	21.6	22.6	20.0	20.2	21.7
Gluten Index	88.9	87.9	83.6	94.6	88.4	82.5	87.3	87.8	83.8
Falling Number (sec)	316	288	304	292	283	306	323	289	304
Amylograph (65g) (BU)	662	406	463	322	462	418	760	392	475
Starch Damage (%)	3.9	3.3	4.7	4.5	3.4	4.5	3.7	3.2	4.8
SRC: GPI	0.69	0.65	0.59	0.66	0.66	0.58	0.70	0.65	0.58
Water/50% Sucrose	54/74	54/99	57/110	57/83	52/96	58/109	53/72	55/99	57/108
5% Lactic Acid/5% Na ₂ CO ₃	101/72	111/72	112/80	105/78	109/70	110/82	100/70	111/72	110/80
DOUGH PROPERTIES									
Farinograph Peak (min)	1.2	1.1	1.3	1.2	1.3	1.4	1.2	1.0	1.3
Stability (min)	1.6	1.7	2.2	1.5	1.9	2.1	1.6	1.6	2.2
Absorption (%)	52.4	52.5	52.7	53.6	52.2	53.0	52.0	52.6	52.7
Alveograph P (mm)	39	37	37	44	39	38	38	37	36
L (mm)	78	81	90	75	81	91	78	81	90
W (10 ⁻⁴ joules)	83	80	82	87	84	84	82	79	82
P/L	0.51	0.46	0.41	0.59	0.48	0.42	0.48	0.46	0.41
Extensio Resistance (BU)	188	151	174	164	158	169	195	149	175
Extensibility (cm)	16.1	16.4	16.2	16.9	16.8	16.6	15.8	16.3	16.1
Area (sq cm)	53	43	49	48	46	49	54	42	48
BAKING EVALUATION									
Bake Grain and Texture	5.6	4.8	5.0	5.7	5.1	5.1	5.6	4.7	5.0
Absorption (%)	54.4	54.3	54.6	55.6	54.0	54.7	54.0	54.3	54.5
Loaf Volume (cc)	605	711	718	589	719	731	609	709	714
Cookie Diameter (cm)	9.2	9.0	9.5	9.0	9.0	9.4	9.3	9.0	9.5
Spread Ratio	10.2	9.9	9.4	9.7	9.6	8.8	10.3	10.0	9.5
PRODUCTION OF 11 STATES (%):	100.0%			22.4%			77.6%		

*East Coast: Maryland, Virginia, North Carolina; Gulf: Alabama, Arkansas, Illinois, Indiana, Kentucky, Missouri, Ohio, Tennessee

2020 SRW STATE SUMMARY

	Alabama	Arkansas	Illinois	Indiana	Kentucky	Missouri	Ohio	Tennessee	Maryland	North Carolina	Virginia
Sample Count	4	7	32	28	12	28	34	6	15	18	12
WHEAT GRADE DATA FROM AREA COMPOSITE SAMPLES											
Test Weight (lb/bu)	60.2	59.1	60.1	59.8	60.6	58.7	59.8	60.0	60.0	58.8	59.3
(kg/hl)	79.2	77.8	79.1	78.6	79.7	77.2	78.7	78.9	79.0	77.4	78.0
Damage - Total (%)	0.7	0.7	0.0	0.0	0.0	0.0	0.1	0.0	0.4	1.1	0.7
Foreign Material (%)	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.0
Shrunken and Broken (%)	0.4	0.5	0.4	0.6	0.4	0.5	0.6	0.4	0.4	0.6	0.5
Total Defects (%)	1.1	1.5	0.4	0.6	0.4	0.5	0.7	0.4	1.2	1.8	1.2
Grade	1	2	1	2	1	2	2	1	1	2	2
WHEAT NON-GRADE DATA FROM INDIVIDUAL SAMPLES											
Moisture (%)	12.7	13.0	13.6	13.3	13.9	12.9	12.9	13.3	13.3	13.8	13.6
Protein (%) 12%/0% mb	9.0/10.2	9.4/10.7	9.5/10.8	9.4/10.7	10.0/11.3	9.6/10.9	8.9/10.2	9.4/10.7	9.3/10.5	9.3/10.6	8.9/10.2
Ash (%) 14%/0% mb	1.15/1.34	1.39/1.62	1.29/1.50	1.47/1.71	1.30/1.51	1.30/1.51	1.43/1.66	1.30/1.51	1.29/1.50	1.21/1.40	1.24/1.45
1000 Kernel Weight (g)	39.0	33.1	32.2	31.5	37.1	32.0	29.9	38.9	37.9	35.5	37.0
Wheat Falling Number (sec)	312	305	329	332	325	334	333	332	321	258	289
DON (ppm)	0.1	0.2	1.1	0.4	0.5	0.9	0.3	0.4	0.2	0.2	NA
WHEAT NON-GRADE DATA FROM COMPOSITE AREA SAMPLES											
Dockage (%)	0.3	0.4	0.3	0.4	0.2	0.3	0.2	0.3	0.3	0.2	0.2
Moisture (Lab) (%)	13.0	13.2	13.7	13.1	14.3	13.3	12.5	13.4	13.3	13.9	13.4
Protein (Lab) (%)	9.1	9.7	9.5	9.3	10.1	9.6	8.8	9.0	9.1	9.6	9.3
Kernel Size (%) lg/med/sm	95/05/00	91/09/00	86/13/01	83/16/01	92/08/00	87/13/00	81/18/01	99/00/01	94/06/00	89/11/00	91/09/00
Single Kernel Hardness	19.0	23.9	25.1	30.5	26.2	17.8	28.3	16.5	23.6	27.1	23.2
Weight (mg)	40.6	36.6	33.4	31.5	37.3	31.7	30.0	39.6	37.3	36.6	37.3
Diameter (mm)	2.82	2.77	2.64	2.57	2.70	2.57	2.49	2.76	2.73	2.71	2.74
Sedimentation (cc)	12.0	14.0	11.0	10.4	11.0	11.8	11.0	9.0	12.7	10.4	10.9
DON (ppm)	0.2	0.5	0.9	0.5	0.4	0.8	0.2	0.9	0.2	0.1	0.2
FLOUR DATA											
Lab Mill Extraction (%)	66.1	67.0	66.9	66.6	66.8	67.4	66.0	67.5	66.6	67.2	66.8
Flour Color - *L	91.4	91.3	91.6	91.1	91.8	91.1	91.0	91.4	91.5	91.6	91.4
- *a	-2.5	-2.2	-2.4	-2.4	-2.3	-2.3	-2.5	-2.4	-2.3	-2.3	-2.4
- *b	9.1	8.8	8.7	10.1	8.7	9.2	10.0	9.0	8.8	8.8	9.3
Flour Protein (%) 14%/0% mb	7.3/8.5	7.9/9.1	7.5/8.8	7.5/8.7	7.9/9.1	7.6/8.9	7.1/8.3	7.2/8.3	7.5/8.7	7.7/8.9	7.5/8.7
Flour Ash (%) 14%/0% mb	0.40/0.46	0.42/0.49	0.39/0.45	0.40/0.47	0.40/0.46	0.42/0.49	0.41/0.47	0.39/0.46	0.42/0.49	0.44/0.51	0.38/0.44
Wet Gluten (%)	20.4	22.8	19.2	20.6	22.8	19.8	18.5	19.3	20.0	24.3	19.5
Gluten Index	93.3	74.7	80.8	89.6	72.4	93.8	96.5	92.3	96.5	98.4	83.3
Falling Number (sec)	308	298	303	327	358	340	322	297	320	287	264
Amylograph (65g) (BU)	699	373	705	794	673	791	879	794	693	111	280
Starch Damage (%)	3.4	5.3	3.4	4.3	3.8	3.6	3.8	3.4	4.6	4.7	4.0
SRC: GPI	0.69	0.75	0.67	0.63	0.81	0.69	0.74	0.70	0.78	0.61	0.64
Water	54	55	51	52	51	58	53	51	54	59	55
50% Sucrose	89	73	79	78	54	87	58	78	55	97	89
5% Lactic Acid	106	105	99	93	98	113	95	100	98	111	103
5% Na ₂ CO ₃	66	68	69	69	68	77	71	66	71	85	71
DOUGH PROPERTIES											
Farinograph Peak (min)	1.2	1.5	1.2	1.2	1.2	1.1	1.3	1.2	1.2	1.2	1.3
Stability (min)	1.6	2.1	1.8	1.4	1.5	1.4	1.9	1.1	1.4	1.3	1.9
Absorption (%)	52.0	53.7	51.9	52.7	51.5	52.6	51.3	52.4	53.0	54.5	52.5
Alveograph P (mm)	42	44	40	38	35	38	37	39	44	48	35
L (mm)	80	86	69	73	96	74	89	58	72	73	86
W (10 ⁻⁴ joules)	96	97	79	77	88	80	83	76	94	87	79
P/L	0.53	0.51	0.57	0.52	0.36	0.52	0.41	0.67	0.62	0.66	0.41
Extensio Resistance (BU)	230	116	191	183	208	170	182	282	188	138	189
Extensibility (cm)	15.7	19.5	15.7	15.6	15.7	16.4	16.1	13.6	15.8	17.7	16.6
Area (sq cm)	64	42	53	49	58	49	53	64	53	42	56
BAKING EVALUATION											
Bake Grain and Texture	4.5	5.5	6.0	5.5	5.5	6.0	5.4	5.0	5.7	5.7	5.9
Absorption (%)	54.0	55.0	53.8	54.8	53.5	54.7	53.3	54.5	55.0	56.5	54.5
Loaf Volume (cc)	535	645	596	605	630	673	558	650	571	602	587
Cookie Diameter (cm)	9.3	8.7	9.3	9.1	9.4	9.4	9.3	9.2	9.1	8.9	9.1
Spread Ratio	10.7	9.1	10.6	10.0	10.4	10.6	10.5	9.6	10.5	9.2	9.8

2020 SRW AREA SURVEY

	Alabama		Arkansas		Illinois		Indiana		Kentucky		Missouri		Ohio		Tennessee		Maryland		North Carolina		Virginia	
Sample Count	4	7	W	E	S	N	12	13	15	S	N	6	28	6	4	11	S	NE	W	E		
WHEAT GRADE DATA FROM AREA COMPOSITE SAMPLES																						
Test Weight (lb/bu)	60.2	59.1	60.3	59.8	59.4	60.0	60.6	58.8	58.6	58.9	60.0	60.0	59.7	60.2	59.1	58.6	58.9	59.4	58.9	59.4		
(kg/hl)	79.2	77.8	79.3	78.7	78.2	78.9	79.7	77.4	77.1	77.5	78.9	78.9	78.6	79.2	77.8	77.1	77.5	78.2	77.5	78.2		
Damage - Total (%)	0.7	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	1.3	0.0	0.0	2.0	0.7	0.7	0.7	0.7		
Foreign Material (%)	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0		
Shrunken and Broken (%)	0.4	0.5	0.4	0.5	0.6	0.6	0.4	0.6	0.5	0.5	0.6	0.4	0.5	0.4	0.5	0.6	0.4	0.5	0.4	0.5		
Total Defects (%)	1.1	1.5	0.4	0.5	0.6	0.6	0.4	0.6	0.5	1.2	0.6	0.4	2.1	0.7	0.8	2.6	1.1	1.2	1.1	1.2		
Grade	1	2	1	2	2	1	1	2	2	2	1	1	2	1	2	2	2	2	2	2		
WHEAT NON-GRADE DATA FROM INDIVIDUAL SAMPLES																						
Moisture (%)	12.7	13.0	13.5	13.7	13.7	13.1	13.9	12.7	13.1	13.0	12.8	13.3	12.4	13.7	13.4	14.0	13.9	13.4	13.9	13.4		
Protein (%) 12% mb	9.0	9.4	9.6	9.3	9.8	9.1	10.0	9.7	9.5	9.7	8.8	9.4	9.6	9.1	9.4	9.3	8.6	9.1	9.1	9.1		
Ash (%) 14% mb	1.15	1.39	1.29	1.29	1.45	1.48	1.30	1.29	1.30	1.51	1.41	1.30	1.34	1.27	1.15	1.25	1.23	1.25	1.23	1.25		
1000 Kernel Weight (g)	39.0	33.1	32.3	32.1	32.7	30.8	37.1	31.0	32.8	31.5	29.7	38.9	37.9	37.8	35.5	35.5	35.3	37.8	35.3	37.8		
Wheat Falling Number (sec)	312	305	334	321	328	334	325	337	331	325	334	332	324	319	250	263	330	272	330	272		
DON (ppm)	0.1	0.2	1.4	0.6	0.9	0.2	0.5	1.0	0.8	0.5	0.2	0.4	0.4	0.1	0.2	0.2	NA	0.2	NA	0.2		
WHEAT NON-GRADE DATA FROM COMPOSITE AREA SAMPLES																						
Dockage (%)	0.3	0.4	0.3	0.2	0.4	0.4	0.2	0.4	0.2	0.4	0.2	0.3	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.2		
Moisture (%)	13.0	13.2	13.6	13.8	13.5	12.9	14.3	12.9	13.5	12.6	12.5	13.4	12.2	13.8	14.0	13.9	13.2	13.5	13.2	13.5		
Protein (%) 12% mb	9.1	9.7	9.7	9.2	9.9	9.0	10.1	9.9	9.4	9.4	8.7	9.0	9.7	8.8	9.6	9.6	8.7	9.6	8.7	9.6		
Kernel Size Large (Over 7) (%)	95	91	86	84	87	81	92	86	86	85	81	94	94	93	89	89	90	91	90	91		
Med (Over 9) (%)	5	9	13	14	13	18	8	13	13	15	18	0	6	6	11	11	9	8	9	8		
Small (Thru 9) (%)	0	0	1	2	1	1	0	1	0	1	1	1	1	1	0	0	0	0	0	0		
Single Kernel Hardness	19.0	23.9	22.3	29.8	26.6	32.8	26.2	16.5	18.8	24.6	29.0	16.5	19.1	25.8	21.2	31.6	22.5	23.5	23.5	23.5		
Weight (mg)	40.6	36.6	34.2	32.1	32.0	31.2	37.3	30.4	32.6	30.1	29.9	39.6	36.0	38.0	38.2	35.4	35.9	37.9	35.9	37.9		
Diameter (mm)	2.82	2.77	2.66	2.62	2.62	2.54	2.70	2.54	2.59	2.55	2.48	2.76	2.70	2.75	2.77	2.67	2.71	2.75	2.71	2.75		
Sedimentation (cc)	12	14	11	11	11	10	11	10	13	11	11	9	12	13	11	10	13	10	13	10		
DON (ppm)	0.2	0.5	1.0	0.7	0.7	0.3	0.4	0.6	0.9	0.3	0.1	0.9	0.4	0.2	0.0	0.2	0.4	0.1	0.4	0.1		
FLOUR DATA																						
Lab Mill Extraction (%)	66.1	67.0	66.7	67.1	67.4	66.1	66.8	67.2	67.6	65.3	66.1	67.5	66.1	66.9	68.2	66.4	67.2	66.7	66.7	66.7		
Flour Color - *L	91.4	91.3	91.6	91.5	91.5	91.0	91.8	91.3	90.9	91.4	91.0	91.4	91.4	91.5	91.4	91.7	91.2	91.4	91.2	91.4		
- *a	-2.5	-2.2	-2.3	-2.4	-2.4	-2.5	-2.3	-2.4	-2.3	-2.5	-2.5	-2.4	-2.3	-2.3	-2.3	-2.4	-2.4	-2.4	-2.4	-2.4		
- *b	9.1	8.8	9.1	8.1	9.2	10.6	8.7	8.9	9.4	9.8	10.0	9.0	8.6	8.9	8.4	9.1	9.2	9.3	9.2	9.3		
Flour Protein (%) 14% mb	7.3	7.9	7.6	7.4	7.7	7.3	7.9	7.6	7.7	7.4	7.1	7.2	7.6	7.4	7.8	7.5	7.5	7.5	7.5	7.5		
Flour Ash (%) 14% mb	0.40	0.42	0.38	0.42	0.41	0.40	0.40	0.43	0.42	0.37	0.41	0.39	0.43	0.42	0.47	0.42	0.41	0.37	0.41	0.37		
Wet Gluten (%)	20.4	22.8	17.8	21.4	21.7	20.0	22.8	20.2	19.6	20.6	18.2	19.3	18.6	20.6	28.8	20.8	21.3	18.8	21.3	18.8		
Gluten Index	93.3	74.7	93.4	60.0	80.3	95.1	72.4	96.9	91.6	86.4	98.4	92.3	96.6	96.4	98.2	98.5	79.5	84.9	79.5	84.9		
Falling Number (sec)	308	298	289	325	341	318	358	351	332	289	328	297	287	336	375	219	305	246	305	246		
Amylograph (65g) (BU)	699	373	565	936	905	728	673	885	725	745	904	794	778	653	100	119	485	193	485	193		
Starch Damage (%)	3.4	5.3	3.4	3.4	3.8	4.6	3.8	3.4	3.8	4.2	3.8	3.4	4.6	4.6	5.3	4.2	4.6	3.8	4.6	3.8		
SRC: GPI	0.69	0.75	0.67	0.67	0.64	0.63	0.81	0.63	0.73	0.70	0.75	0.70	0.78	0.78	0.66	0.58	0.66	0.63	0.66	0.63		
Water	54	55	50	52	51	52	51	60	57	51	53	51	53	55	57	61	61	52	61	52		
50% Sucrose	89	73	81	77	76	79	54	93	83	76	54	78	55	56	80	110	87	89	87	89		
5% Lactic Acid	106	105	100	97	91	94	98	109	115	100	94	100	98	98	106	115	111	99	111	99		
5% Na ₂ CO ₃	66	68	69	68	66	72	68	80	74	67	72	66	70	71	80	89	80	68	80	68		
DOUGH PROPERTIES																						
Farinograph Peak (min)	1.2	1.5	1.3	1.0	1.1	1.2	1.2	1.1	1.1	1.0	1.4	1.2	1.2	1.2	1.3	1.1	1.2	1.3	1.2	1.3		
Stability (min)	1.6	2.1	2.2	1.1	1.3	1.4	1.5	1.4	1.4	2.0	1.9	1.1	1.4	1.4	1.3	1.4	2.1	1.8	2.1	1.8		
Absorption (%)	52.0	53.7	51.6	52.3	52.4	52.9	51.5	52.8	52.4	51.1	51.3	52.4	53.4	52.8	56.5	53.0	51.5	52.9	51.5	52.9		
Alveograph P (mm)	42	44	38	42	36	39	35	41	36	34	37	39	43	45	54	44	34	36	44	36		
L (mm)	80	86	74	62	70	75	96	63	81	97	87	58	81	67	70	75	89	85	89	85		
W (10 ⁻⁴ joules)	96	97	79	80	72	80	88	79	81	81	83	76	99	91	90	85	74	81	91	81		
P/L	0.53	0.51	0.51	0.68	0.51	0.52	0.36	0.65	0.44	0.35	0.43	0.67	0.53	0.67	0.77	0.59	0.38	0.42	0.59	0.42		
Extensio Resistance (BU)	230	116	216	151	182	183	208	158	179	191	180	282	188	188	146	132	188	189	188	189		
Extensibility (cm)	15.7	19.5	15.4	16.3	14.9	16.0	15.7	16.3	16.5	16.4	16.1	13.6	16.0	15.7	17.4	17.9	15.9	16.9	17.9	16.9		
Area (sq cm)	64	42	59	44	45	51	58	45	52	57	52	64	54	52	42	42	52	58	52	58		
BAKING EVALUATION																						
Bake Grain and Texture	4.5	5.5	6.0	6.0	5.5	5.5	5.5	4.5	7.0	5.0	5.5	5.0	5.0	6.0	6.0	5.5	5.5	6.0	5.5	6.0		
Absorption (%)	54.0	55.0	53.6	54.0	54.5	54.9	53.5	55.0	54.5	53.1	53.3	54.5	55.4	54.8	58.4	55.0	53.5	54.9	53.5	54.9		
Loaf Volume (cc)	535	645	575	630	630	590	630	655	685	600	550	650	585	565	610	595	720	530	720	530		
Cookie Diameter (cm)	9.3	8.7	9.4	9.0	9.1	9.1	9.4	9.5	9.3	9.5	9.3	9.2	8.9	9.2	8.7	9.0	9.2	9.1	9.2	9.1		
Spread Ratio	10.7	9.1	10.8	10.3	9.9	10.1	10.4	10.9	10.4	9.4	10.7	9.6	9.9	10.8	8.2	10.0	10.2	9.6	10.2	9.6		

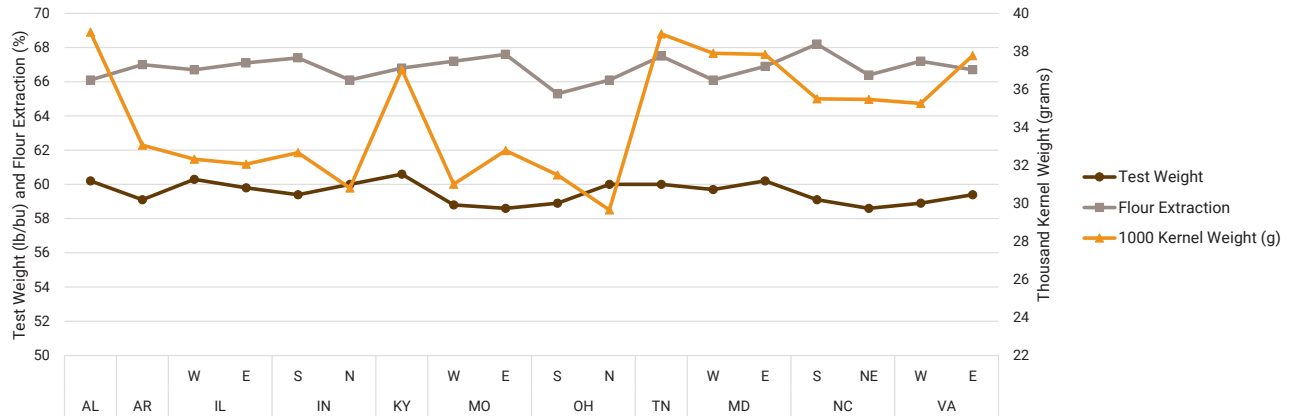
N-North, S-South, E-East, W-West, NE-Northeast; Lg-Large, Med-Medium, Sm-Small; mb-moisture basis; NA-Not Available

COMPARISONS OF 2020 RESULTS

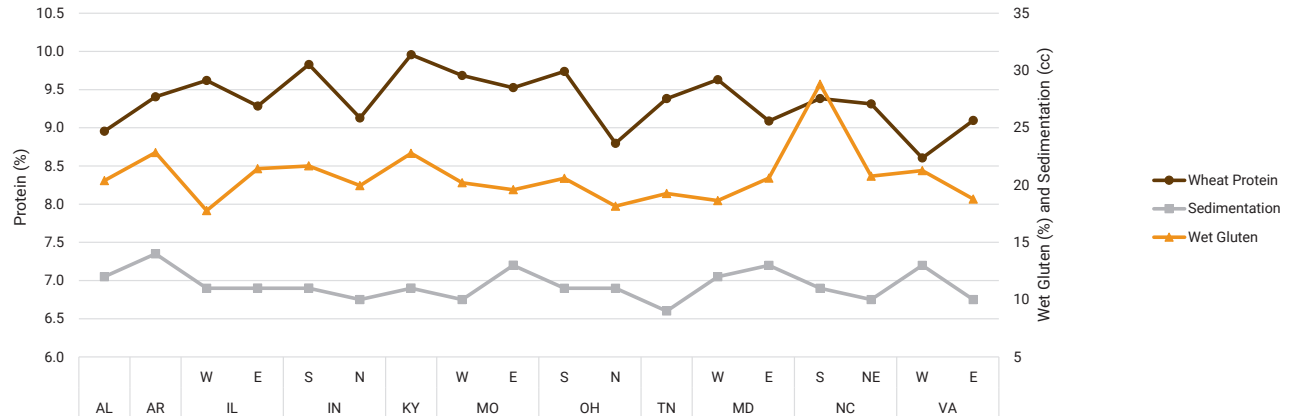
For Selected Quality Factors



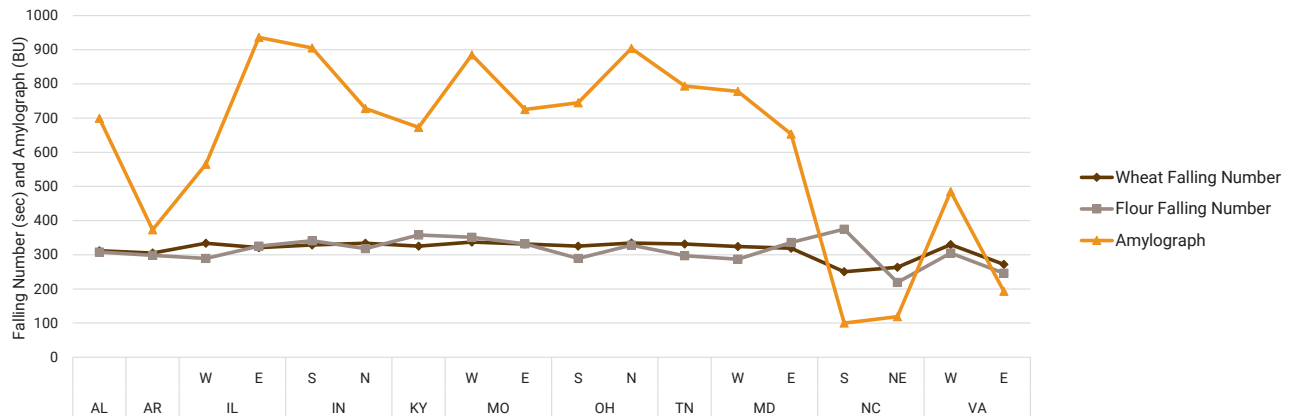
Test Weight, Thousand Kernel Weight and Laboratory Mill Flour Extraction



Protein, Sedimentation and Wet Gluten



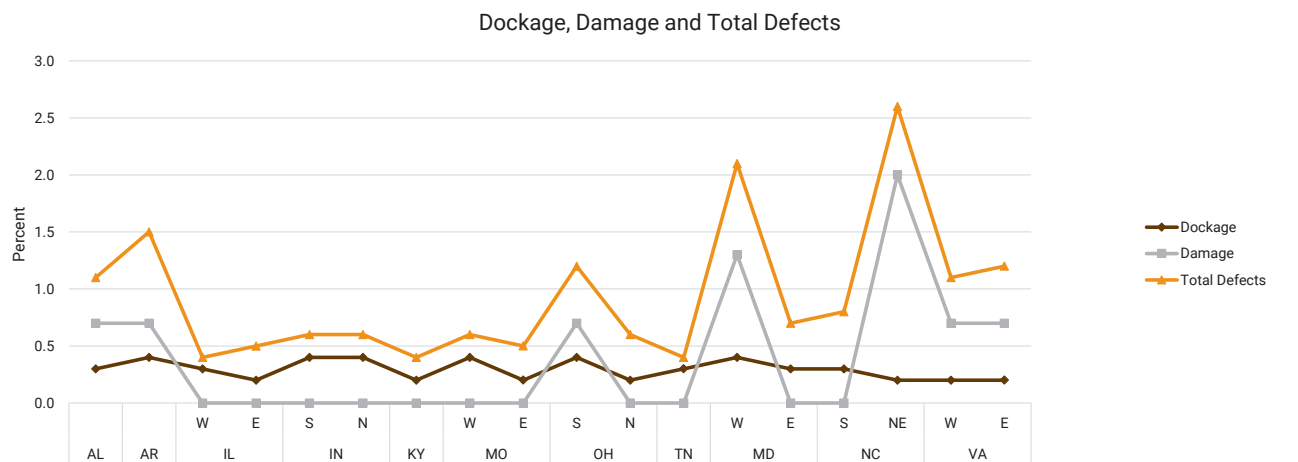
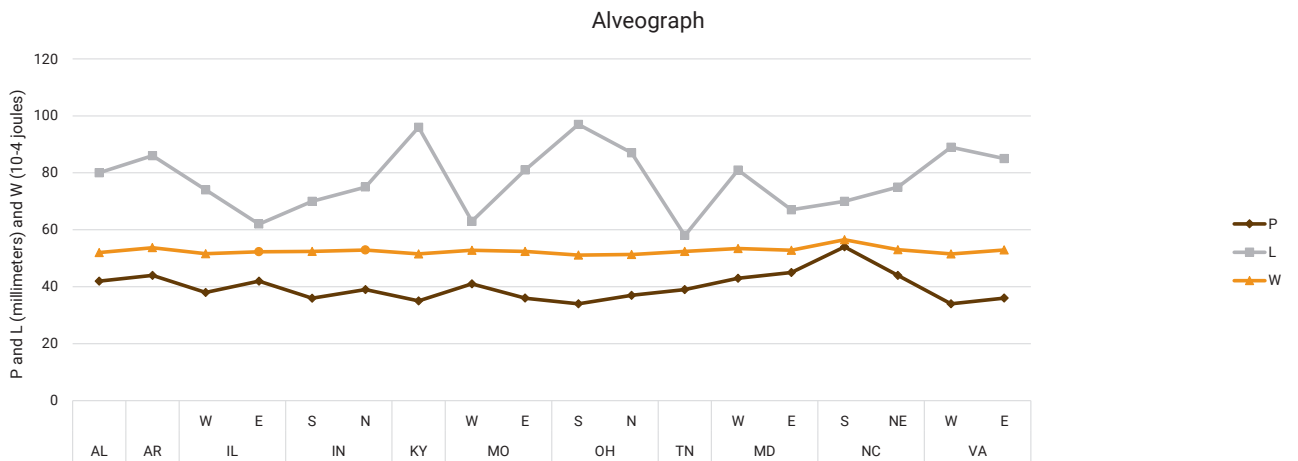
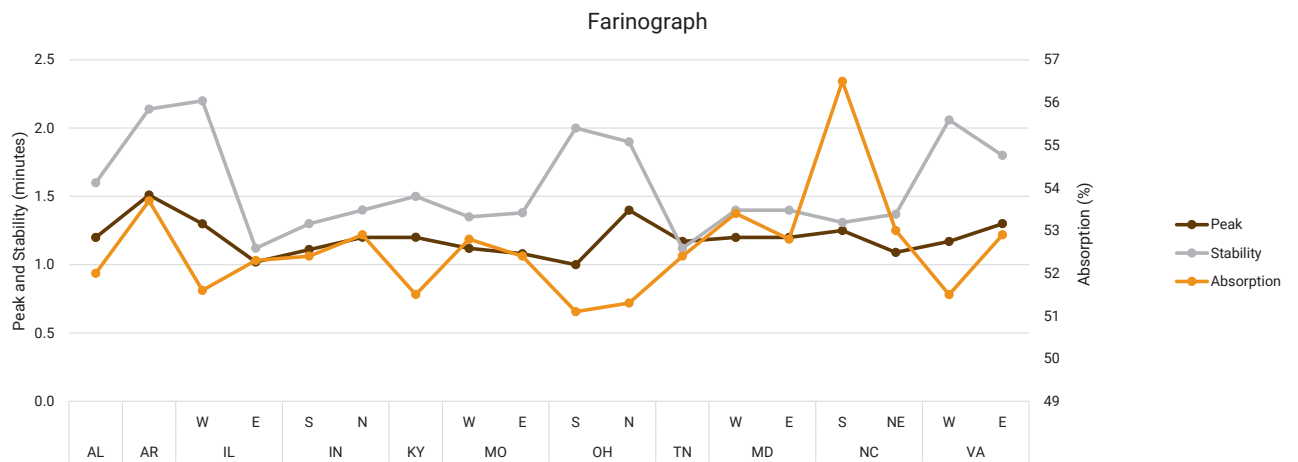
Falling Number and Amylograph



COMPARISONS OF 2020 RESULTS



For Selected Quality Factors



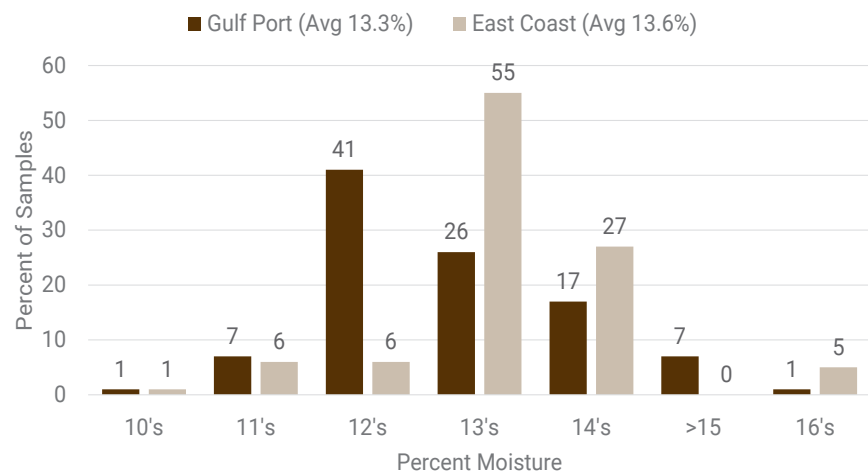
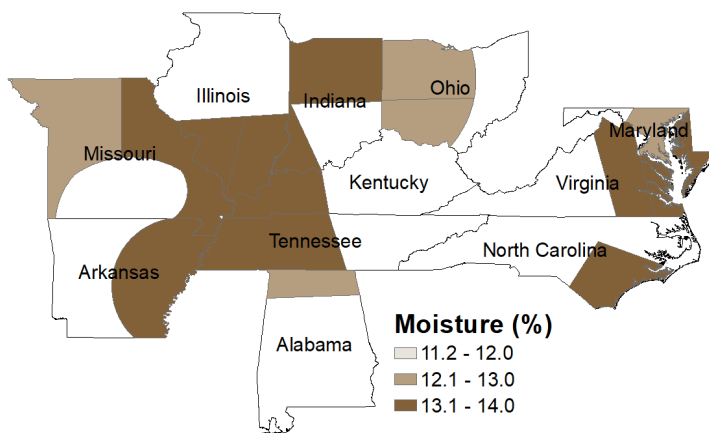
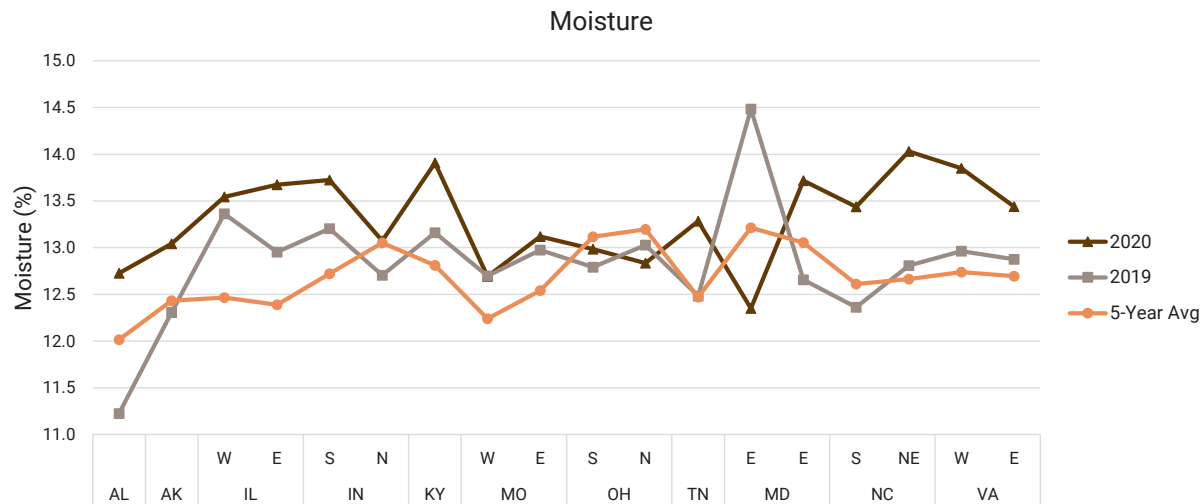
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DISTRIBUTION OF 2020 RESULTS AND COMPARISONS WITH PREVIOUS YEARS



Moisture



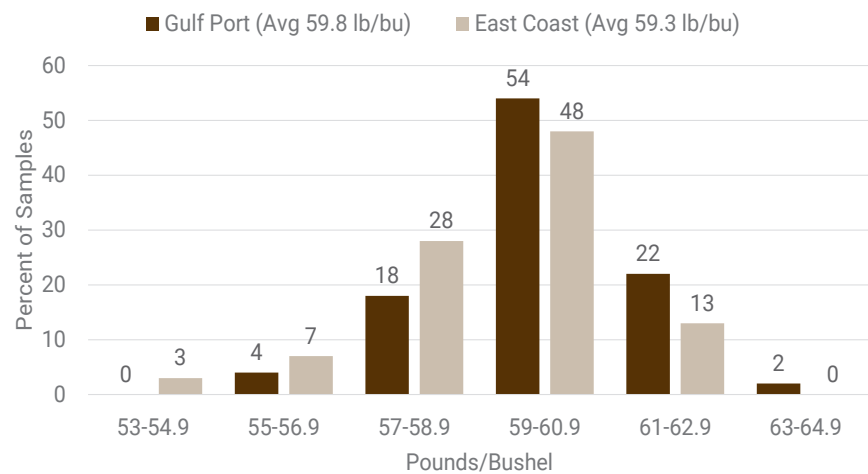
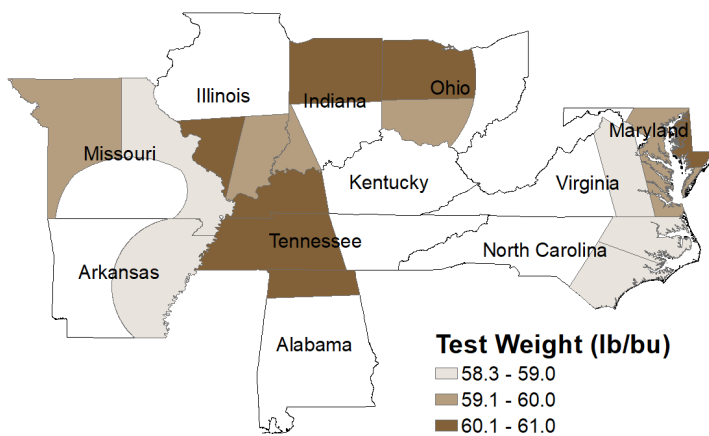
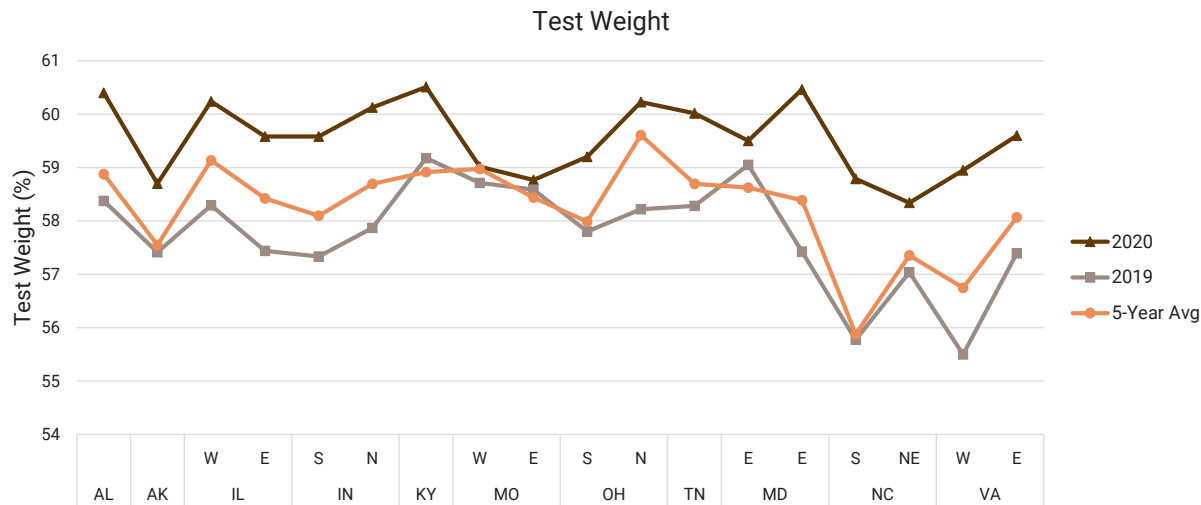
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N-North, S-South, E-East, W-West, NE-Northeast



DISTRIBUTION OF 2020 RESULTS AND COMPARISONS WITH PREVIOUS YEARS



Test Weight

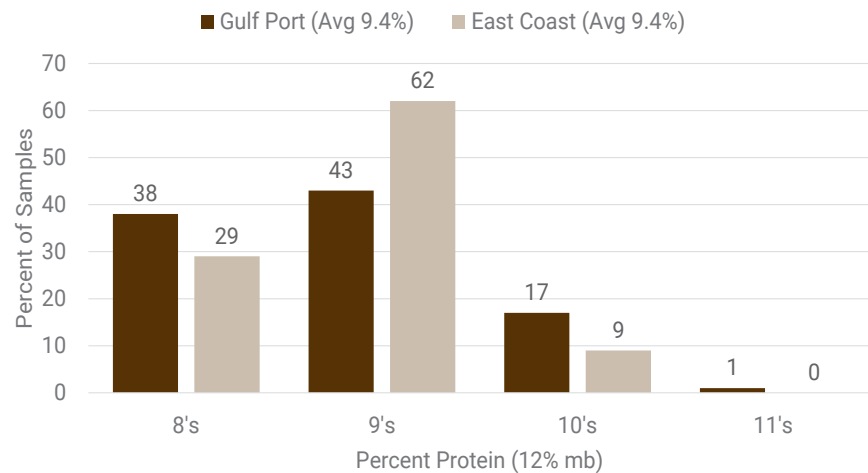
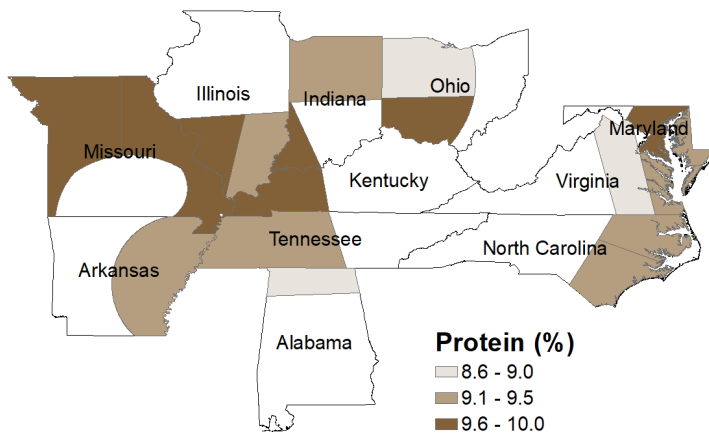
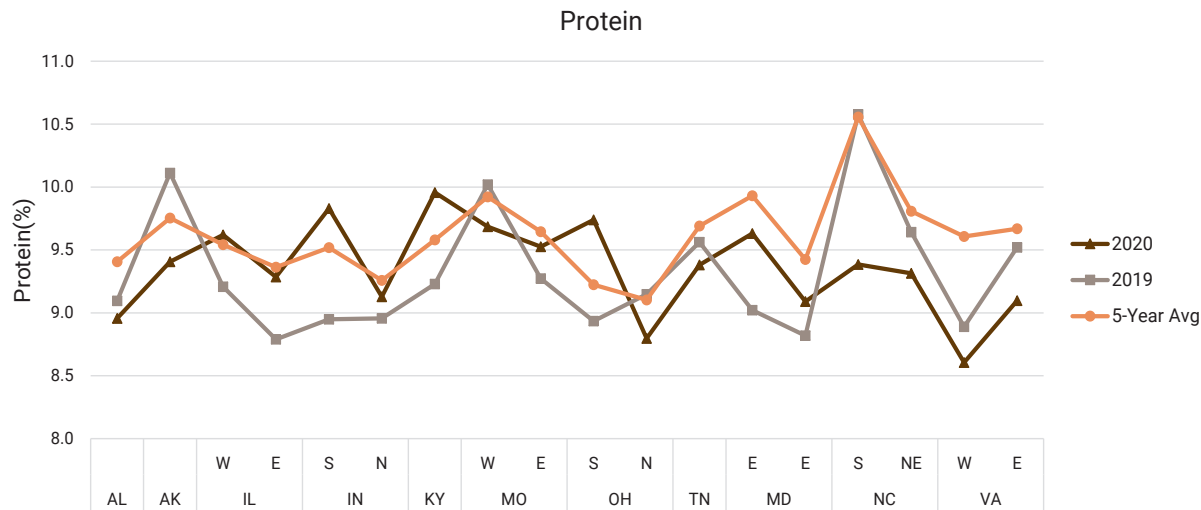


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N-North, S-South, E-East, W-West, NE-Northeast

DISTRIBUTION OF 2020 RESULTS AND COMPARISONS WITH PREVIOUS YEARS



Protein

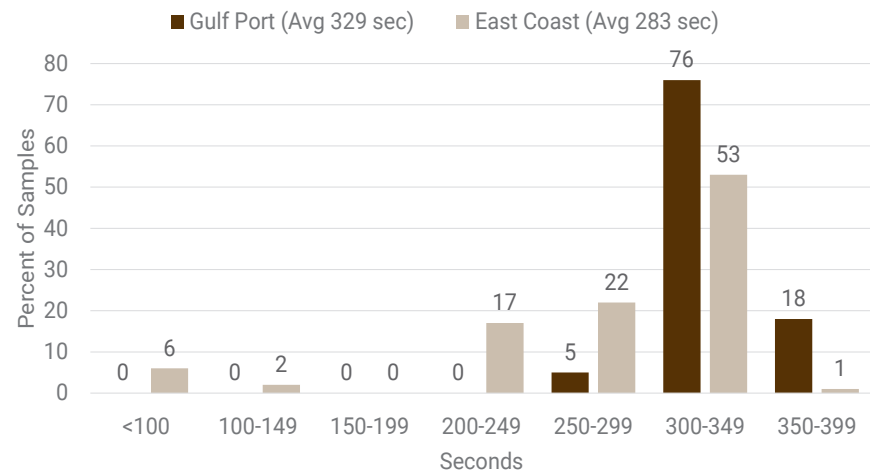
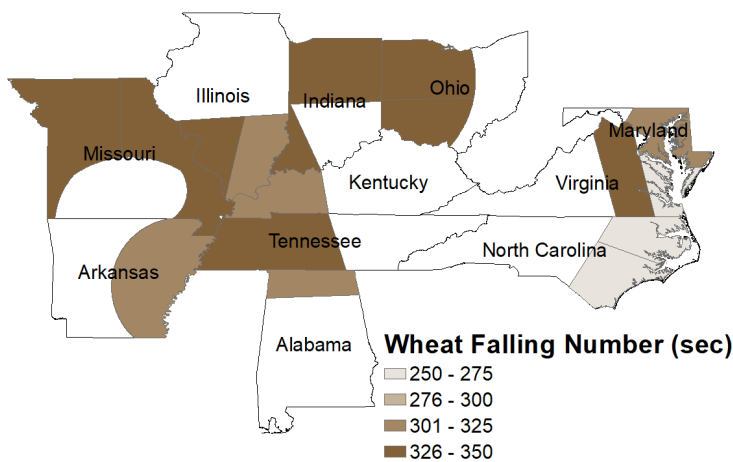
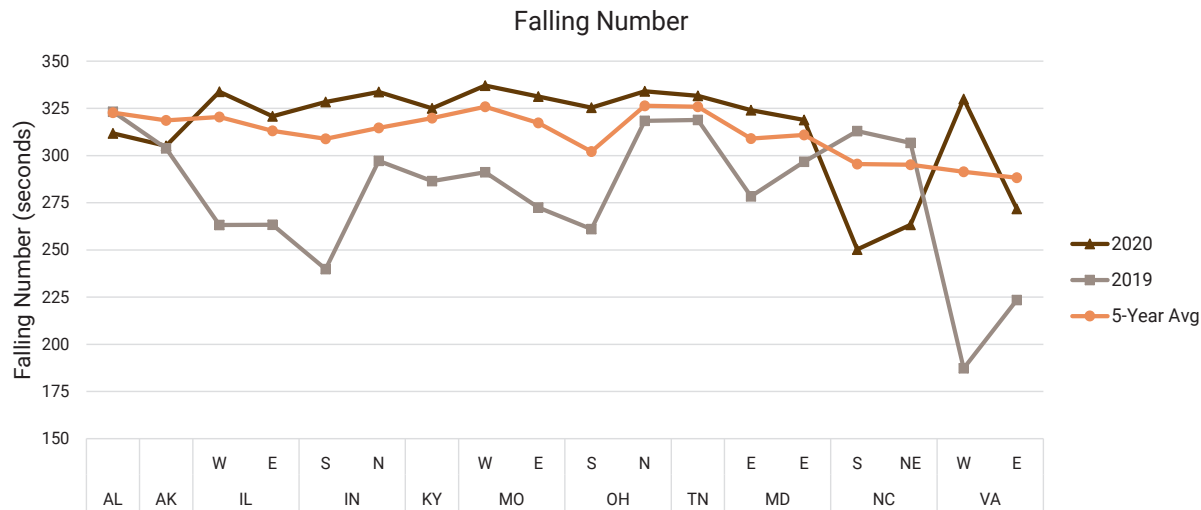


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N-North, S-South, E-East, W-West, NE-Northeast

DISTRIBUTION OF 2020 RESULTS AND COMPARISONS WITH PREVIOUS YEARS



Falling Number

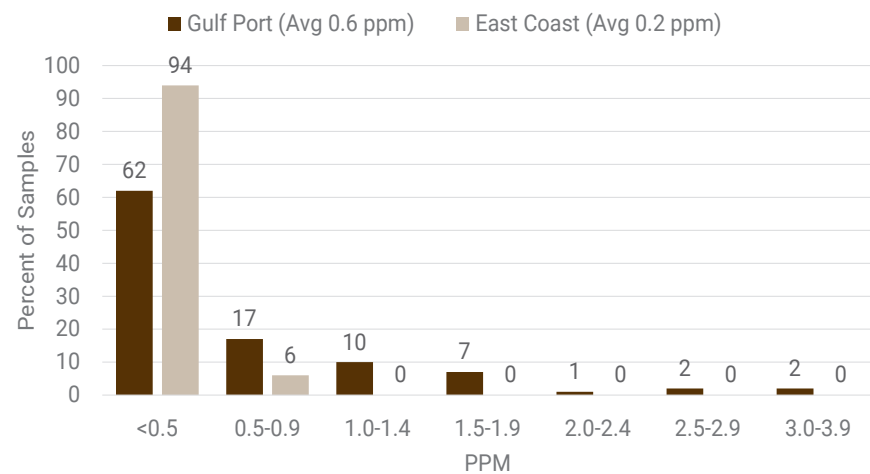
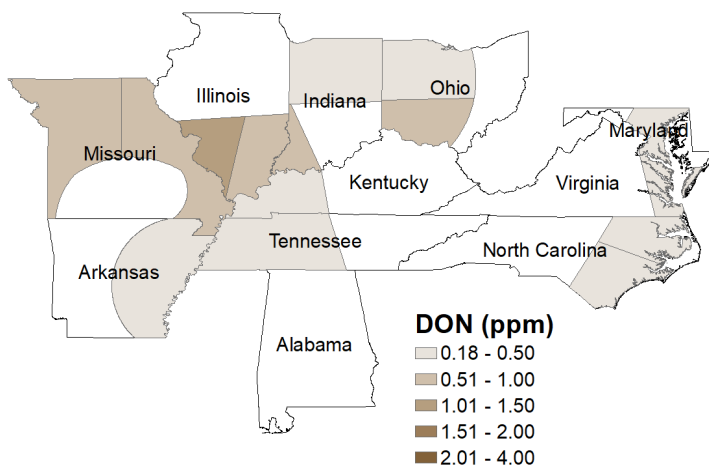
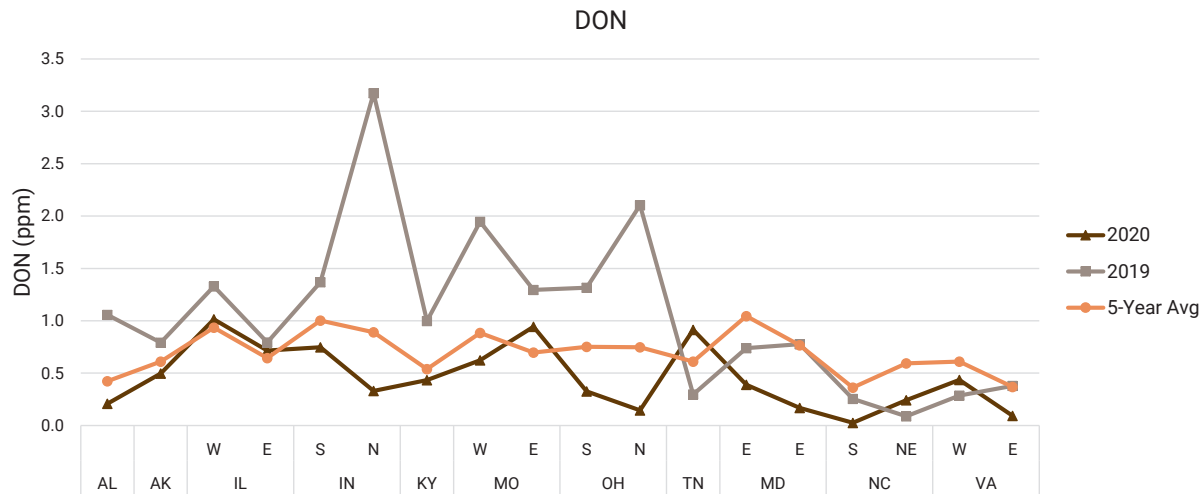


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N-North, S-South, E-East, W-West, NE-Northeast

DISTRIBUTION OF 2020 RESULTS AND COMPARISONS WITH PREVIOUS YEARS



Vomitoxin (DON)



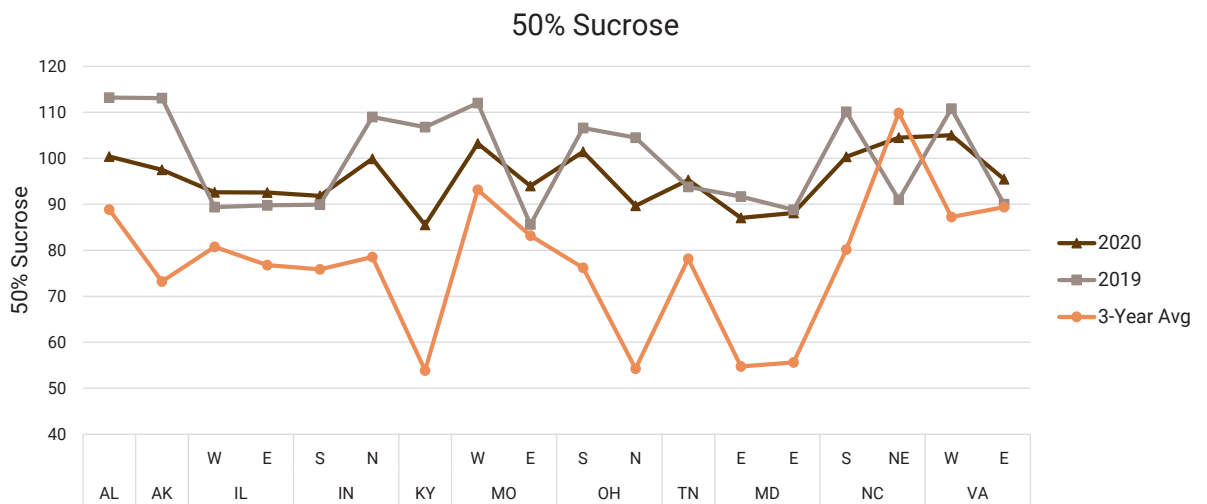
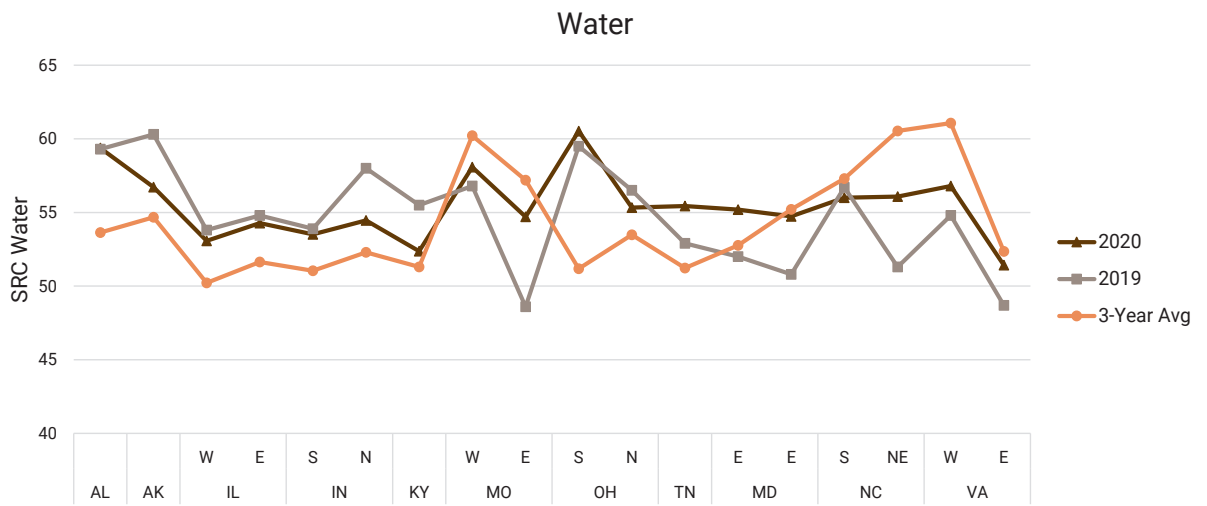
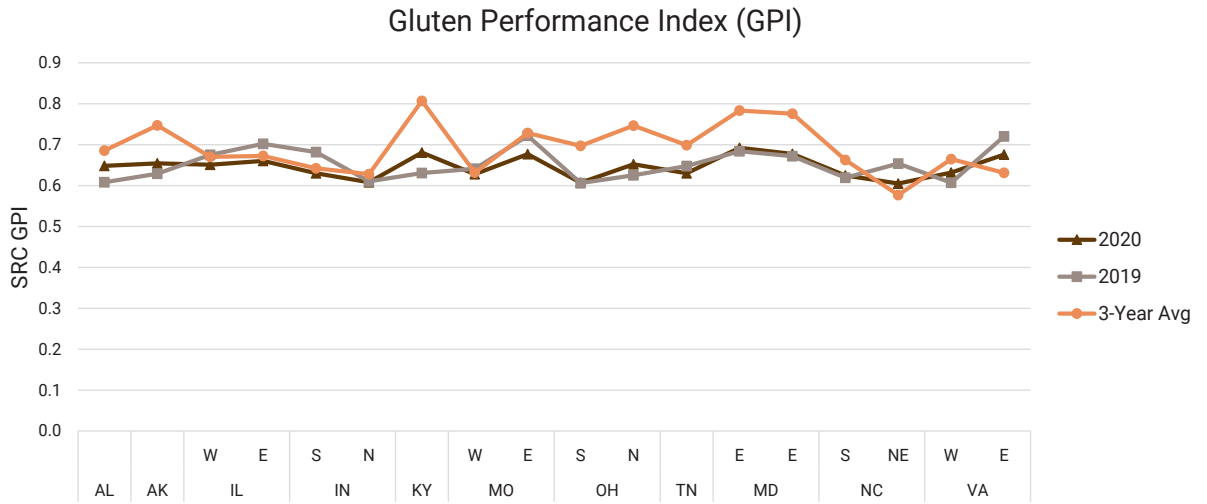
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N-North, S-South, E-East, W-West, NE-Northeast



DISTRIBUTION OF 2020 RESULTS AND COMPARISONS WITH PREVIOUS YEARS



Solvent Retention Capacity (SRC)



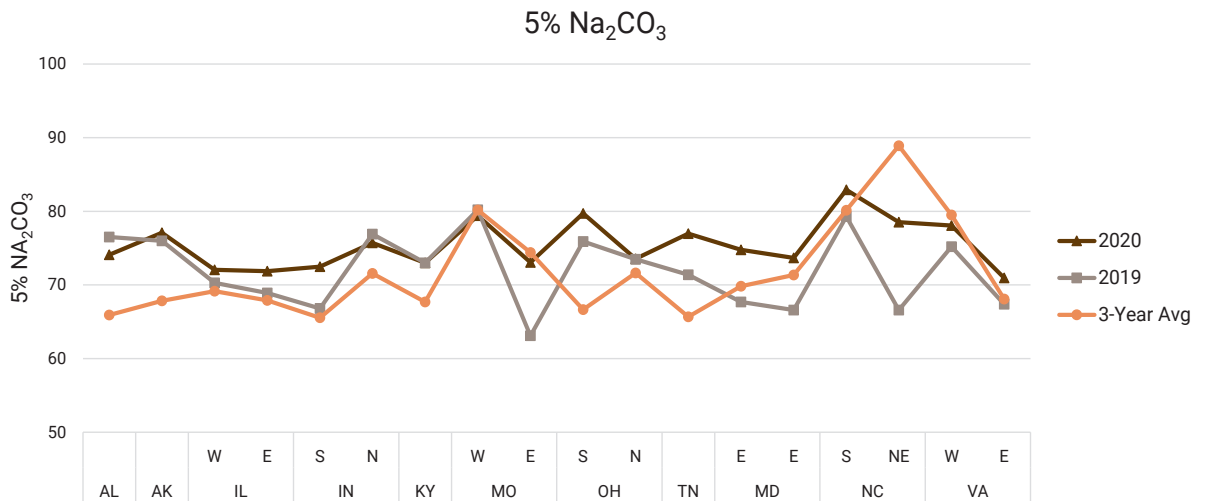
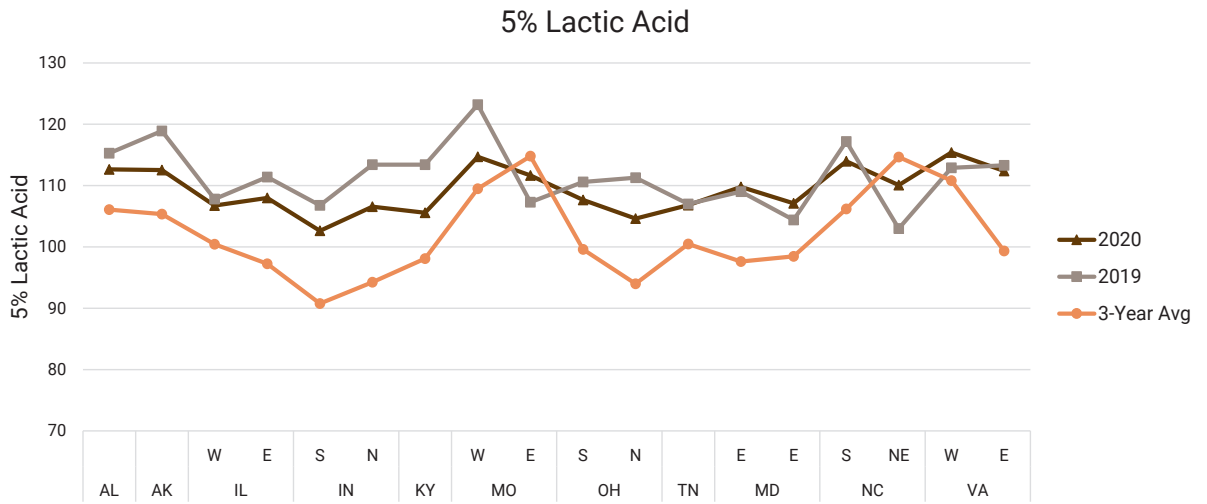
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DISTRIBUTION OF 2020 RESULTS AND COMPARISONS WITH PREVIOUS YEARS



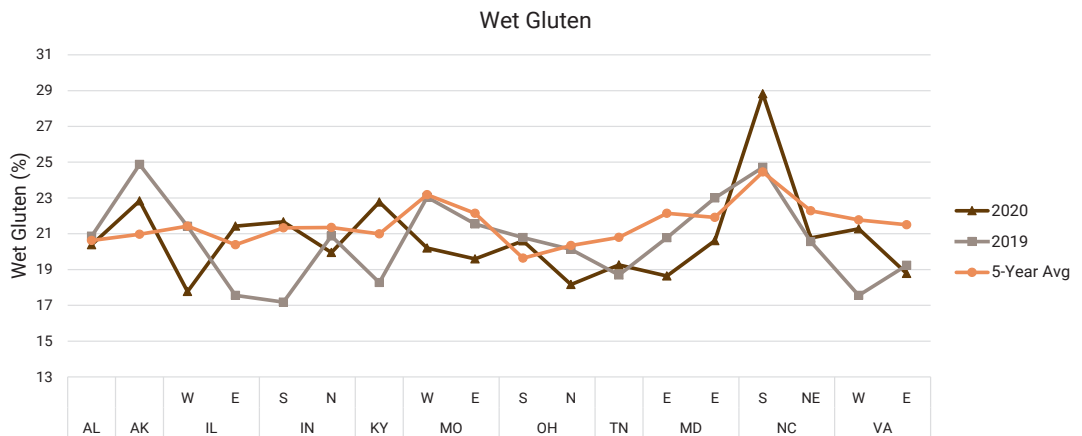
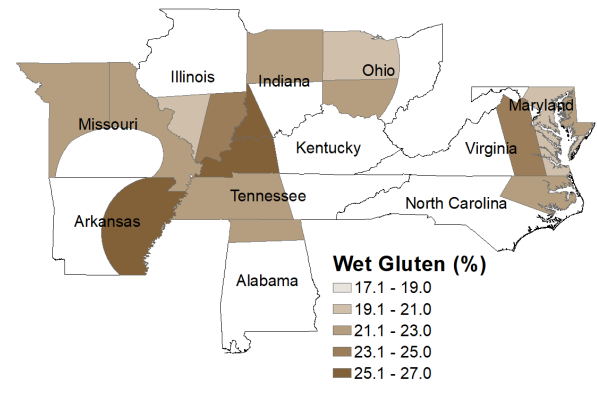
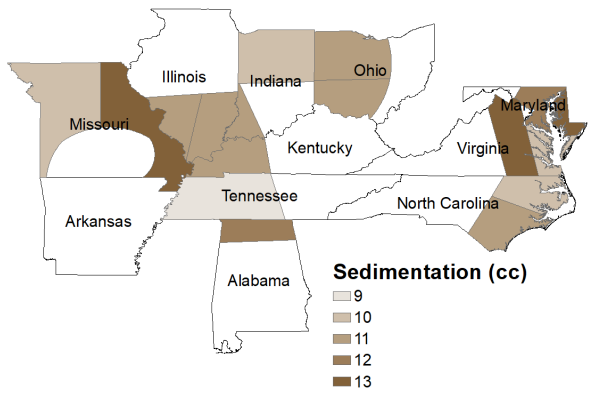
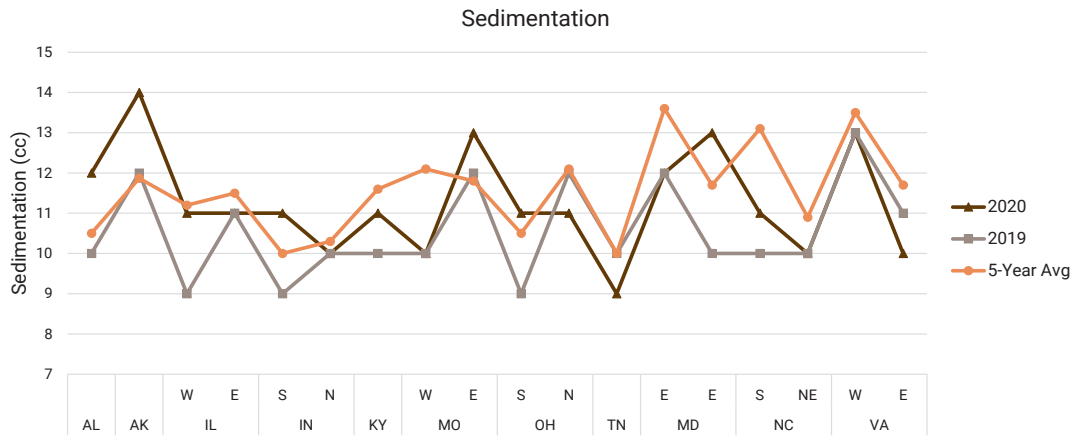
Solvent Retention Capacity (SRC)



DISTRIBUTION OF 2020 RESULTS AND COMPARISONS WITH PREVIOUS YEARS



Sedimentation and Wet Gluten



AL-Alabama, AK-Arkansas, IL-Illinois, IN-Indiana, KY-Kentucky, MD-Maryland, MO-Missouri, NC-North Carolina, OH-Ohio, TN-Tennessee, VA-Virginia; N-North, S-South, E-East, W-West, NE-Northeast

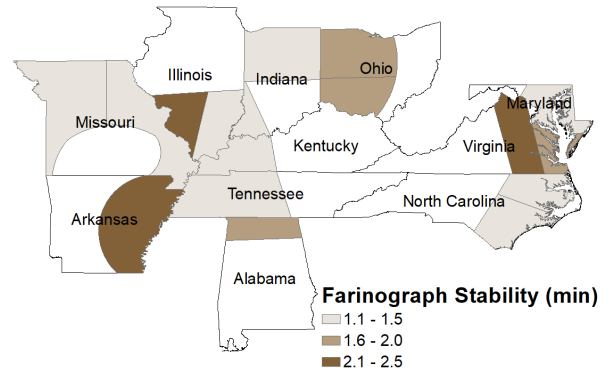
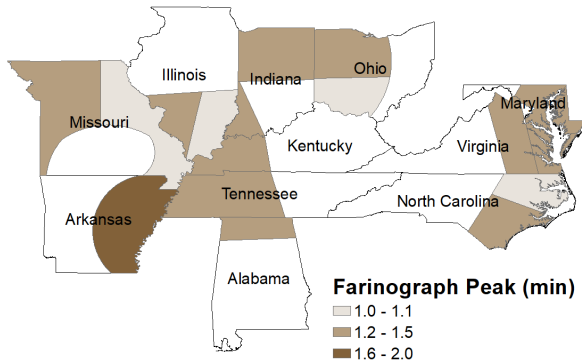
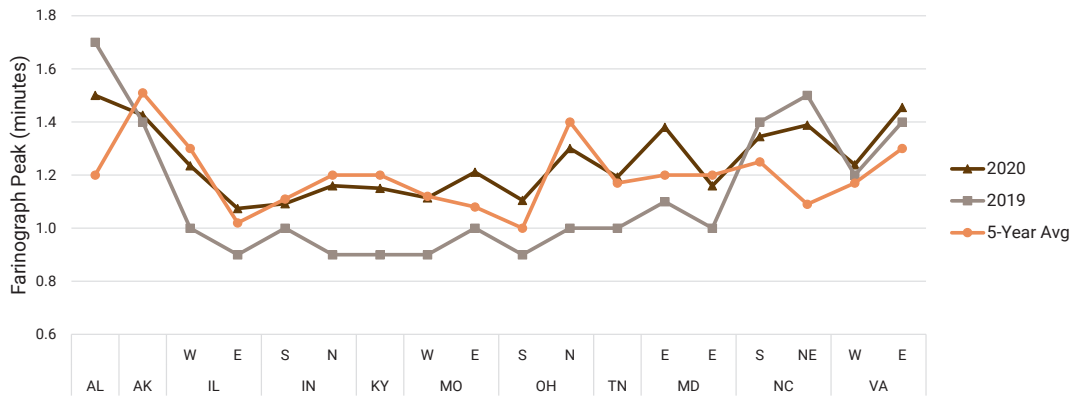


DISTRIBUTION OF 2020 RESULTS AND COMPARISONS WITH PREVIOUS YEARS

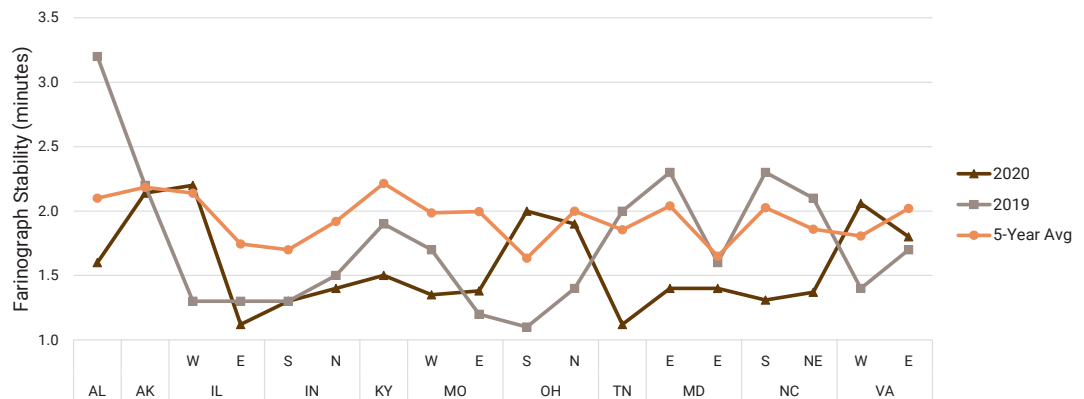


Farinograph

Farinograph Peak



Farinograph Stability

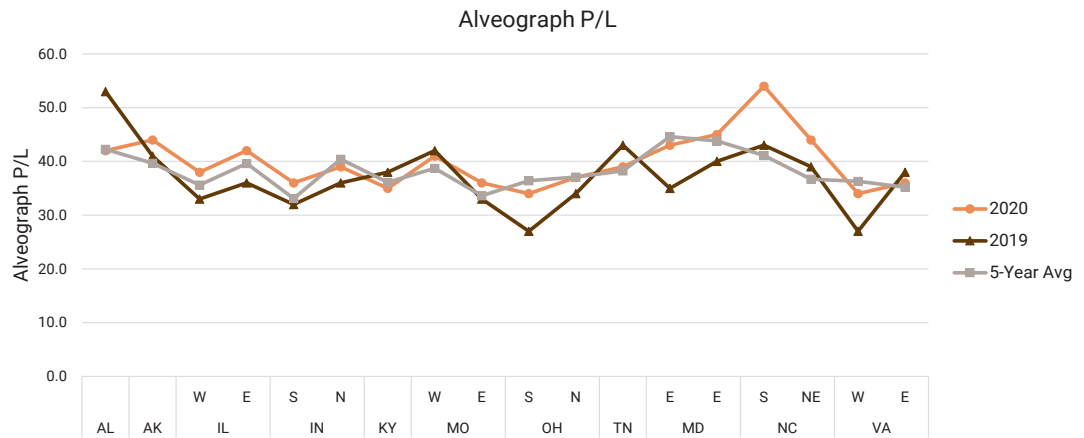
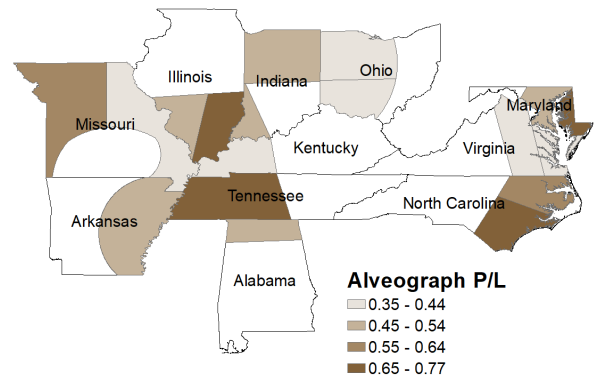
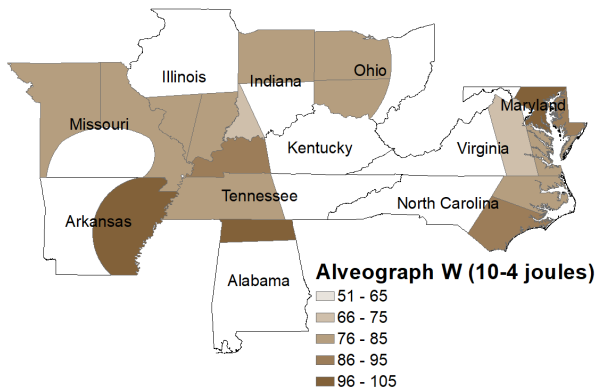
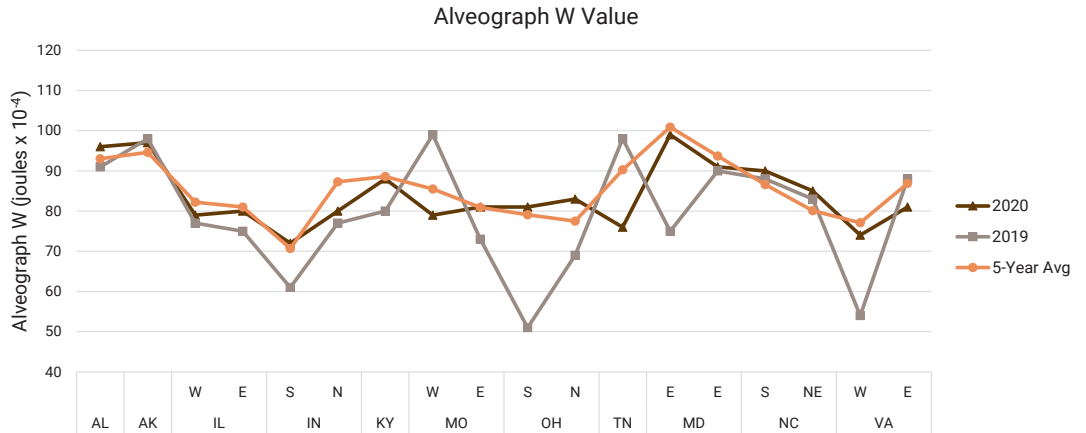




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