

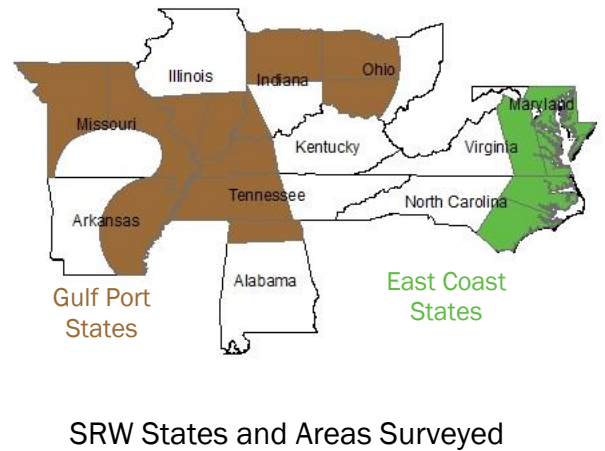
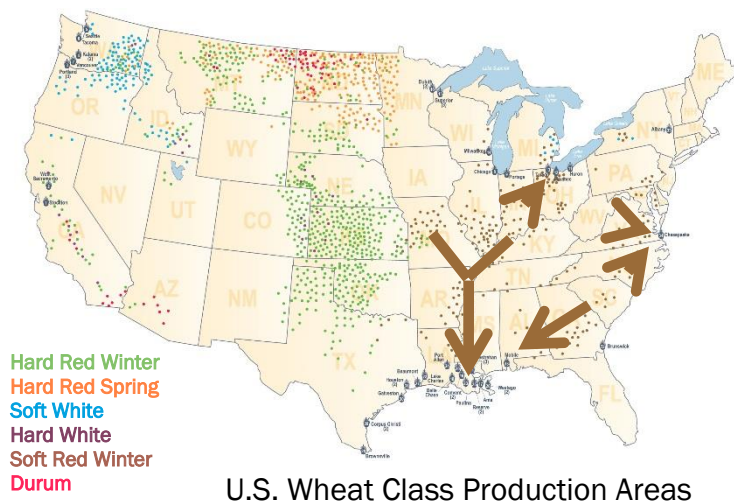


U.S. WHEAT
ASSOCIATES

2019 QUALITY SURVEY
Soft Red Winter Wheat



Survey Overview



Weather and Harvest: Soft red winter wheat (SRW) is grown over a wide area of the eastern United States. The area seeded to SRW in fall 2018 for the 2019 harvest is estimated by USDA at 5.54 million acres (2.24 million hectares), down from 6.08 million acres (2.46 million hectares) seeded for the 2018 harvest, well below the average SRW planted area of the past five years. The reduced area is attributed mainly to choices made by growers based on commodity prices. The 2019 SRW production, estimated at 7.01 million metric tons (MMT), is down from 7.77 MMT in 2018 and well below the 5-year average.

Planting started at a normal pace but slowed as fall progressed due to extensive precipitation. In the six SRW survey states where USDA estimates wheat crop conditions, by late fall the winter wheat crop was rated 58% good to excellent and 92% fair to excellent. Much of the SRW growing area received excessive moisture throughout the winter and spring, and rain continued to cause lengthy harvest delays in many areas. The excessive moisture adversely affected quality by reducing falling number values and increasing DON values in some areas. In addition, the average yield per harvested acre is estimated to be below last year and the five-year average, reflecting the excessive moisture received during the growing season.

Survey Methods: Great Plains Analytical Laboratory, Kansas City, Mo., collected and analyzed 261 samples from elevators in 18 reporting areas across 11 states. 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 2019 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 72% of total 2019 SRW production.

Wheat and Grade Data: The overall average grade of the samples collected for the 2019 SRW harvest survey is U.S. No. 2. The average test weight is 58.1 lb/bu (76.5 kg/hl), equal to the 5-year average and above the 57.9 lb/bu (76.2 kg/hl) average in 2018. The Gulf Port average of 58.5 lb/bu (76.9 kg/hl) is above both last year and the 5-year average. The East Coast test weight average of 56.9 lb/bu (75.0 kg/hl) is above last year but below the 5-year average of 57.4 lb/bu (75.6 kg/hl).

The East Coast Total Defects average of 2.5% is above last year and 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 is 1.1%, above 2018 but almost half of the 5-year average. Other Gulf Port grade factors, dockage and moisture are similar to or higher than 2018 and 5-year average values.

The Composite average wheat protein content of 9.5% (12% moisture basis) is lower than 2018's 9.9% and the 5-year average of 9.7%. Both the Gulf Port protein average of 9.4% and East Coast average of 9.7% are below the respective 2018 and 5-year averages. The Composite average falling number of 288 seconds is significantly lower than 2018 and the 5-year average. The Gulf Port average of 289 seconds and the East Coast average of 283 seconds are both significantly below 2018 and the 5-year averages. Approximately 21% of samples had a falling number below 250 seconds in 2019, with 13% below 225. The Composite DON average of 1.3 ppm is above the 2018 average but similar to the 5-year average of 1.2 ppm. The East Coast value of 0.5 ppm is below the 5-year average while the Gulf Port value of 1.5 ppm is above the 5-year average. Of the samples tested for DON, 33% of the Gulf Port results and 84% of the East Coast results were less than 1.0 ppm.

Flour and Baking Data: The Composite, East Coast and Gulf Port Buhler laboratory mill flour extraction averages are below 2018 and the 5-year averages. The farinograph peak and absorption values are similar to 5-year averages, but the stability values are all below the 5-year averages. The SRC values generally indicate good quality for cookies. The Composite, East Coast and Gulf Port alveograph L averages of 81 are lower than last year and the 5-year average, indicating lower extensibility. All other alveograph averages are similar to the respective 5-year averages given the variability of alveograph analysis. The Gulf amylograph average of 392 BU and East average of 462 indicate relatively high levels of amylase activity in the crop and are consistent with the low falling numbers. The Composite, East Coast and Gulf Port cookie spread ratios are all higher than last year and the 5-year averages, indicating good extensibility. Average loaf volumes are all lower than last year and the 5-year averages.

Summary: Some SRW production areas, especially in the Gulf Port states, experienced difficult growing conditions in 2019 with excessive moisture affecting falling number and DON values. Processors should find good qualities for cookies and crackers and segments of the crop with good cake qualities. Buyers are encouraged to review their quality specifications to ensure that their purchases meet their expectations.

About U.S. Wheat Associates: U.S. Wheat Associates (USW) is the industry's market development organization working in more than 100 countries. Its mission is to "develop, maintain, and expand international markets to enhance the profitability of U.S. wheat producers and their customers." USW activities are funded by producer checkoff dollars managed by 17 state wheat commissions and through cost-share USDA Foreign Agricultural Service market development programs. For more information, visit www.uswheat.org or contact your state wheat commission.

Nondiscrimination and Alternate Means of Communications: USW prohibits discrimination in all its programs and activities on the basis of race, color, religion, national origin, gender, marital or family status, age, disability, political beliefs or sexual orientation. Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USW at 202-463-0999 (TDD/TTY - 800-877-8339, or from outside the U.S., 605-331-4923). To file a complaint of discrimination, write to Vice President of Finance, USW, 3103 10th Street, North, Arlington, VA 22201, or call 202-463-0999. USW is an equal opportunity provider and employer.

Soft Red Winter Production

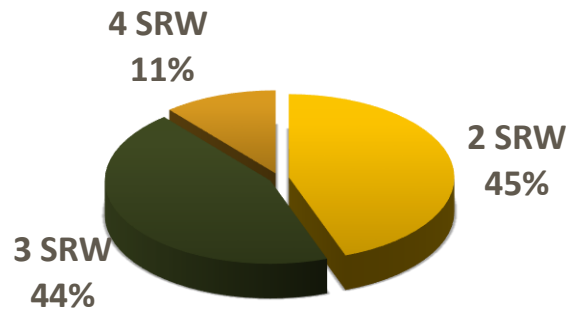
For the major producing states (million metric tons)

	2019	2018	2017	2016	2015
<i>Alabama</i>	0.2	0.2	0.2	0.3	0.4
<i>Arkansas</i>	0.1	0.1	0.2	0.2	0.4
<i>Illinois</i>	1.0	1.0	1.0	0.9	0.9
<i>Indiana</i>	0.5	0.5	0.5	0.6	0.5
<i>Kentucky</i>	0.7	0.5	0.6	0.9	0.9
<i>Maryland</i>	0.3	0.3	0.4	0.5	0.5
Michigan	1.0	1.0	0.9	0.8	0.7
<i>Missouri</i>	0.9	0.9	1.0	1.1	0.9
<i>North Carolina</i>	0.3	0.6	0.6	0.4	0.8
<i>Ohio</i>	0.7	0.9	0.9	1.2	0.9
<i>Tennessee</i>	0.4	0.5	0.5	0.7	0.7
<i>Virginia</i>	0.2	0.2	0.3	0.3	0.4
Wisconsin	0.3	0.4	0.3	0.5	0.4
Surveyed-States Total*	5.2	5.8	6.1	7.0	7.2
Thirteen-State Total	6.5	7.2	7.3	8.9	8.7
Total SRW Production	7.0	7.8	7.9	9.4	9.8

Based on USDA crop estimates as of August 12, 2019.

**Eleven states denoted by italics were surveyed and account for 72% of estimated 2019 SRW production.*

SRW 2019 Grade Distribution



Based on 18 Composite Samples

Soft Red Winter 2019 Survey

	Composite Average			East Coast*			Gulf Ports*		
	2019	2018	5-Year	2019	2018	5-Year	2019	2018	5-Year
Wheat Grade Data									
Test Weight (lb/bu)	58.1	57.9	58.1	56.9	56.6	57.4	58.5	58.2	58.3
Test Weight (kg/hl)	76.5	76.2	76.5	75.0	74.5	75.6	76.9	76.6	76.7
Damage - Total (%)	0.6	0.5	1.4	1.4	1.3	1.2	0.4	0.4	1.4
Foreign Material (%)	0.1	0.0	0.1	0.2	0.1	0.1	0.1	0.0	0.1
Shrunken and Broken (%)	0.8	0.5	0.5	1.5	0.6	0.6	0.6	0.5	0.5
Total Defects (%)	1.4	1.1	2.0	2.5	2.0	1.9	1.1	0.8	2.1
Grade	2	3	2	3	3	3	2	2	2
Wheat Non-Grade Data									
Dockage (%)	0.4	0.4	0.5	0.4	0.3	0.5	0.4	0.4	0.5
Moisture (%)	13.7	12.8	12.9	13.6	13.1	12.8	13.7	12.7	12.9
Protein (%) 12%/0% mb	9.5/10.8	9.9/11.3	9.7/11.0	9.7/11.0	10.2/11.6	10.0/11.3	9.4/10.7	9.9/11.3	9.7/11.0
Wheat Ash (%) 14%/0% mb	1.37/1.59	1.45/1.69	1.46/1.70	1.39/1.62	1.43/1.66	1.46/1.70	1.37/1.59	1.45/1.69	1.46/1.70
1000 Kernel Weight (g)	31.8	29.9	31.9	31.7	30.8	32.4	31.8	29.7	31.8
Wheat Falling Number (sec)	288	322	309	283	301	318	289	327	307
Kernel Size (%) lg/med/sm	85/14/01	77/21/02	83/16/01	84/14/02	74/22/04	83/16/01	85/14/01	78/21/01	83/16/01
Single Kernel Hardness	18.7	17.3	21.4	17.5	15.0	18.7	19.0	17.8	22.0
Single Kernel Weight (mg)	33.7	33.2	33.6	34.0	34.0	34.0	33.7	33.0	33.5
Single Kernel Diameter (mm)	2.66	2.59	2.61	2.64	2.59	2.62	2.67	2.59	2.62
Sedimentation (cc)	10.5	11.4	12.2	10.5	11.7	12.9	10.5	11.3	12.1
DON (ppm)	1.3	0.7	1.2	0.5	1.1	0.9	1.5	0.7	1.3
Flour Data									
Lab Mill Extraction (%)	67.5	68.0	69.5	67.6	67.9	69.5	67.4	68.0	69.5
Flour Color - *L	91.0	91.0	91.3	91.1	90.7	91.6	91.0	91.1	91.3
Flour Color - *a	-2.4	-2.2	-2.5	-2.4	-2.2	-2.6	-2.4	-2.2	-2.5
Flour Color - *b	9.1	8.8	8.6	8.9	8.8	8.8	9.1	8.8	8.5
Flour Protein (%) 14%/0% mb	7.5/8.7	8.5/9.9	8.1/9.4	7.7/8.9	8.4/9.8	8.3/9.7	7.4/8.6	8.5/9.9	8.1/9.4
Flour Ash (%) 14%/0% mb	0.44/0.51	0.47/0.55	0.45/0.53	0.44/0.52	0.46/0.53	0.45/0.52	0.44/0.51	0.47/0.55	0.46/0.53
Wet Gluten (%)	20.5	23.6	22.2	21.6	23.0	22.6	20.2	23.7	22.1
Gluten Index	87.9	80.3	82.0	88.4	74.3	80.6	87.8	81.7	82.3
Falling Number (sec)	286	322	309	291	301	317	285	327	307
Amylograph (65g) (BU)	406	568	481	462	371	436	392	614	493
Starch Damage (%)	3.3	5.5	5.0	3.4	5.0	4.7	3.2	5.6	5.1
SRC: GPI	0.65	0.59	0.58	0.66	0.60	0.56	0.65	0.59	0.58
Water/50% Sucrose	54/99	57/109	57/110	52/96	56/113	59/111	55/99	57/108	57/109
5% Lactic Acid/5% Na ₂ CO ₃	111/72	113/81	112/81	109/70	118/83	110/84	111/72	111/81	110/81
Dough Properties									
Farinograph Peak (min)	1.1	1.2	1.3	1.3	1.2	1.4	1.0	1.2	1.3
Farinograph Stability (min)	1.7	1.8	2.3	1.9	1.7	2.3	1.6	1.8	2.4
Farinograph Absorption (%)	52.5	51.9	52.6	52.2	52.6	53.2	52.6	51.7	52.5
Alveograph P (mm)	37	34	36	39	35	37	37	34	36
Alveograph L (mm)	81	97	90	81	93	90	81	98	90
Alveograph W (10-4 joules)	80	81	81	84	79	82	79	81	80
Alveograph P/L	0.46	0.35	0.40	0.48	0.38	0.41	0.46	0.34	0.40
Extenso Resistance (BU)	151	182	180	158	152	172	149	188	182
Extenso Extensibility (cm)	16.4	15.3	16.1	16.8	15.9	16.6	16.3	15.2	16.0
Extenso Area (sq cm)	43	48	50	46	42	50	42	49	50
Baking Evaluation									
Bake Grain and Texture	4.8	4.8	5.1	5.1	4.8	5.1	4.7	4.8	5.1
Bake Absorption (%)	54.3	53.7	54.6	54.0	54.4	54.9	54.3	53.5	54.6
Loaf Volume (cc)	711	735	720	719	738	733	709	734	717
Cookie Diameter (cm)	9.0	8.7	9.6	9.0	8.4	9.5	9.0	8.8	9.6
Cookie Spread Ratio	9.9	9.3	9.2	9.6	8.5	8.6	10.0	9.5	9.4
% Area Production	100.0%			20.1%			79.9%		

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

2019 State Summary

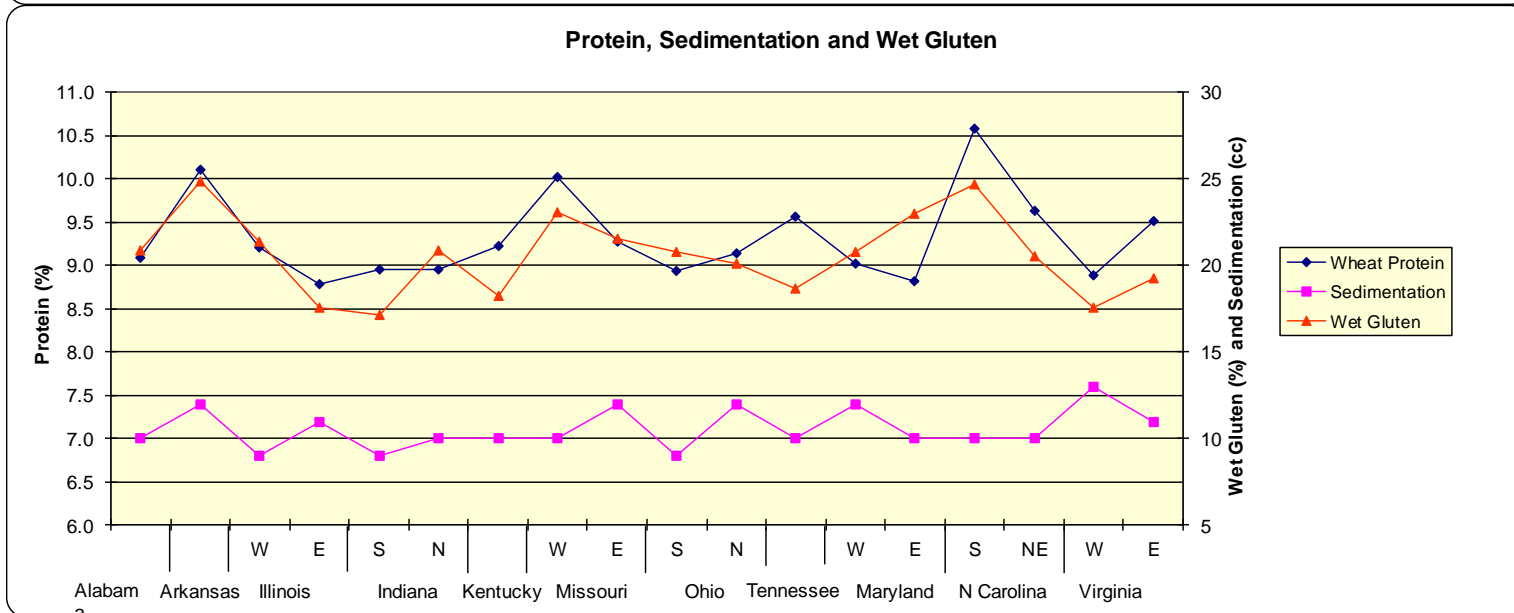
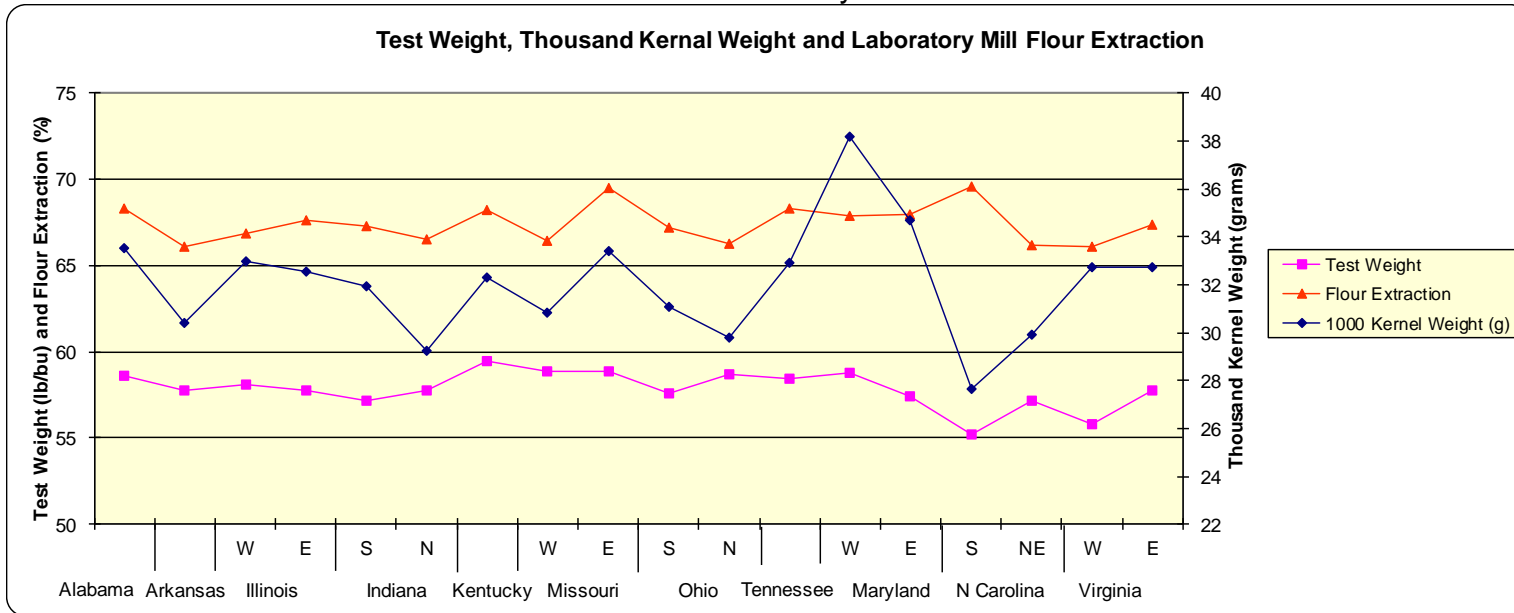
	Alabama	Arkansas	Illinois	Indiana	Kentucky	Missouri	Ohio	Tennessee	Maryland	North Carolina	Virginia
Sample Count	4	8	41	29	18	29	54	11	21	23	18
Wheat Grade Data - from Area Composite Samples											
Test Weight (lb/bu)	58.6	57.8	58.0	57.6	59.5	58.9	58.5	58.4	57.8	56.3	57.1
Test Weight (kg/hl)	77.1	76.1	76.3	75.8	78.3	77.5	77.0	76.9	76.1	74.2	75.2
Damage - Total (%)	0.7	0.7	0.0	2.2	0.0	0.3	0.1	0.0	0.9	1.6	1.5
Foreign Material (%)	0.3	0.0	0.1	0.3	0.0	0.0	0.3	0.0	0.2	0.3	0.0
Shrunken and Broken (%)	0.7	0.8	0.5	0.8	0.5	0.7	0.7	0.8	1.0	2.3	0.6
Total Defects (%)	1.7	1.5	0.6	3.2	0.5	1.0	1.1	0.8	2.2	3.1	1.9
Grade	2	3	2	3	2	2	2	2	3	3	3
Wheat Non-Grade Data - from Individual Samples											
Moisture (%)	11.2	12.3	13.2	12.9	13.2	12.9	13.0	12.5	13.2	12.6	12.9
Protein (%) 12%/0% mb	9.1/10.3	10.1/11.5	9.0/10.3	9.0/10.2	9.2/10.5	9.6/10.9	9.1/10.4	9.6/10.9	8.9/10.1	10.1/11.4	9.3/10.6
Ash (%) 14%/0% mb	1.36/1.59	1.42/1.65	1.33/1.55	1.38/1.60	1.32/1.53	1.38/1.60	1.40/1.63	1.37/1.60	1.40/1.63	1.42/1.66	1.31/1.52
1000 Kernel Weight (g)	33.6	30.4	32.8	30.2	32.3	32.4	30.0	32.9	35.7	28.9	32.7
Wheat Falling Number (sec)	323	304	263	276	287	280	309	319	292	309	212
DON (ppm)	0.7	0.8	1.3	2.1	1.0	1.8	2.1	0.4	0.8	0.3	0.3
Wheat Non-Grade Data - from Area Composite Samples											
Dockage (%)	0.4	0.2	0.3	0.4	0.2	0.5	0.3	0.4	0.3	0.5	0.3
Moisture (Lab) (%)	12.8	12.7	13.6	13.5	14.2	13.3	14.2	13.8	13.7	13.6	13.6
Protein (Lab) (%)	9.6	9.8	9.5	8.5	9.3	10.1	8.9	9.9	8.9	10.1	9.9
Kernel Size (%) Ig/med/sm	83/16/01	78/21/01	89/10/01	84/15/01	88/11/01	88/12/00	77/19/04	86/14/00	92/07/01	77/21/02	89/10/01
Single Kernel Hardness	30.7	16.5	15.2	22.5	14.9	16.0	25.5	16.2	17.0	18.2	16.3
Single Kernel Weight (mg)	34.9	37.4	33.1	32.6	33.9	35.1	31.6	35.5	36.1	32.7	34.4
Single Kernel Diameter (mm)	2.65	2.77	2.68	2.66	2.70	2.71	2.58	2.72	2.76	2.56	2.66
Sedimentation (cc)	10.0	12.0	9.8	9.6	10.0	11.2	11.5	10.0	10.6	10.0	11.7
DON (ppm)	1.1	0.8	1.1	2.5	1.0	1.6	2.0	0.3	0.8	0.2	0.3
Flour Data											
Lab Mill Extraction (%)	68.3	66.1	67.2	66.8	68.2	68.2	66.4	68.3	68.0	67.7	67.0
Flour Color - *L	91.7	91.0	91.1	90.9	91.2	91.0	90.8	91.0	91.2	91.1	90.8
Flour Color - *a	-2.5	-2.4	-2.2	-2.4	-2.4	-2.3	-2.6	-2.4	-2.4	-2.3	-2.5
Flour Color - *b	10.2	9.1	8.1	9.2	9.1	8.8	10.1	9.3	8.9	8.9	9.1
Flour Protein (%) 14%/0% mb	7.5/8.8	8.0/9.2	7.3/8.5	7.4/8.6	7.4/8.6	7.8/9.0	7.2/8.4	7.5/8.7	7.1/8.3	8.2/9.5	7.3/8.4
Flour Ash (%) 14%/0% mb	0.42/0.48	0.45/0.52	0.45/0.52	0.44/0.51	0.45/0.53	0.44/0.51	0.45/0.52	0.43/0.50	0.46/0.53	0.43/0.50	0.45/0.53
Wet Gluten (%)	20.9	24.9	20.0	19.5	18.3	22.2	20.2	18.7	22.4	22.4	18.7
Gluten Index	97.4	83.0	97.9	72.3	99.0	73.0	85.3	97.4	97.1	81.1	93.4
Falling Number (sec)	360	307	259	274	262	270	316	301	280	334	206
Amylograph (65g) (BU)	695	565	336	337	298	338	419	522	434	626	127
Starch Damage (%)	3.4	3.4	3.6	3.4	3.4	3.1	2.6	3.4	2.8	3.9	3.0
SRC: GPI	0.61	0.63	0.69	0.64	0.63	0.69	0.62	0.65	0.68	0.64	0.68
Water	59	60	54	56	56	52	57	53	51	54	51
50% Sucrose	113	113	90	102	107	96	105	94	90	99	97
5% Lactic Acid	115	119	109	111	113	114	111	107	106	109	113
5% Na2CO3	77	76	70	73	73	70	74	71	67	72	70
Dough Properties											
Farinograph Peak (min)	1.7	1.4	1.0	0.9	0.9	1.0	1.0	1.0	1.0	1.5	1.3
Farinograph Stability (min)	3.2	2.2	1.3	1.4	1.9	1.4	1.4	2.0	1.8	2.2	1.6
Farinograph Absorption (%)	52.2	52.6	52.1	52.9	51.8	52.7	53.0	53.2	52.3	52.2	52.1
Alveograph P (mm)	53	41	34	35	38	37	33	43	39	41	34
Alveograph L (mm)	54	106	77	78	77	90	78	89	75	85	80
Alveograph W (10-4 joules)	91	98	76	71	80	84	66	98	86	85	77
Alveograph P/L	0.98	0.39	0.44	0.44	0.49	0.41	0.42	0.48	0.51	0.48	0.43
Extenso Resistance (BU)	214	164	164	126	168	143	119	154	157	158	157
Extenso Extensibility (cm)	14.6	17.5	15.5	16.3	14.7	16.9	17.3	17.5	16.6	16.8	17.4
Extenso Area (sq cm)	54	51	43	34	41	43	36	48	45	46	46
Baking Evaluation											
Bake Grain and Texture	4.0	5.0	5.2	4.6	4.0	5.2	4.2	5.0	5.5	5.0	4.7
Bake Absorption (%)	54.0	54.5	53.6	54.8	53.4	54.6	54.9	55.0	54.1	54.0	53.7
Loaf Volume (cc)	660	735	691	701	650	742	723	750	750	704	711
Cookie Diameter (cm)	8.8	9.1	8.9	9.0	8.9	9.2	8.9	8.8	9.1	9.0	9.1
Cookie Spread Ratio	9.3	10.1	9.6	10.5	9.3	10.8	10.5	9.3	9.5	9.7	9.6

Soft Red Winter 2019 Survey

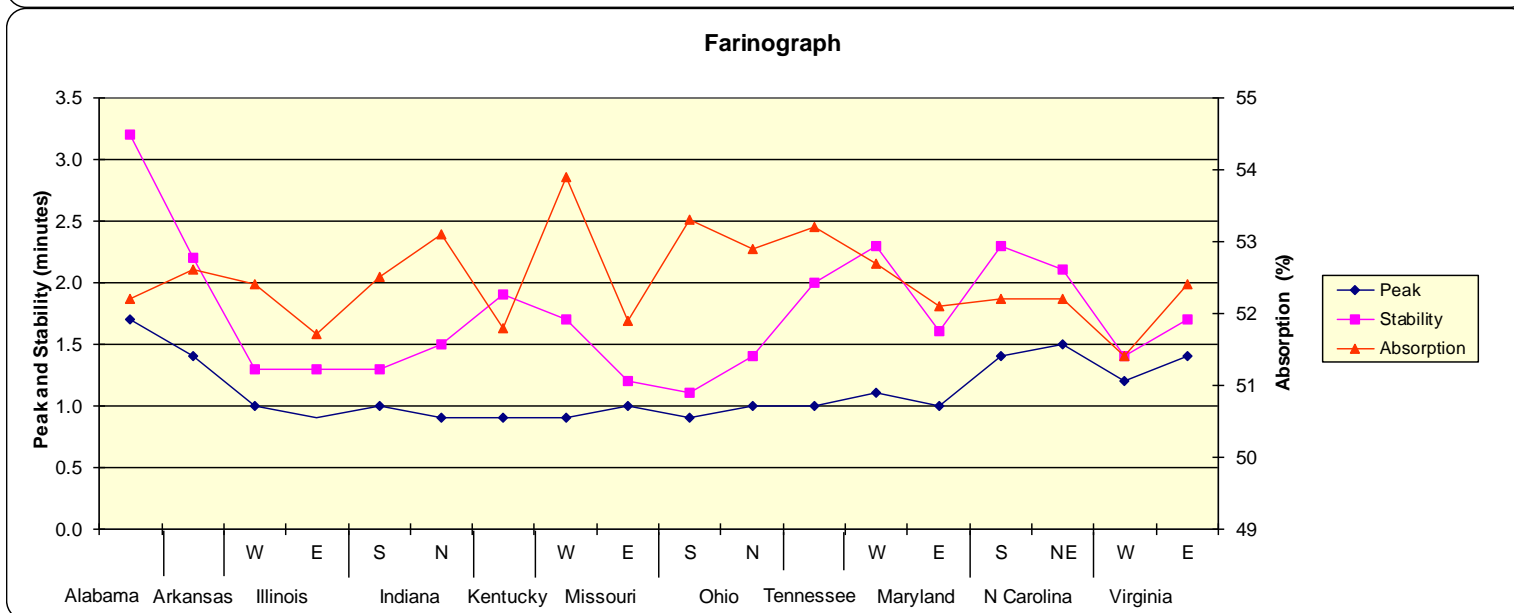
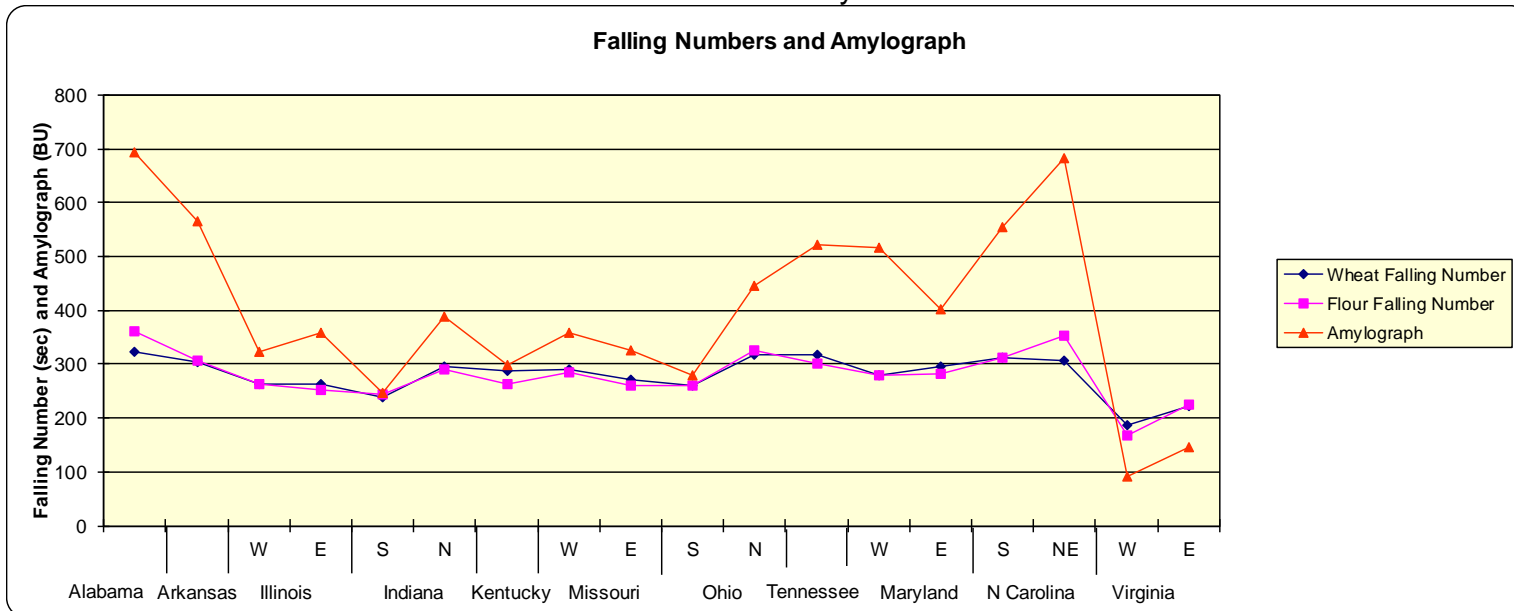
	Alabama		Arkansas		Illinois		Indiana		Kentucky		Missouri		Ohio		Tennessee		Maryland		North Carolina		Virginia	
		W	E	S	N		W	E	S	N		W	E	S	NE	W	E					
Sample Count	4	8	25	16	15	19	18	15	14	11	43	11	6	15	12	11	4	14				
Wheat Grade Data - from Area Composite Samples																						
Test Weight (lb/bu)	58.6	57.8	58.1	57.8	57.2	57.8	59.5	58.9	58.9	57.6	58.7	58.4	58.8	57.4	55.2	57.2	55.8	57.8				
Test Weight (kg/hl)	77.1	76.1	76.5	76.1	75.3	76.1	78.3	77.5	77.5	75.8	77.3	76.9	77.4	75.6	72.7	75.3	73.5	76.1				
Damage - Total (%)	0.7	0.7	0.0	0.0	1.3	2.7	0.0	0.7	0.0	0.7	0.0	0.0	0.0	1.3	2.7	0.7	2.0	1.3				
Foreign Material (%)	0.3	0.0	0.0	0.3	0.3	0.3	0.0	0.0	0.0	0.3	0.3	0.0	0.0	0.3	0.3	0.3	0.0	0.0				
Shrunken and Broken (%)	0.7	0.8	0.5	0.4	0.7	0.8	0.5	0.5	0.9	0.6	0.7	0.8	0.5	1.2	1.5	2.9	0.7	0.5				
Total Defects (%)	1.7	1.5	0.5	0.7	2.3	3.8	0.5	1.2	0.9	1.6	1.0	0.8	0.5	2.8	4.5	1.9	2.7	1.5				
Grade	2	3	2	3	3	3	2	2	2	3	2	2	2	3	4	3	4	3				
Wheat Non-Grade Data - from Individual Samples																						
Moisture (%)	11.2	12.3	13.4	13.0	13.2	12.7	13.2	12.7	13.0	12.8	13.0	12.5	14.5	12.7	12.4	12.8	13.0	12.9				
Protein (%) 12% mb	9.1	10.1	9.2	8.8	8.9	9.0	9.2	10.0	9.3	8.9	9.1	9.6	9.0	8.8	10.6	9.6	8.9	9.5				
Ash (%) 14% mb	1.36	1.42	1.35	1.29	1.38	1.37	1.32	1.38	1.38	1.37	1.41	1.37	1.40	1.41	1.37	1.47	1.27	1.32				
1000 Kernel Weight (g)	33.6	30.4	33.0	32.6	31.9	29.3	32.3	30.8	33.4	31.1	29.8	32.9	38.2	34.7	27.6	29.9	32.7	32.7				
Wheat Falling Number (sec)	323	304	263	263	240	297	287	291	272	261	318	319	278	297	313	307	187	224				
DON (ppm)	0.7	0.8	1.5	1.0	1.6	2.4	1.0	1.8	1.8	1.5	2.2	0.4	1.1	0.7	0.4	0.2	0.4	0.2				
Wheat Non-Grade Data - from Area Composite Samples																						
Dockage (%)	0.4	0.2	0.3	0.4	0.5	0.4	0.2	0.4	0.6	0.4	0.3	0.4	0.4	0.3	0.4	0.5	0.4	0.2				
Moisture (%)	12.8	12.7	13.7	13.6	13.4	13.6	14.2	13.4	13.2	13.4	14.3	13.8	14.1	13.6	13.3	13.8	13.6	13.6				
Protein (%) 12% mb	9.6	9.8	10.0	8.8	9.1	8.2	9.3	10.6	9.8	9.1	8.9	9.9	9.8	8.6	10.9	9.5	9.1	10.3				
Kernel Size Lg (Over 7) (%)	84	79	89	90	88	81	89	83	90	86	75	85	92	93	68	84	89	90				
Kernel Size Med (Over 9) (%)	16	21	11	10	11	17	11	17	9	13	20	14	7	6	29	15	11	9				
Kernel Size Sm (Thru 9) (%)	1	1	1	0	0	2	1	1	0	1	5	0	2	1	4	1	1	1				
Single Kernel Hardness	30.7	16.5	14.1	16.9	15.5	26.5	14.9	13.8	17.5	23.7	25.8	16.2	25.5	13.7	20.0	16.8	23.1	12.9				
Single Kernel Weight (mg)	34.9	37.4	33.3	32.8	33.1	32.4	33.9	32.9	36.6	31.4	31.7	35.5	37.4	35.6	31.4	33.7	31.6	35.8				
Single Kernel Diameter (mm)	2.65	2.77	2.67	2.69	2.68	2.65	2.70	2.63	2.77	2.63	2.57	2.72	2.81	2.74	2.50	2.60	2.57	2.70				
Sedimentation (cc)	10	12	9	11	9	10	10	10	12	9	12	10	12	10	10	10	13	11				
DON (ppm)	1.1	0.8	1.3	0.8	1.4	3.2	1.0	1.9	1.3	1.3	2.1	0.3	0.7	0.8	0.3	0.1	0.3	0.4				
Flour Data																						
Lab Mill Extraction (%)	68.3	66.1	66.9	67.6	67.3	66.5	68.2	66.4	69.5	67.2	66.3	68.3	67.9	68.0	69.6	66.2	66.1	67.4				
Flour Color - *L	91.7	91.0	91.1	91.1	91.3	90.7	91.2	91.1	90.9	90.6	90.8	91.0	91.3	91.1	90.9	91.3	90.9	90.7				
Flour Color - *a	-2.5	-2.4	-2.2	-2.2	-2.4	-2.4	-2.4	-2.2	-2.3	-2.3	-2.6	-2.4	-2.4	-2.4	-2.2	-2.4	-2.4	-2.5				
Flour Color - *b	10.2	9.1	8.1	8.1	8.7	9.5	9.1	8.5	9.0	9.3	10.2	9.3	8.8	9.0	8.2	9.4	8.9	9.2				
Flour Protein (%) 14% mb	7.5	8.0	7.6	6.9	7.1	7.6	7.4	7.9	7.7	7.2	7.2	7.5	7.5	7.0	8.7	7.8	7.0	7.4				
Flour Ash (%) 14% mb	0.42	0.45	0.44	0.45	0.44	0.44	0.45	0.44	0.44	0.46	0.45	0.43	0.45	0.46	0.45	0.42	0.47	0.45				
Wet Gluten (%)	20.9	24.9	21.4	17.6	17.2	20.9	18.3	23.0	21.6	20.8	20.1	18.7	20.8	23.0	24.7	20.6	17.6	19.2				
Gluten Index	97.4	83.0	97.0	99.3	94.8	59.3	99.0	85.1	64.8	69.4	88.2	97.4	93.1	98.6	62.3	96.1	94.6	92.8				
Falling Number (sec)	360	307	263	253	244	291	262	285	260	260	326	301	279	281	312	352	167	225				
Amylograph (65g) (BU)	695	565	323	358	248	389	298	358	325	280	445	522	516	402	555	682	91	145				
Starch Damage (%)	3.4	3.4	3.8	3.4	3.4	3.4	3.4	3.4	3.0	3.0	2.5	3.4	2.5	3.0	2.5	4.9	3.0	3.0				
SRC: GPI	0.61	0.63	0.68	0.70	0.68	0.61	0.63	0.64	0.72	0.61	0.63	0.65	0.68	0.67	0.62	0.65	0.61	0.72				
Water	59	60	54	55	54	58	56	57	49	60	57	53	52	51	57	51	55	49				
50% Sucrose	113	113	89	90	90	109	107	112	86	107	105	94	92	89	110	91	111	90				
5% Lactic Acid	115	119	108	111	107	113	113	123	107	111	111	107	109	104	117	103	113	113				
5% Na2CO3	77	76	70	69	67	77	73	80	63	76	74	71	68	67	79	67	75	67				
Dough Properties																						
Farinograph Peak (min)	1.7	1.4	1.0	0.9	1.0	0.9	0.9	0.9	1.0	0.9	1.0	1.0	1.1	1.0	1.4	1.5	1.2	1.4				
Farinograph Stability (min)	3.2	2.2	1.3	1.3	1.3	1.5	1.9	1.7	1.2	1.1	1.4	2.0	2.3	1.6	2.3	2.1	1.4	1.7				
Farinograph Absorption (%)	52.2	52.6	52.4	51.7	52.5	53.1	51.8	53.9	51.9	53.3	52.9	53.2	52.7	52.1	52.2	52.2	51.4	52.4				
Alveograph P (mm)	53	41	33	36	32	36	38	42	33	27	34	43	35	40	43	39	27	38				
Alveograph L (mm)	54	106	85	64	59	89	77	92	89	69	80	89	84	72	82	88	73	83				
Alveograph W (10-4 joules)	91	98	77	75	61	77	80	99	73	51	69	98	75	90	88	83	54	88				
Alveograph P/L	0.98	0.39	0.39	0.56	0.54	0.40	0.49	0.46	0.37	0.39	0.43	0.48	0.42	0.56	0.52	0.44	0.37	0.46				
Extenso Resistance (BU)	214	164	155	180	153	110	168	127	154	113	120	154	129	168	149	165	146	163				
Extenso Extensibility (cm)	14.6	17.5	16.0	14.8	14.4	17.4	14.7	17.4	16.5	16.8	17.4	17.5	15.8	16.9	17.7	16.0	16.5	17.8				
Extenso Area (sq cm)	54	51	43	44	36	33	41	41	45	33	36	48	35	49	47	46	41	49				
Baking Evaluation																						
Bake Grain and Texture	4.0	5.0	5.0	5.5	4.0	5.0	4.0	5.5	5.0	5.5	4.0	5.0	5.5	5.5	5.0	5.0	5.0	4.5				
Bake Absorption (%)	54.0	54.5	54.0	53.0	54.4	55.0	53.4	55.5	54.0	55.4	54.8	55.0	54.5	54.0	54.0	54.0	53.0	54.0				
Loaf Volume (cc)	660	735	725	635	660	725	650	730	750	710	725	750	725	760	710	700	735	700				
Cookie Diameter (cm)	8.8	9.1	9.0	8.8	9.3	8.8	8.9	8.8	9.5	8.9	8.9	8.8	9.1	9.1	9.1	8.9	9.2	9.1				
Cookie Spread Ratio	9.3	10.1	9.4	9.8	10.7	10.4	9.3	10.1	11.3	10.5	10.5	9.3	9.6	9.5	10.1	9.3	10.9	9.0				

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

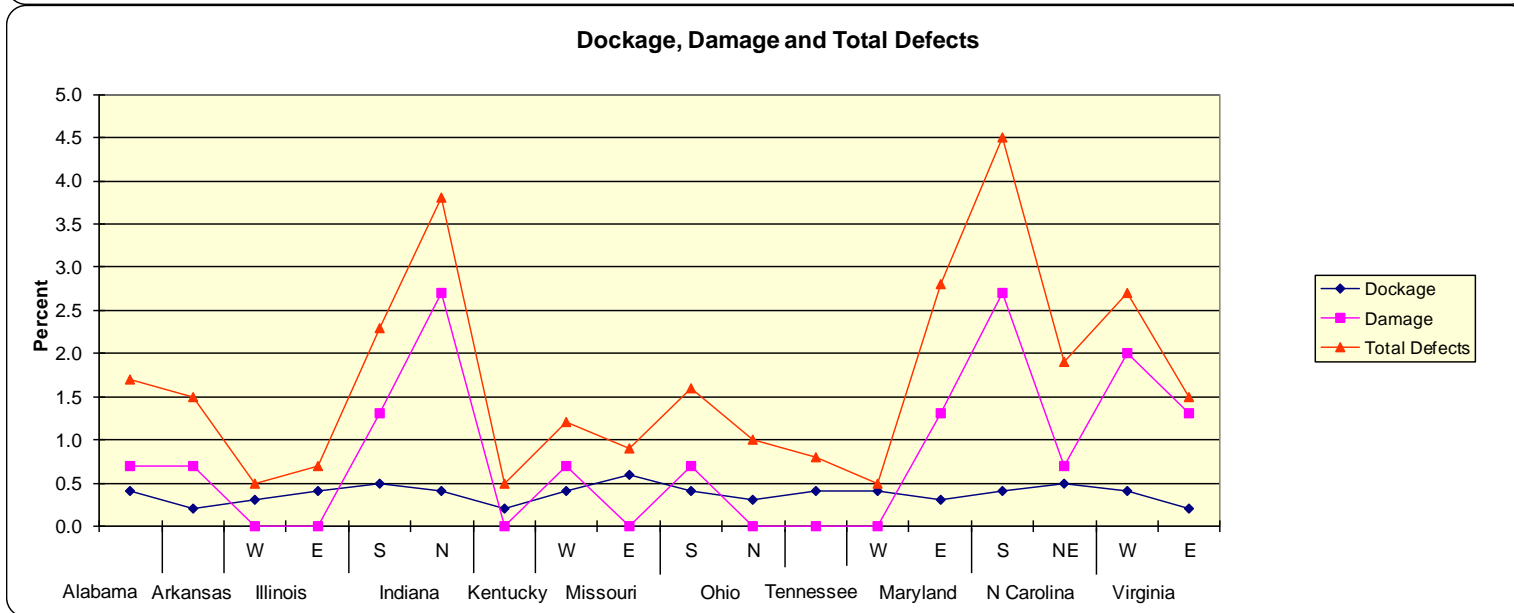
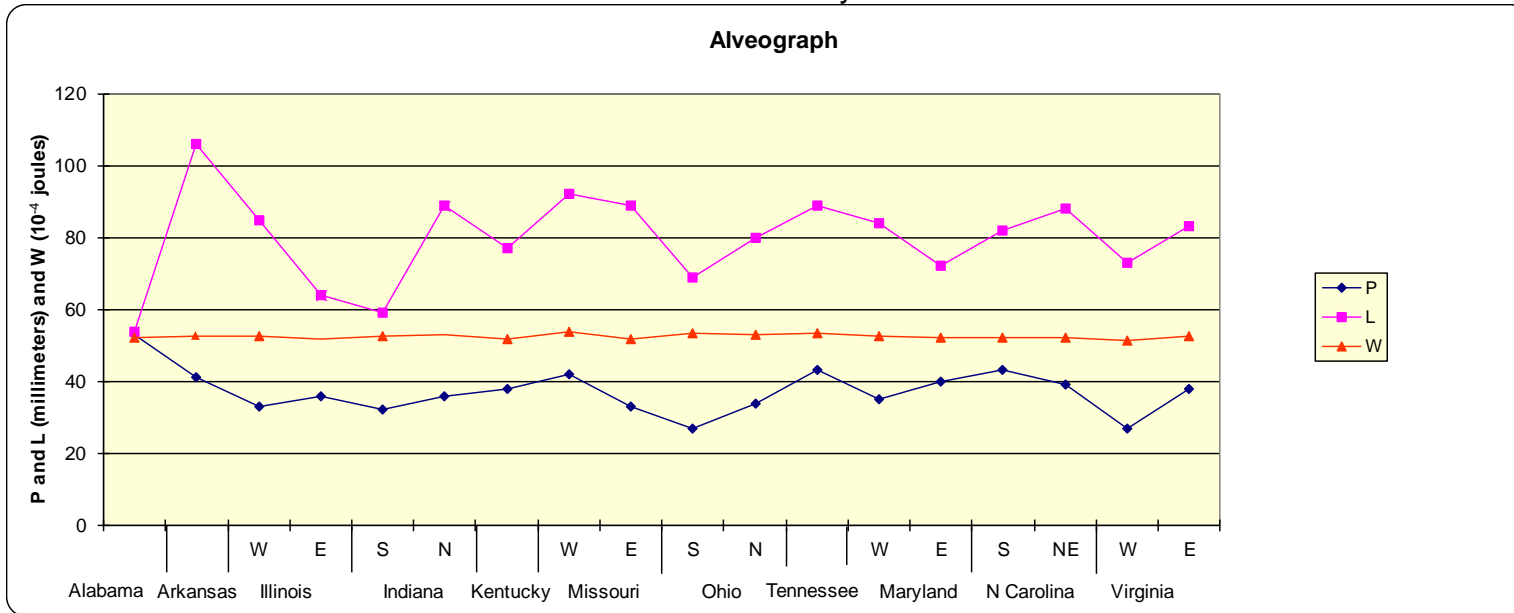
Comparisons of 2019 Results For Selected Quality Factors



Comparisons of 2019 Results For Selected Quality Factors

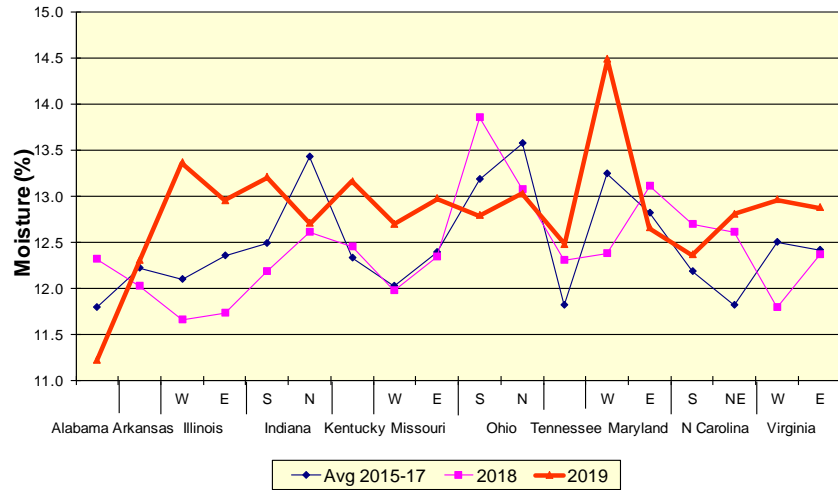


Comparisons of 2019 Results For Selected Quality Factors

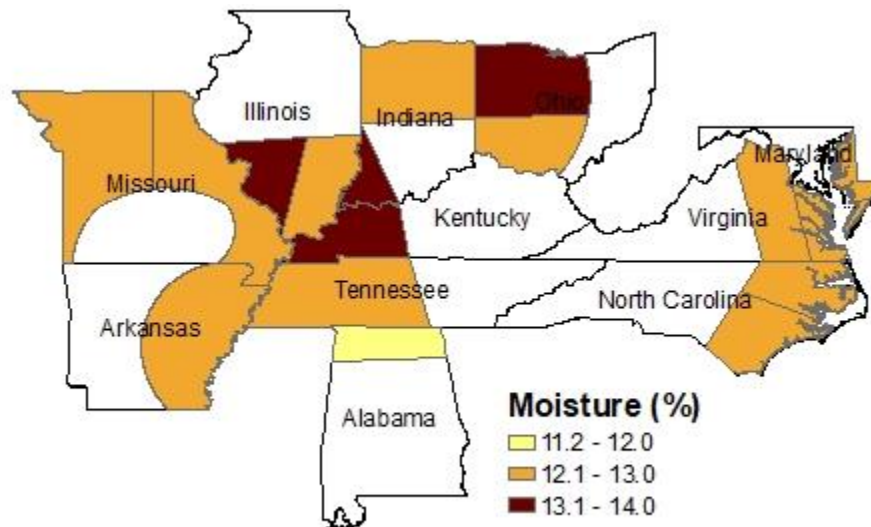
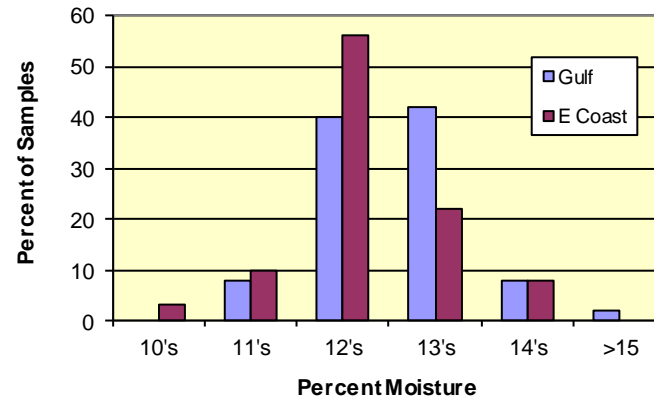


Distribution of 2019 Results and Comparisons with Previous Years For Selected Quality Factors

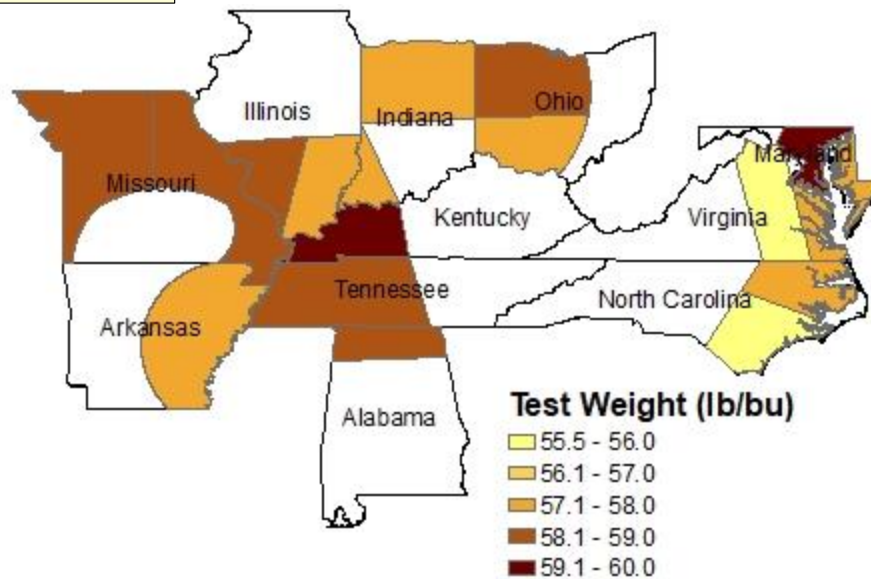
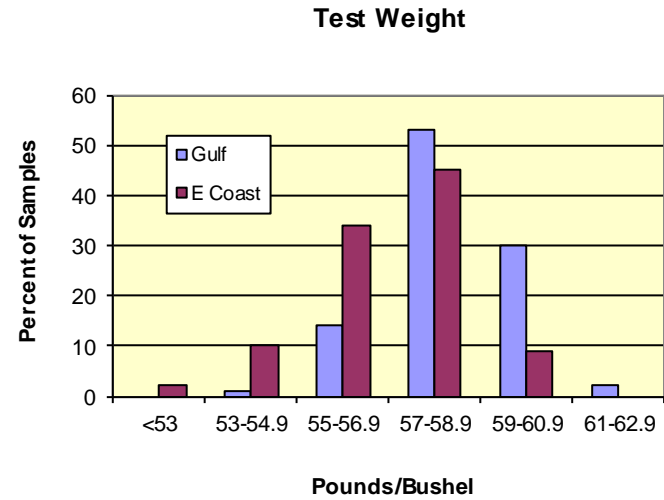
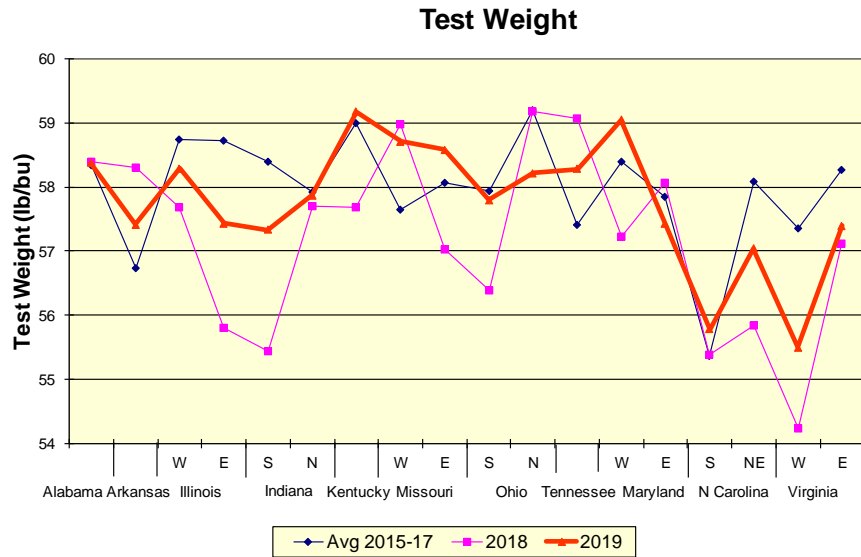
Moisture



Moisture

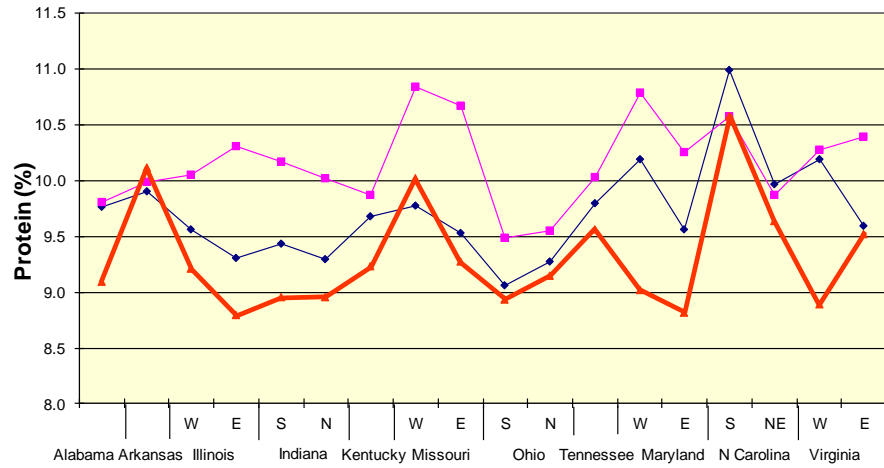


Distribution of 2019 Results and Comparisons with Previous Years For Selected Quality Factors

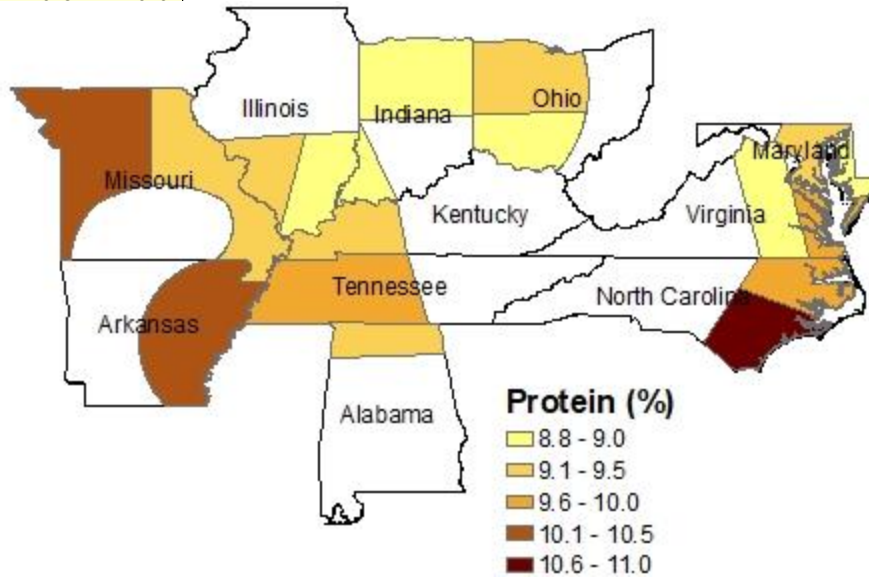
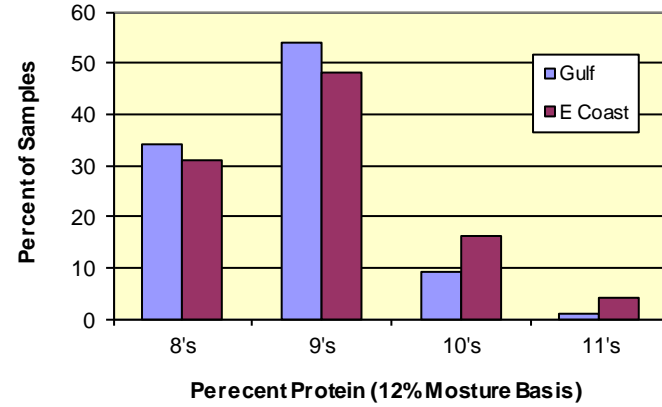


Distribution of 2019 Results and Comparisons with Previous Years For Selected Quality Factors

Protein

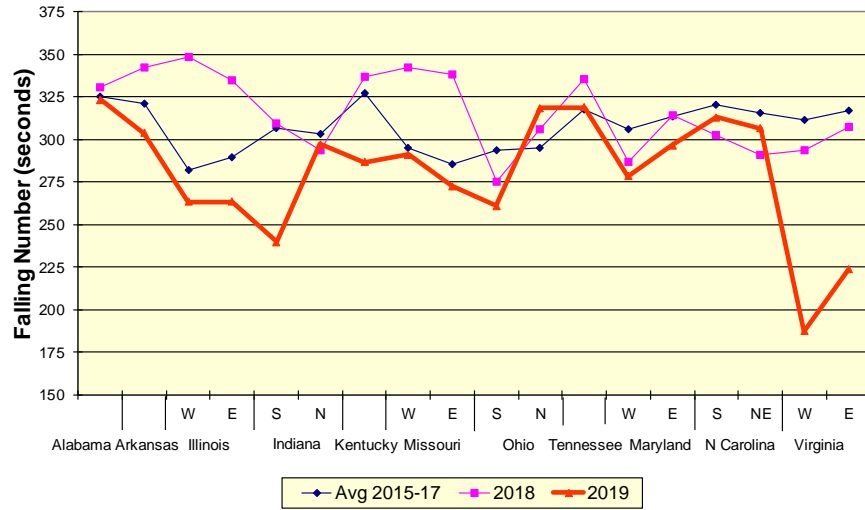


Protein

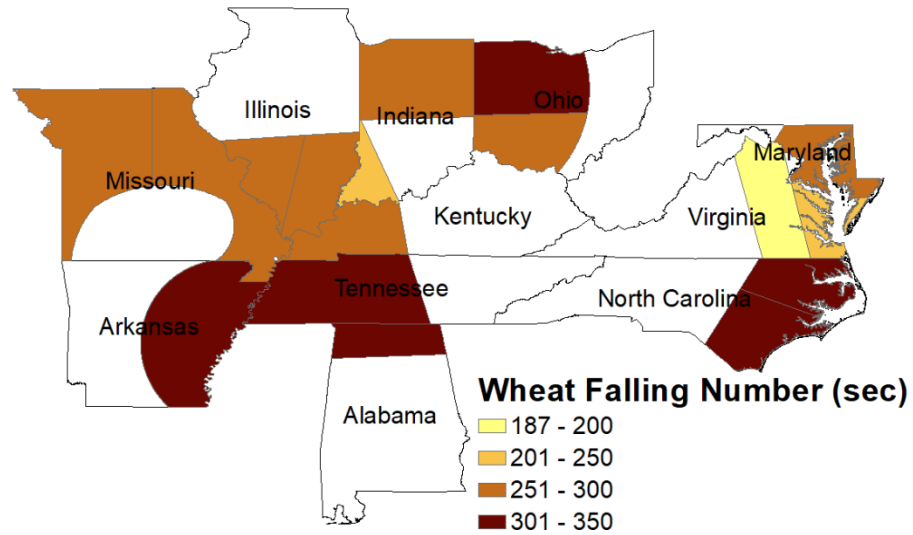
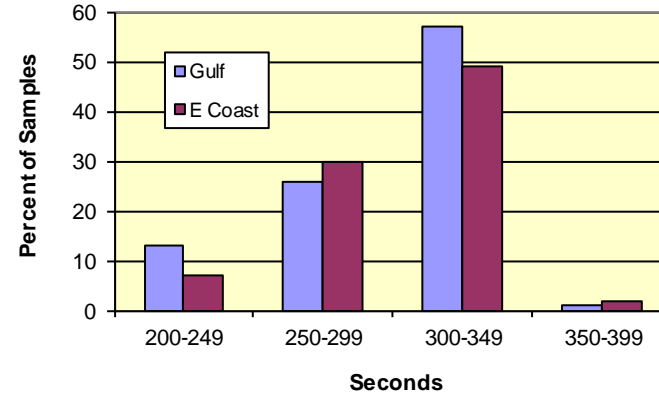


Distribution of 2019 Results and Comparisons with Previous Years For Selected Quality Factors

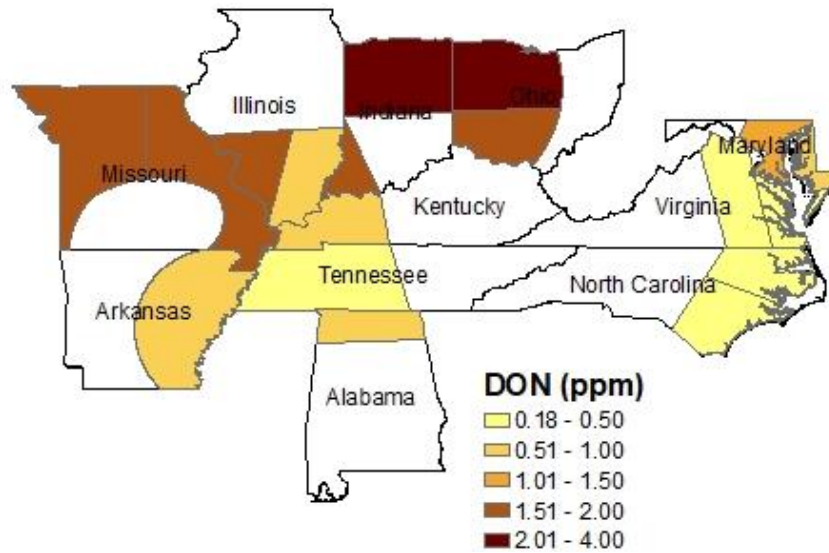
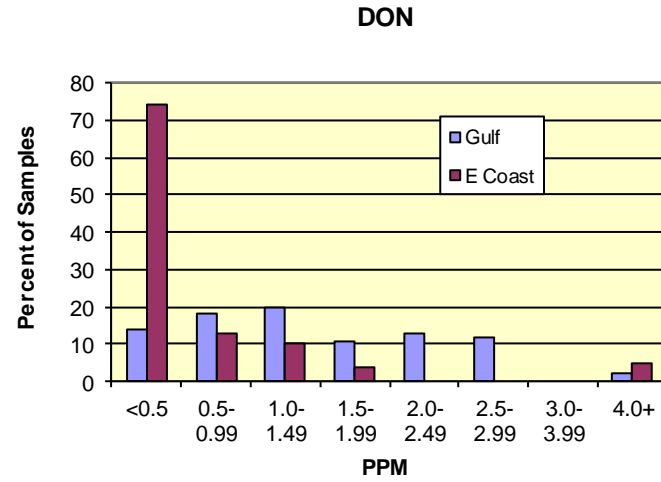
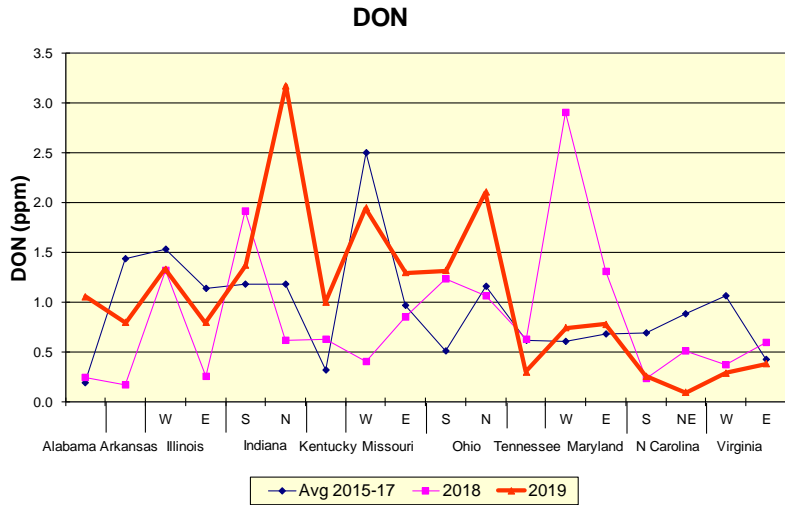
Falling Number



Falling Number

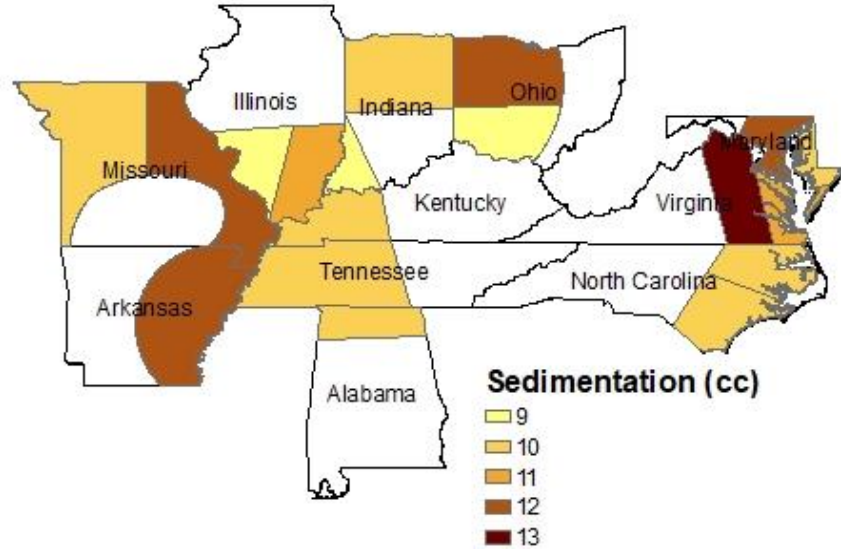
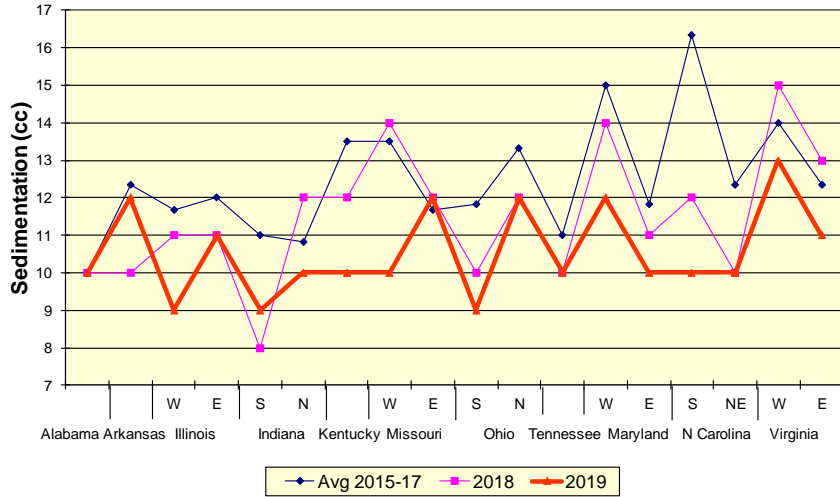


Distribution of 2019 Results and Comparisons with Previous Years For Selected Quality Factors

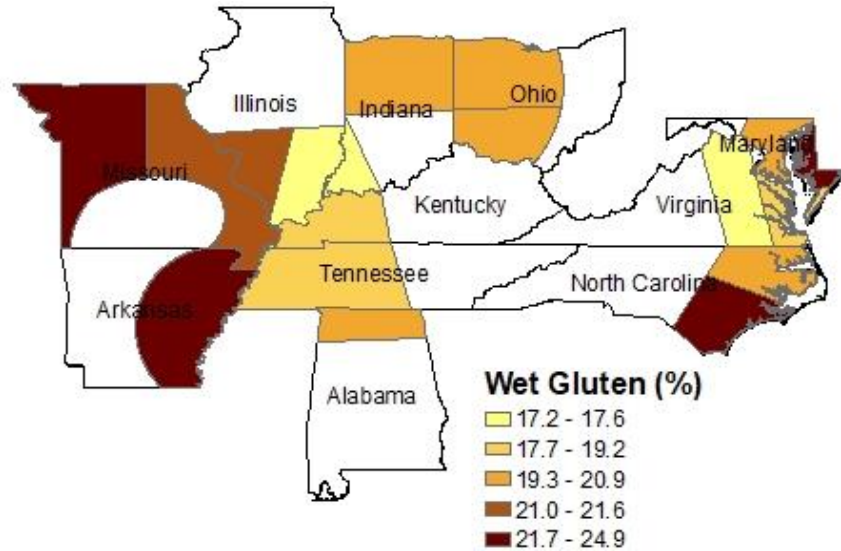
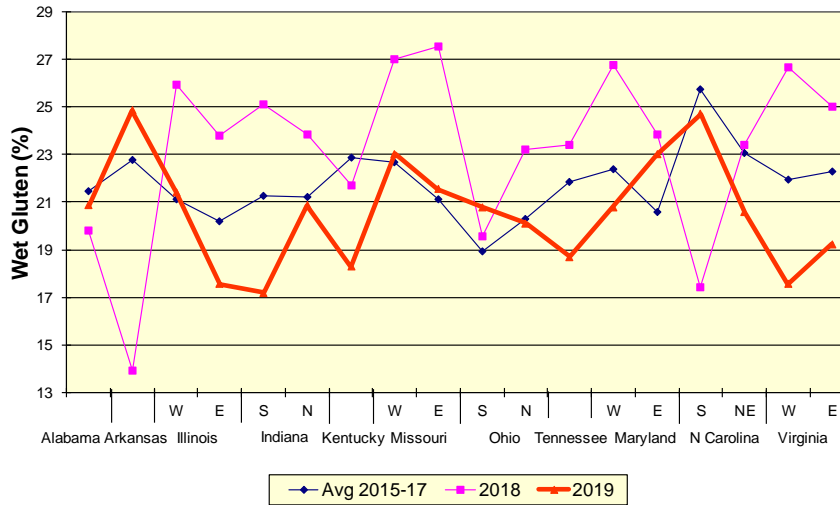


Distribution of 2019 Results and Comparisons with Previous Years For Selected Quality Factors

Sedimentation

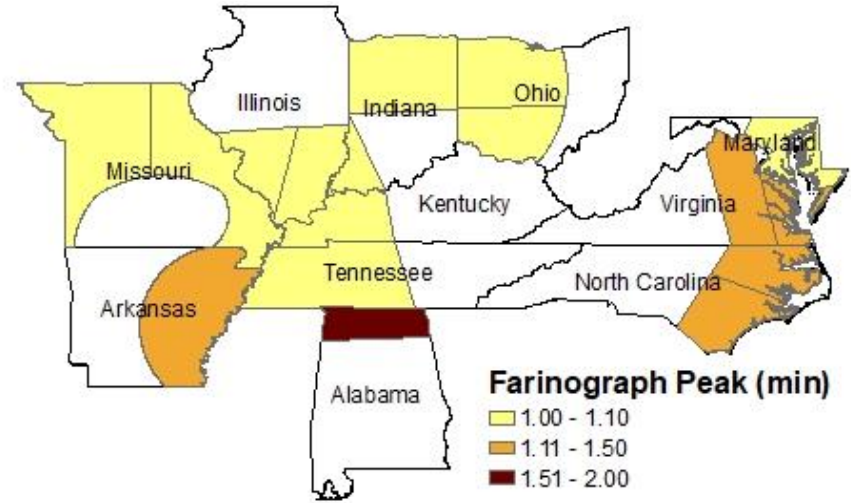
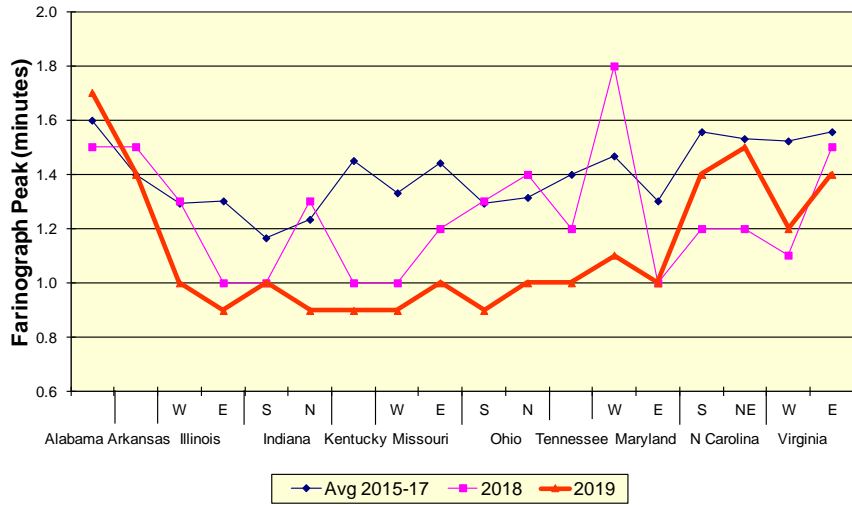


Wet Gluten

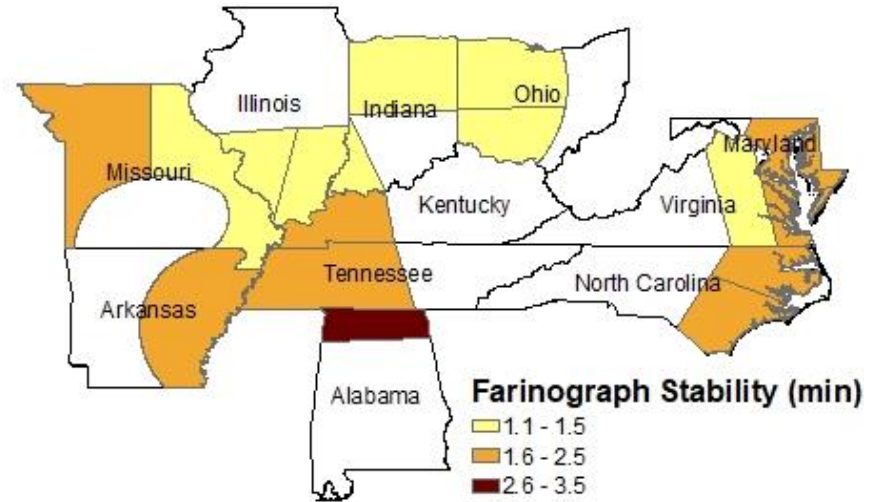
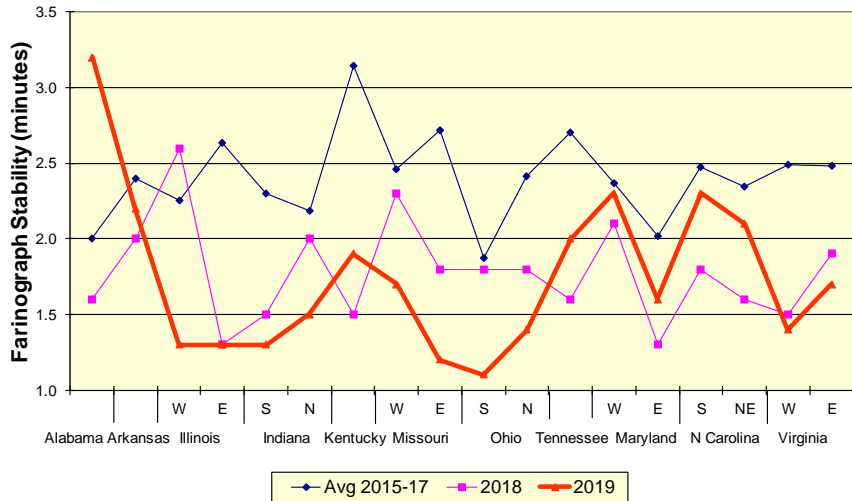


Distribution of 2019 Results and Comparisons with Previous Years For Selected Quality Factors

Farinograph Peak

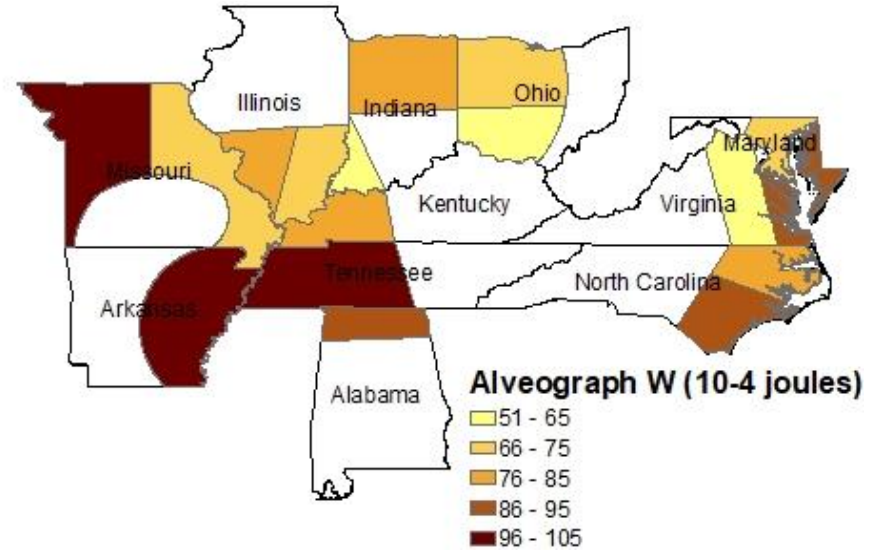
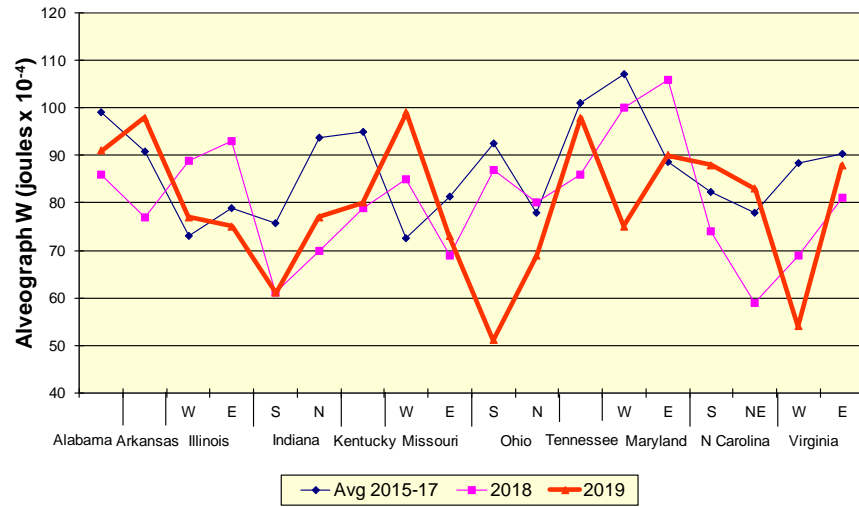


Farinograph Stability



Distribution of 2019 Results and Comparisons with Previous Years For Selected Quality Factors

Alveograph W Value



Alveograph P/L

