

# 2019 HARVEST

## U.S. PACIFIC NORTHWEST

### *SOFT WHITE WHEAT QUALITY REPORT*



*This project is funded by the Idaho Wheat Commission,  
Oregon Wheat Commission, Washington Grain  
Commission, U.S. Wheat Associates, and  
Wheat Marketing Center, Inc.*



# EXECUTIVE SUMMARY

*Photo courtesy of Oregon Wheat Commission; Photo credit to Matt Kamerrer*

Pacific Northwest (PNW) wheat production experienced generally good growing conditions in the 2019 crop year. PNW total production of soft white wheat exceeded the five-year average; club wheat acres and production decreased. Average protein was higher, kernels were similar in size and weight, and average test weight was similar to last year and the five-year averages for both soft white and club wheat. Flour ash content was similar to the five-year average. Falling number values for both wheat and flour were similar to last year. Dough testing indicated the weak gluten strength typically found in soft white and club wheat flour. Farinograph water absorption was lower than the five-year average.

All production zones' sponge cake volumes and total scores were comparable to last year's results at corresponding protein ranges. Cookie diameters were all smaller than last year, but similar to the five-year average. Chinese southern type steamed bread total scores for all production zones were similar to the five-year average.

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# PACIFIC NORTHWEST WHEAT PRODUCTION

**U.S. soft white wheat is grown in the Pacific Northwest, which includes the states of Idaho, Oregon, and Washington.**

Pacific Northwest soft white wheat is valued for its white bran, low moisture content, and weak gluten characteristics. Consequently, soft white wheat is well suited for products such as cakes, pastries, cookies, crackers, pancakes, snack foods, flat breads, and Chinese southern-type steamed breads.

The soft white wheat class includes the subclasses of white club wheat and western white wheat. White club wheat has very weak gluten characteristics. Western white wheat is a blend of the white club wheat subclass and soft white wheat. The amount of white club wheat in western white wheat ranges from 10 to 90 percent. The minimum percentage of white club wheat in western white wheat is 10 percent; higher amounts are determined by contract specifications negotiated between buyer and seller (typically 10-30%).



## SOFT WHITE AND WHITE CLUB WHEAT SUMMARY

	Soft White		White Club	
	2019	5 yr av	2019	5 yr av
<b>Test Weight</b> (lb/bu)	61.6	60.7	60.6	60.4
<b>Hectoliter Weight</b> (kg/hl)	81.0	79.8	79.7	79.5
<b>Grade</b>	1SWH	1SWH	1WHCB	1WHCB
<b>Dockage</b> (%)	0.4	0.5	0.8	0.6
<b>Wheat Moisture</b> (%)	9.9	9.1	9.3	8.5
<b>Wheat Protein</b> (% , 12% mb)	10.0	10.1	9.3	10.3
<b>Wheat Ash</b> (% , 14% mb)	1.35	1.35	1.29	1.30
<b>1000 Kernel Weight</b> (g, 14% mb)	36.4	34.2	31.4	30.7
<b>Wheat Falling Number</b> (seconds, 14% mb)	317	335	355	338
<b>Flour Extraction</b> (%)	72.1	73.9	72.8	74.8
<b>Flour Ash</b> (% , 14% mb)	0.45	0.45	0.47	0.47
<b>Flour Wet Gluten</b> (% , 14% mb)	24.5	24.5	21.2	23.3
<b>Farinograph: Absorption</b> (% , 14% mb)	52.2	53.4	50.2	52.0
<b>Peak Time</b> (minutes)	1.7	2.7	1.2	1.7
<b>Stability Time</b> (minutes)	2.6	2.8	1.5	1.3
<b>Alveograph: L</b> (mm)	129	99	102	72
<b>W</b> (10 <sup>-4</sup> joules)	85	96	35	45
<b>Production</b> (mmt)	5.92	5.27	0.17	0.33

## Production Zones



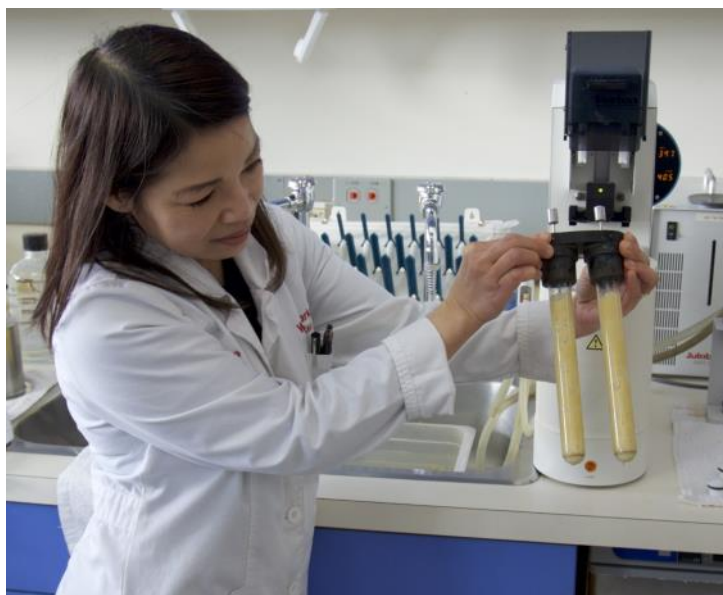
## Weather

The Pacific Northwest (PNW) had good growing conditions for the 2019 soft white wheat (SW) crop. There was adequate soil moisture at planting, and most of the region received adequate rainfall during winter and spring. Spring planting was delayed in some areas due to extended winter weather. Late Spring was mild, while harvest conditions were generally good. Yields were lower in all three states. USDA estimates total 2019 PNW SW production at 6.09 million metric tons (MMT), up slightly from 2018's 6.04 MMT. Of that, white club (WC) is estimated to account for 0.17 MMT.

### 2019 SOFT WHITE AND WHITE CLUB WHEAT PRODUCTION *by production zone*

Production Zone	Million Metric Tons (mmt)	Million Bushels
North Central	1.95	71.8
Northeast	1.83	67.4
Central	1.25	46.0
Southeast	0.73	26.9
Southwest	0.30	11.2
Northwest	0.03	1.1
<b>Total</b>	<b>6.09</b>	<b>224.4</b>

*Source: USDA Small Grains Summary, NASS 9/30/19, and Washington Grain Commission, 10/1/19*



## Wheat Samples

At harvest, wheat samples were collected from a number of sources, including state and private grain inspection agencies and commercial wheat handling operations throughout the Pacific Northwest. Sample collection was based on wheat production in each location. For the 2019 harvest, Wheat Marketing Center (WMC) received and tested 438 soft white wheat and 113 white club wheat samples from Idaho, Oregon, and Washington. Federal Grain Inspection Service (FGIS) graded and ran wheat protein on each sample. WMC conducted wheat, flour, Solvent Retention Capacity (SRC), dough, and finished product tests on composites based on production zones and protein levels.

The top soft white varieties planted in Washington were UI Magic CL+, Otto, Curiosity CL+, Northwest Duet, and Ryan. Oregon's top SW varieties were UI Magic CL+, SY Assure and Brawl CL+. Idaho's top SW winter varieties were SY Ovation and UI Magic CL+; the top SW spring variety was Seahawk. ARS Crescent was the top white club variety planted in the PNW.



*Photo courtesy of Idaho Wheat Commission*

# WHEAT QUALITY

Production Zone	Wheat Protein Range 12% mb %	Grade	Test Weight lb/bu	Dockage %	Whole Kernel Moisture %	Wheat Falling Number 14% mb seconds	Wheat Ash 14% mb %	Thousand Kernel Weight 14% mb g	SKCS Kernel Hardness Index	Whole Meal Wet Gluten 14% mb %
<b>North Central</b>	<8.5	1SWH	61.4	0.6	11.8	298	1.19	35.7	22.8	17.5
Soft White	8.5-9.4	1SWH	61.7	0.4	9.5	297	1.24	35.6	23.3	20.7
Wheat Estimated	9.5-10.4	1SWH	62.0	0.4	9.1	306	1.27	35.0	25.4	24.7
Production	10.5-12.0	1SWH	61.8	0.4	9.3	318	1.28	35.5	25.1	28.3
1.83 MMT	>12.0	1SWH	60.1	0.8	9.6	350	1.38	30.8	21.9	34.2
	<b>2019 Average</b>	<b>1SWH</b>	<b>61.7</b>	<b>0.4</b>	<b>9.4</b>	<b>311</b>	<b>1.27</b>	<b>35.0</b>	<b>24.5</b>	<b>25.3</b>
	2018 Average	1SWH	61.7	0.3	8.2	308	1.26	34.4	27.3	20.8
	5 Year Average	1SWH	60.9	0.4	8.7	340	1.28	33.2	30.2	23.5
<b>Northeast</b>	8.5-9.4	1SWH	62.2	0.6	10.0	314	1.32	36.7	21.9	19.2
Soft White	9.5-10.4	1SWH	62.7	0.4	10.1	319	1.32	37.1	24.4	24.0
Wheat Estimated	10.5-12.0	1SWH	62.0	0.5	9.6	329	1.33	34.4	23.2	27.0
Production	<b>2019 Average</b>	<b>1SWH</b>	<b>62.4</b>	<b>0.5</b>	<b>9.9</b>	<b>321</b>	<b>1.32</b>	<b>36.2</b>	<b>23.4</b>	<b>23.7</b>
1.80 MMT	2018 Average	1SWH	62.5	0.5	8.7	322	1.38	36.8	28.0	19.3
	5 Year Average	1SWH	61.2	0.5	8.9	335	1.33	34.9	29.3	22.5
<b>Central</b>	<8.5	1SWH	60.6	0.6	9.8	302	1.40	36.6	16.2	16.4
Soft White	8.5-9.4	1SWH	61.3	0.4	10.1	298	1.30	36.6	20.7	21.3
Wheat Estimated	9.5-10.4	1SWH	61.4	0.5	10.1	312	1.34	36.2	21.1	24.4
Production	10.5-12.0	1SWH	61.3	0.4	10.1	319	1.36	34.9	21.8	28.3
1.23 MMT	<b>2019 Average</b>	<b>1SWH</b>	<b>61.3</b>	<b>0.5</b>	<b>10.1</b>	<b>311</b>	<b>1.34</b>	<b>35.9</b>	<b>20.8</b>	<b>24.5</b>
	2018 Average	2SWH	60.9	0.5	8.5	330	1.36	34.2	25.7	22.3
	5 Year Average	1SWH	60.1	0.5	8.9	337	1.29	32.7	30.5	24.0
<b>Southeast</b>	8.5-9.4	1SWH	61.6	0.2	10.3	314	1.52	42.3	25.1	17.9
Soft White	9.5-10.4	1SWH	61.3	0.3	10.5	321	1.56	40.3	26.5	21.3
Wheat Estimated	10.5-12.0	1SWH	61.0	0.6	10.6	345	1.59	37.7	29.5	26.7
Production	<b>2019 Average</b>	<b>1SWH</b>	<b>61.3</b>	<b>0.4</b>	<b>10.5</b>	<b>326</b>	<b>1.55</b>	<b>40.3</b>	<b>26.9</b>	<b>21.6</b>
0.73 MMT	2018 Average	1SWH	61.5	0.4	9.1	337	1.53	38.0	28.7	20.5
	5 Year Average	1SWH	61.2	0.5	9.8	335	1.50	37.9	31.1	19.6
<b>Southwest</b>	<8.5	2SWH	59.4	0.3	11.8	308	1.37	41.4	14.2	17.2
Soft White	8.5-9.4	2SWH	58.5	0.7	11.1	290	1.47	37.4	17.5	20.0
Wheat Estimated	<b>2019 Average</b>	<b>2SWH</b>	<b>59.0</b>	<b>0.5</b>	<b>11.5</b>	<b>300</b>	<b>1.41</b>	<b>39.5</b>	<b>15.7</b>	<b>18.5</b>
Production	2018 Average	2SWH	62.3	0.4	10.8	323	1.41	41.3	21.9	18.1
0.30 MMT	5 Year Average	1SWH	60.5	0.6	10.8	338	1.39	38.3	26.1	18.6
<b>White Club</b>	<b>2019 Average</b>	<b>1WHCB</b>	<b>60.6</b>	<b>0.8</b>	<b>9.3</b>	<b>314</b>	<b>1.29</b>	<b>31.0</b>	<b>21.2</b>	<b>21.5</b>
Wheat	2018 Average	1WHCB	61.2	0.5	8.1	316	1.29	32.8	27.9	15.8
Estimated	5 Year Average	1WHCB	60.4	0.6	8.5	333	1.28	31.2	32.7	17.4
Production										
0.17 MMT										

# FLOUR QUALITY

Production Zone	Wheat Protein Range 12% mb	Flour Yield	Flour Ash 14% mb	Flour Protein 14% mb	Flour Color			Flour Wet Gluten 14% mb	Flour Falling Number 14% mb	Amylograph Peak Viscosity
					L*	a*	b*			
					<b>North Central</b>	<8.5	71.2			
Soft White	8.5-9.4	72.6	0.42	8.0	92.9	-2.2	8.3	17.4	332	454
Wheat Estimated	9.5-10.4	72.1	0.44	9.1	92.8	-2.2	8.5	21.4	339	498
Production	10.5-12.0	71.5	0.43	10.1	92.8	-2.1	8.3	27.5	339	512
1.83 MMT	>12.0	66.3	0.45	11.6	92.7	-2.0	7.9	32.5	349	620
	<b>2019 Average</b>	<b>71.6</b>	<b>0.43</b>	<b>9.2</b>	<b>92.8</b>	<b>-2.1</b>	<b>8.4</b>	<b>22.9</b>	<b>338</b>	<b>499</b>
	2018 Average	73.4	0.41	7.9	92.1	-2.3	8.8	19.2	354	456
	5 Year Average	73.9	0.43	9.2	92.7	-2.2	7.9	23.7	381	492
<b>Northeast</b>	8.5-9.4	72.7	0.45	7.8	92.7	-2.2	8.6	17.6	346	428
Soft White	9.5-10.4	73.9	0.43	8.6	92.4	-2.1	8.5	21.8	330	445
Wheat Estimated	10.5-12.0	72.7	0.47	9.6	92.4	-2.1	8.5	24.9	357	463
Production	<b>2019 Average</b>	<b>73.3</b>	<b>0.45</b>	<b>8.7</b>	<b>92.5</b>	<b>-2.1</b>	<b>8.5</b>	<b>21.7</b>	<b>342</b>	<b>446</b>
1.80 MMT	2018 Average	74.3	0.43	7.9	92.7	-2.2	8.7	21.0	366	494
	5 Year Average	74.8	0.44	9.0	92.5	-2.1	7.7	23.3	373	499
<b>Central</b>	<8.5	72.6	0.46	7.0	92.9	-2.1	8.2	13.6	338	517
Soft White	8.5-9.4	72.4	0.46	7.8	92.7	-2.1	8.3	18.3	337	496
Wheat Estimated	9.5-10.4	72.8	0.46	8.6	92.4	-2.1	8.1	22.4	335	522
Production	10.5-12.0	71.4	0.43	9.6	92.5	-1.9	7.8	27.4	336	572
1.23 MMT	<b>2019 Average</b>	<b>72.3</b>	<b>0.45</b>	<b>8.7</b>	<b>92.5</b>	<b>-2.0</b>	<b>8.0</b>	<b>22.7</b>	<b>336</b>	<b>534</b>
	2018 Average	72.8	0.46	8.3	92.7	-2.2	8.5	22.3	359	518
	5 Year Average	73.7	0.44	9.2	92.6	-2.2	8.0	25.1	368	533
<b>Southeast</b>	8.5-9.4	73.7	0.50	7.5	92.9	-2.0	8.1	16.5	324	393
Soft White	9.5-10.4	73.4	0.50	8.3	92.5	-2.0	8.2	19.7	315	421
Wheat Estimated	10.5-12.0	73.1	0.52	9.9	92.6	-1.9	7.9	24.6	341	456
Production	<b>2019 Average</b>	<b>73.4</b>	<b>0.50</b>	<b>8.4</b>	<b>92.7</b>	<b>-2.0</b>	<b>8.1</b>	<b>20.0</b>	<b>326</b>	<b>421</b>
0.73 MMT	2018 Average	74.5	0.49	8.5	92.7	-2.0	8.3	22.2	346	499
	5 Year Average	75.4	0.49	8.7	92.8	-2.1	7.6	22.7	367	459
<b>Southwest</b>	<8.5	73.6	0.50	6.8	92.7	-2.0	7.8	17.8	339	433
Soft White	8.5-9.4	73.3	0.53	7.9	92.4	-1.8	6.9	20.8	290	331
Wheat Estimated	<b>2019 Average</b>	<b>73.5</b>	<b>0.52</b>	<b>7.3</b>	<b>92.5</b>	<b>-1.9</b>	<b>7.4</b>	<b>19.2</b>	<b>316</b>	<b>385</b>
Production	2018 Average	74.4	0.51	7.1	91.8	-2.2	8.7	13.1	341	499
0.30 MMT	5 Year Average	75.3	0.48	7.7	92.5	-2.2	7.8	17.8	352	496
<b>White Club</b>	<b>2019 Average</b>	<b>72.8</b>	<b>0.48</b>	<b>8.9</b>	<b>92.6</b>	<b>-2.3</b>	<b>8.2</b>	<b>21.2</b>	<b>347</b>	<b>523</b>
<b>Wheat</b>	2018 Average	76.9	0.42	8.0	92.3	-2.1	8.9	18.4	315	415
Estimated	5 Year Average	75.0	0.44	9.0	92.1	-2.1	7.8	22.7	363	468
Production										
0.17 MMT										

# SOLVENT RETENTION CAPACITY (SRC)

Production Zone	Wheat Protein Range 12% mb	Water 14% mb	50% Sucrose 14% mb	5% Lactic Acid 14% mb	5% Sodium Carbonate 14% mb	Gluten Performance Index
	%	%	%	%	%	
<b>North Central</b>	<8.5	57	90	110	72	0.68
Soft White	8.5-9.4	54	93	110	73	0.66
Wheat Estimated	9.5-10.4	54	91	122	71	0.75
Production	10.5-12.0	53	94	122	68	0.75
1.83 MMT	>12.0	54	100	140	73	0.81
	<b>2019 Average</b>	<b>54</b>	<b>93</b>	<b>120</b>	<b>71</b>	<b>0.74</b>
	2018 Average	57	79	116	77	0.75
	5 Year Average	58	97	117	85	0.65
<b>Northeast</b>	8.5-9.4	54	89	102	72	0.63
Soft White	9.5-10.4	54	89	103	71	0.64
Wheat Estimated	10.5-12.0	53	89	115	72	0.71
Production	<b>2019 Average</b>	<b>53</b>	<b>89</b>	<b>106</b>	<b>71</b>	<b>0.66</b>
1.80 MMT	2018 Average	62	73	101	76	0.68
	5 Year Average	57	91	107	84	0.61
<b>Central</b>	<8.5	55	87	97	76	0.60
Soft White	8.5-9.4	55	85	106	71	0.67
Wheat Estimated	9.5-10.4	52	88	106	72	0.66
Production	10.5-12.0	53	88	111	70	0.71
1.23 MMT	<b>2019 Average</b>	<b>53</b>	<b>88</b>	<b>107</b>	<b>71</b>	<b>0.67</b>
	2018 Average	61	74	106	78	0.69
	5 Year Average	57	96	105	82	0.59
<b>Southeast</b>	8.5-9.4	53	85	77	68	0.50
Soft White	9.5-10.4	53	86	76	70	0.49
Wheat Estimated	10.5-12.0	54	94	89	69	0.54
Production	<b>2019 Average</b>	<b>54</b>	<b>88</b>	<b>80</b>	<b>69</b>	<b>0.51</b>
0.73 MMT	2018 Average	58	84	86	77	0.53
	5 Year Average	56	95	86	79	0.49
<b>Southwest</b>	<8.5	55	91	94	68	0.59
Soft White	8.5-9.4	51	90	102	67	0.65
Wheat Estimated	<b>2019 Average</b>	<b>53</b>	<b>90</b>	<b>97</b>	<b>68</b>	<b>0.62</b>
Production	2018 Average	60	88	102	82	0.60
0.30 MMT	5 Year Average	58	94	104	85	0.58
<b>White Club</b>	<b>2019 Average</b>	<b>50</b>	<b>90</b>	<b>81</b>	<b>87</b>	<b>0.46</b>
<b>Wheat</b>	2018 Average	52	94	77	76	0.46
Estimated	5 Year Average	52	95	80	73	0.48
Production						
0.17 MMT						

# PHYSICAL DOUGH PROPERTIES

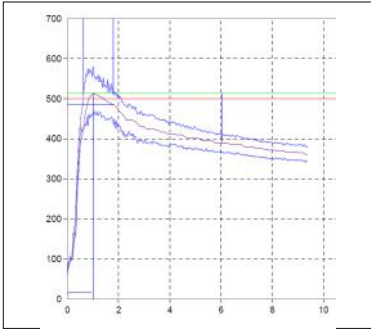
Production Zone	Wheat Protein Range	Farinograph			Alveograph				
		12% mb	Absorption 14%mb	Peak Time	Stability	P	L	P/L	W
		%	%	minutes	minutes	mm	mm		10 <sup>-4</sup> joules
<b>North Central</b>	<8.5	51.9	1.4	1.4	43	81	0.53	105	
Soft White	8.5-9.4	52.2	1.3	1.5	37	89	0.42	95	
Wheat Estimated	9.5-10.4	52.1	1.7	4.0	36	125	0.29	119	
Production	10.5-12.0	52.6	2.2	4.5	35	155	0.23	125	
1.83 MMT	>12.0	54.0	3.5	5.2	40	207	0.19	186	
	<b>2019 Average</b>	<b>52.4</b>	<b>1.9</b>	<b>3.6</b>	<b>37</b>	<b>130</b>	<b>0.30</b>	<b>120</b>	
	2018 Average	51.1	2.5	3.8	34	105	0.34	92	
	5 Year Average	53.5	3.0	4.1	45	108	0.47	127	
<b>Northeast</b>	8.5-9.4	51.9	1.2	2.3	40	86	0.47	86	
Soft White	9.5-10.4	52.1	1.7	2.6	33	121	0.27	86	
Wheat Estimated	10.5-12.0	52.5	2.0	2.9	32	158	0.20	100	
Production	<b>2019 Average</b>	<b>52.2</b>	<b>1.7</b>	<b>2.6</b>	<b>34</b>	<b>123</b>	<b>0.30</b>	<b>90</b>	
1.80 MMT	2018 Average	51.7	1.9	2.6	33	86	0.40	66	
	5 Year Average	53.1	2.4	3.2	37	98	0.40	92	
<b>Central</b>	<8.5	49.8	1.0	1.2	29	69	0.42	58	
Soft White	8.5-9.4	50.5	1.0	1.5	30	130	0.23	89	
Wheat Estimated	9.5-10.4	51.2	1.7	2.0	29	125	0.23	83	
Production	10.5-12.0	51.8	1.8	2.7	28	140	0.20	88	
1.23 MMT	<b>2019 Average</b>	<b>51.2</b>	<b>1.6</b>	<b>2.1</b>	<b>29</b>	<b>126</b>	<b>0.24</b>	<b>83</b>	
	2018 Average	50.4	2.1	3.0	30	112	0.28	79	
	5 Year Average	52.6	2.2	2.7	36	99	0.41	87	
<b>Southeast</b>	8.5-9.4	51.5	1.1	1.3	28	98	0.29	51	
Soft White	9.5-10.4	52.1	1.4	1.6	28	88	0.32	46	
Wheat Estimated	10.5-12.0	53.3	1.9	1.8	26	119	0.22	53	
Production	<b>2019 Average</b>	<b>52.2</b>	<b>1.4</b>	<b>1.5</b>	<b>27</b>	<b>101</b>	<b>0.28</b>	<b>50</b>	
0.73 MMT	2018 Average	52.0	1.8	2.1	27	95	0.29	48	
	5 Year Average	53.4	1.8	2.2	34	76	0.48	59	
<b>Southwest</b>	<8.5	50.4	1.2	1.0	25	111	0.23	57	
Soft White	8.5-9.4	50.5	1.4	1.6	27	119	0.23	74	
Wheat Estimated	<b>2019 Average</b>	<b>50.4</b>	<b>1.3</b>	<b>1.3</b>	<b>26</b>	<b>115</b>	<b>0.23</b>	<b>65</b>	
Production	2018 Average	50.5	1.7	2.8	31	89	0.35	67	
0.30 MMT	5 Year Average	52.1	1.7	2.9	40	79	0.53	83	
<b>White Club</b>	<b>2019 Average</b>	<b>50.2</b>	<b>1.2</b>	<b>1.5</b>	<b>18</b>	<b>102</b>	<b>0.18</b>	<b>35</b>	
<b>Wheat</b>	2018 Average	49.9	1.5	1.4	21	76	0.28	31	
Estimated	5 Year Average	52.0	1.7	1.3	27	71	0.40	45	
Production									
0.17 MMT									



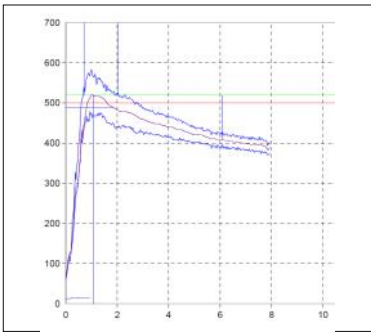
# FINISHED PRODUCTS

Production Zone	Wheat Protein Range	Sugar Snap Cookie			Sponge Cake		Chinese Southern Type Steamed Bread		
		12% mb	Spread	Spread Factor	Top Grain Score	Volume	Total Score	Specific Volume	Total Score
		%	cm	width/height		cc		cc/g	Control is
<b>North Central</b>	<8.5	8.8	9.5	6.5	1171	55	1.71	67	
Soft White	8.5-9.4	8.9	10.8	5.0	1151	57	1.88	67	
Wheat Estimated	9.5-10.4	8.8	10.3	5.0	1102	36	1.92	70	
Production	10.5-12.0	8.6	10.1	4.0	1062	32	2.03	70	
1.83 MMT	>12.0	8.5	9.8	3.5	1094	29	2.01	69	
	<b>2019 Average</b>	<b>8.7</b>	<b>10.3</b>	<b>4.7</b>	<b>1102</b>	<b>39</b>	<b>1.94</b>	<b>69</b>	
	2018 Average	9.2	9.6	5.3	1101	48	2.00	64	
	5 Year Average	8.7	9.4	3.0	1164	44	2.18	68	
<b>Northeast</b>	8.5-9.4	8.9	10.2	4.5	1150	45	1.88	68	
Soft White	9.5-10.4	8.7	9.1	5.0	1115	47	1.90	68	
Wheat Estimated	10.5-12.0	8.8	10.3	4.5	1038	27	2.07	68	
Production	<b>2019 Average</b>	<b>8.8</b>	<b>9.7</b>	<b>4.7</b>	<b>1101</b>	<b>41</b>	<b>1.94</b>	<b>68</b>	
1.80 MMT	2018 Average	9.1	9.6	4.8	1140	52	1.96	64	
	5 Year Average	8.7	9.3	3.2	1188	47	2.19	67	
<b>Central</b>	<8.5	9.0	11.6	6.5	1161	55	1.95	68	
Soft White	8.5-9.4	8.8	11.0	4.0	1156	51	2.01	68	
Wheat Estimated	9.5-10.4	9.0	10.5	4.5	1107	41	2.06	68	
Production	10.5-12.0	8.8	11.0	2.5	1094	38	2.12	68	
1.23 MMT	<b>2019 Average</b>	<b>8.9</b>	<b>10.9</b>	<b>4.0</b>	<b>1114</b>	<b>43</b>	<b>2.06</b>	<b>68</b>	
	2018 Average	9.1	9.3	5.2	1112	51	2.04	65	
	5 Year Average	8.6	9.4	3.4	1174	45	2.21	67	
<b>Southeast</b>	8.5-9.4	9.0	10.6	6.0	1172	55	1.90	67	
Soft White	9.5-10.4	8.9	10.4	5.0	1126	45	2.01	66	
Wheat Estimated	10.5-12.0	8.7	9.4	4.5	1075	39	2.06	66	
Production	<b>2019 Average</b>	<b>8.9</b>	<b>10.2</b>	<b>5.2</b>	<b>1128</b>	<b>47</b>	<b>1.98</b>	<b>66</b>	
0.73 MMT	2018 Average	9.3	9.4	4.2	1111	55	2.02	65	
	5 Year Average	8.8	9.6	3.5	1188	51	2.11	65	
<b>Southwest</b>	<8.5	9.0	10.5	5.5	1179	55	1.89	67	
Soft White	8.5-9.4	9.0	10.6	5.0	1140	53	1.89	65	
Wheat Estimated	<b>2019 Average</b>	<b>9.0</b>	<b>10.6</b>	<b>5.3</b>	<b>1161</b>	<b>54</b>	<b>1.89</b>	<b>66</b>	
Production	2018 Average	9.2	9.2	4.3	1134	53	1.90	64	
0.30 MMT	5 Year Average	8.7	9.1	3.9	1198	51	2.04	66	
<b>White Club</b>	<b>2019 Average</b>	<b>9.0</b>	<b>12.0</b>	<b>5.5</b>	<b>1141</b>	<b>53</b>	<b>2.14</b>	<b>62</b>	
<b>Wheat</b>	2018 Average	9.5	11.2	5.5	1115	53	2.20	62	
Estimated	5 Year Average	9.0	10.7	4.6	1197	47	2.30	65	
Production									
0.17 MMT									

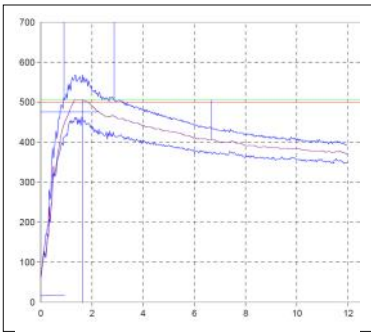
# FARINOGRAPH



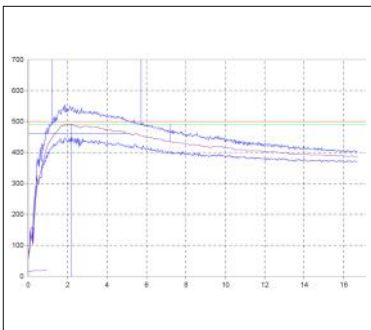
<8.5% Wheat Protein Range



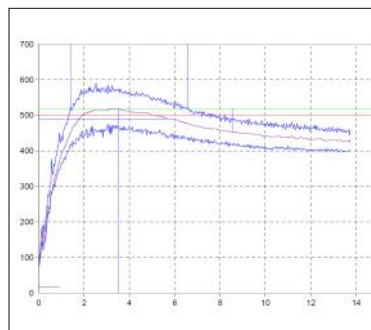
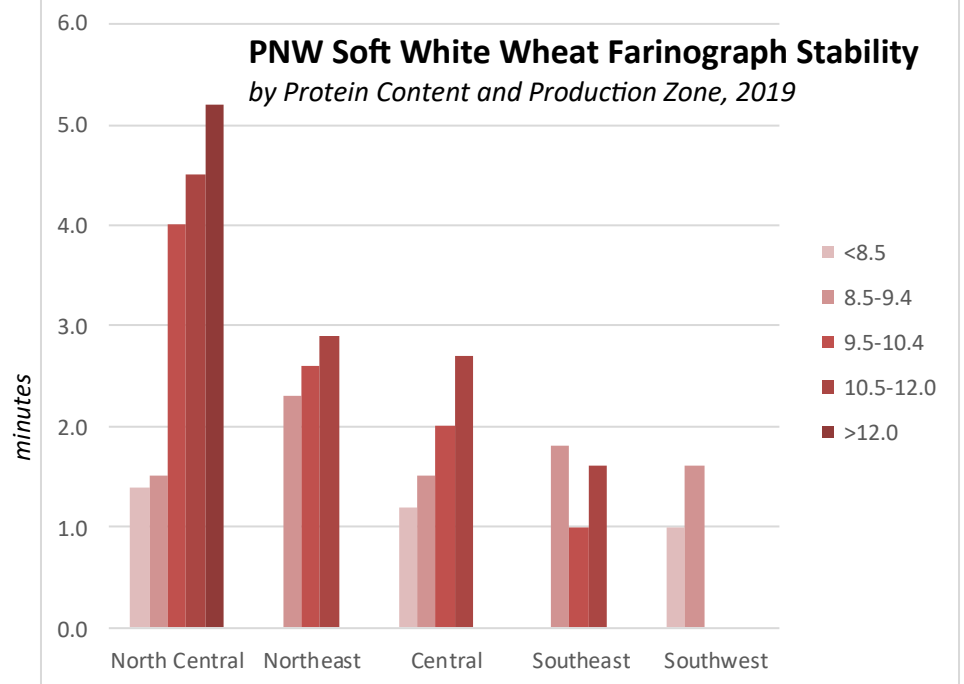
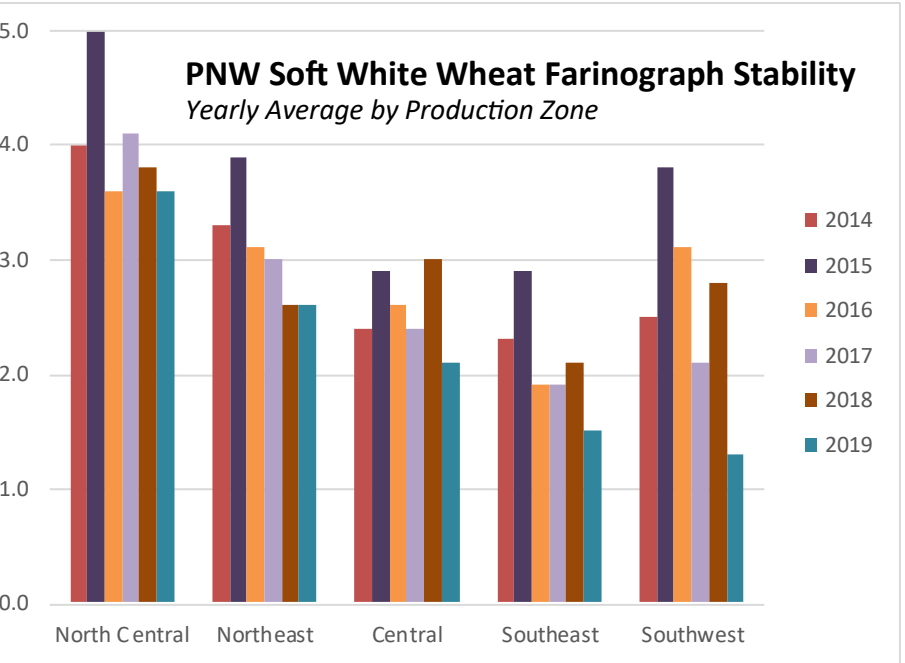
8.5-9.4% Wheat Protein Range



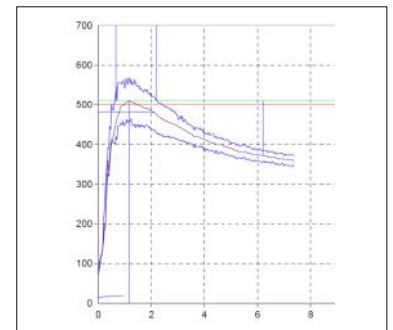
9.5-10.4% Wheat Protein Range



10.5-12.0% Wheat Protein Range



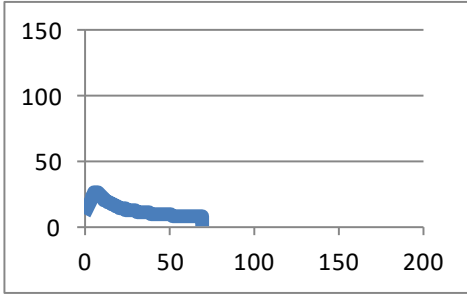
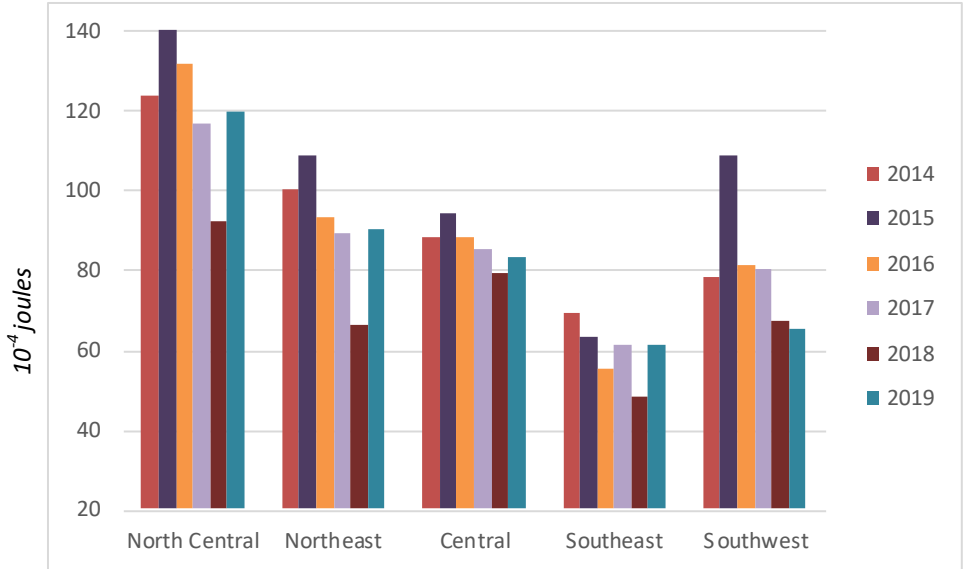
>12.0% Wheat Protein Range



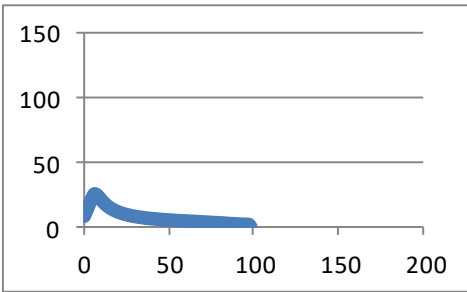
White Club Wheat

# ALVEOGRAPH

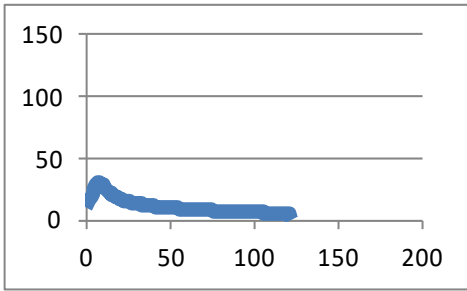
**PNW Soft White Wheat Alveograph "W" Value**  
Yearly Average by Production Zone



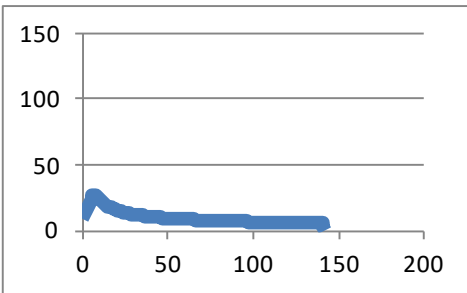
<8.5% Wheat Protein Range



8.5-9.4% Wheat Protein Range

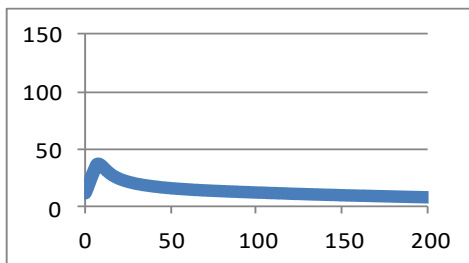
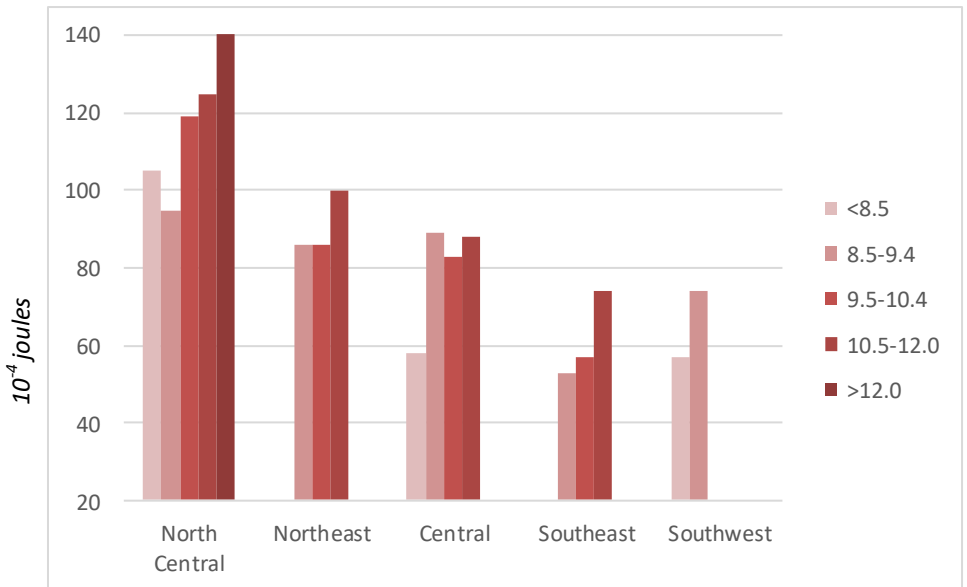


9.5-10.4% Wheat Protein Range

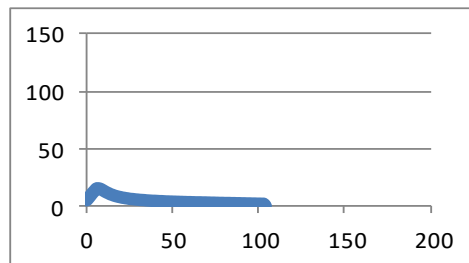


10.5-12.0% Wheat Protein Range

**PNW Soft White Wheat Alveograph "W" Value**  
by Protein Content and Production Zone, 2019

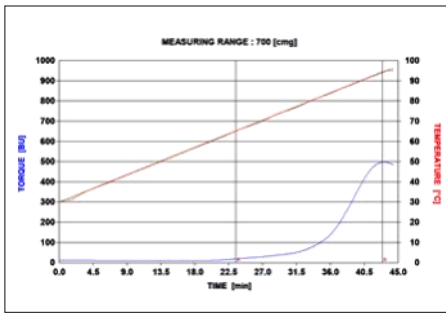


>12.0% Wheat Protein Range

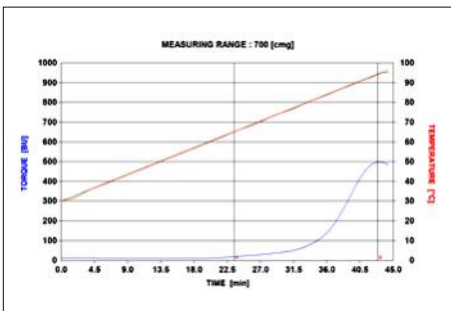


White Club Wheat

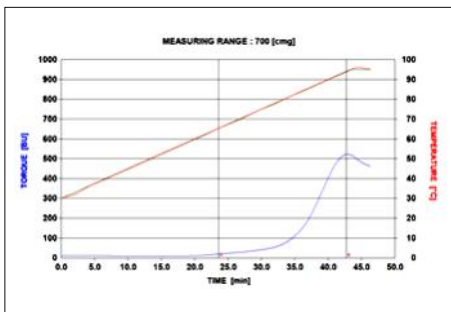
# AMYLOGRAPH



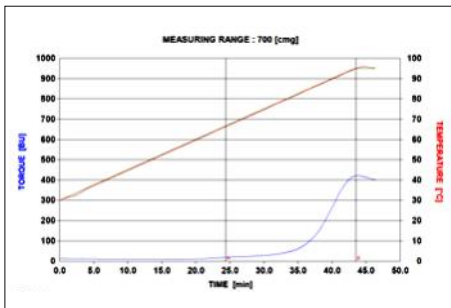
North Central Production Zone



Northeast Production Zone

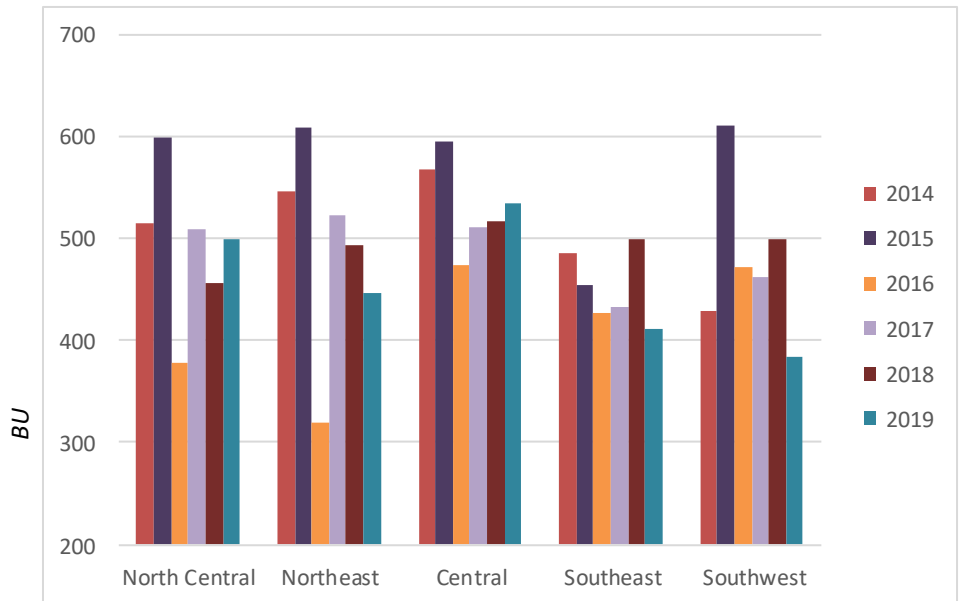


Central Production Zone

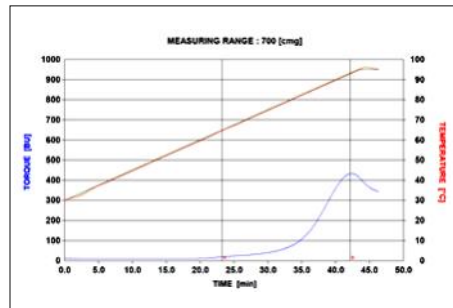
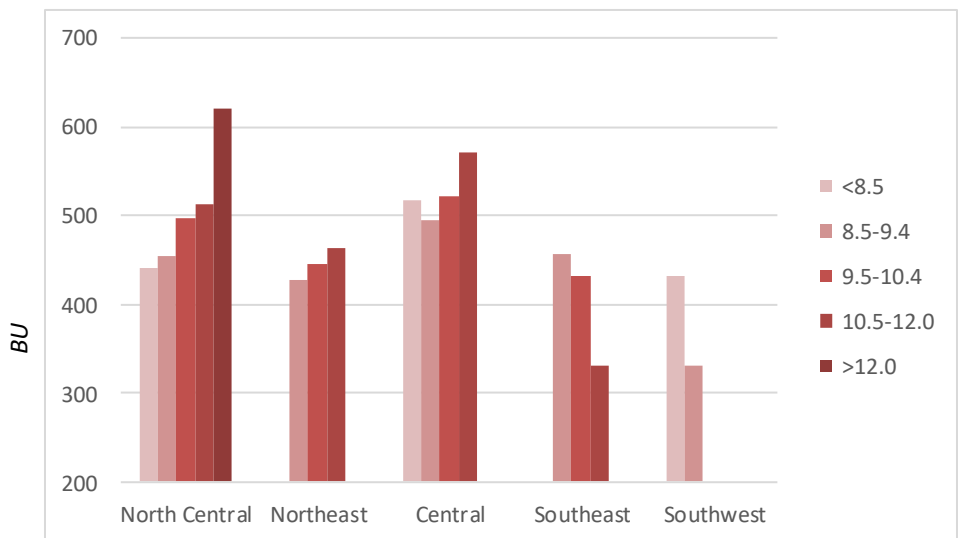


Southeast Production Zone

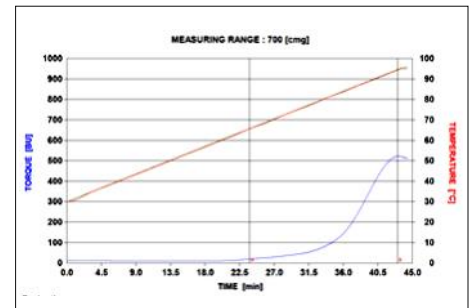
**PNW Soft White Wheat Amylograph Peak Viscosity**  
Yearly Average by Production Zone



**PNW Soft White Wheat Amylograph Peak Viscosity**  
by Protein Content and Production Zone, 2019



Southwest Production Zone

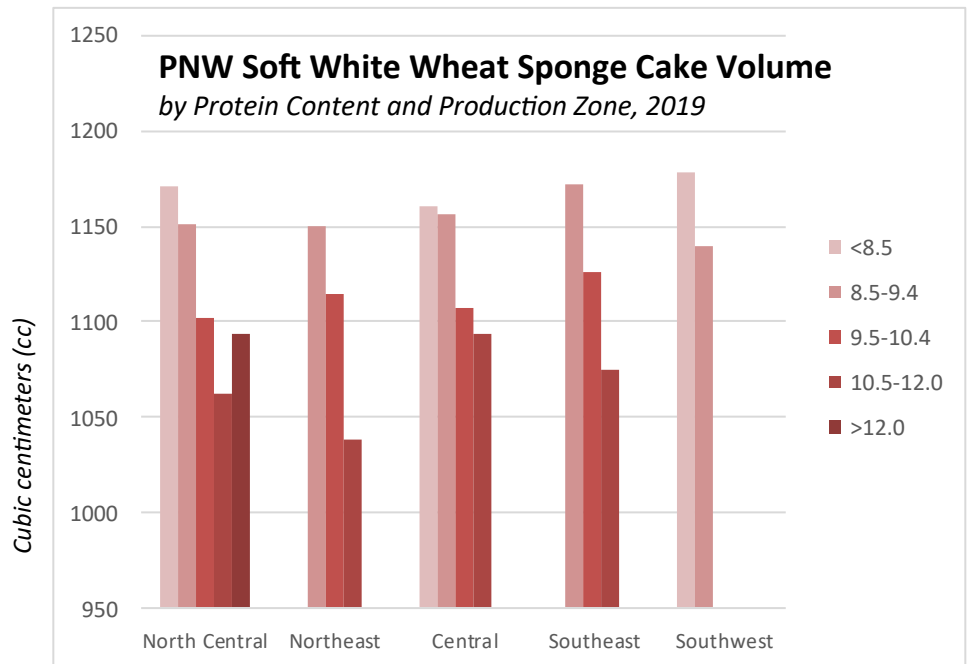
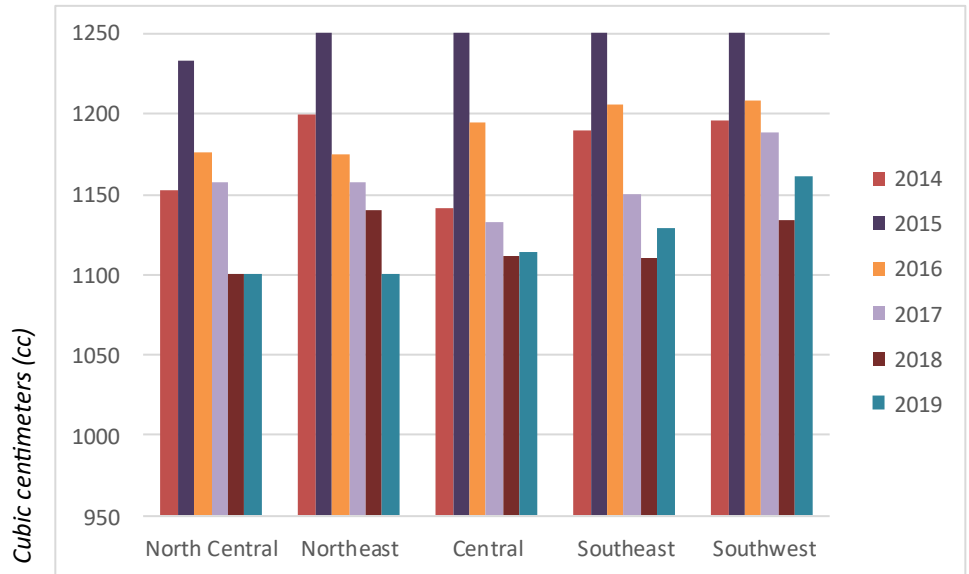


White Club Wheat

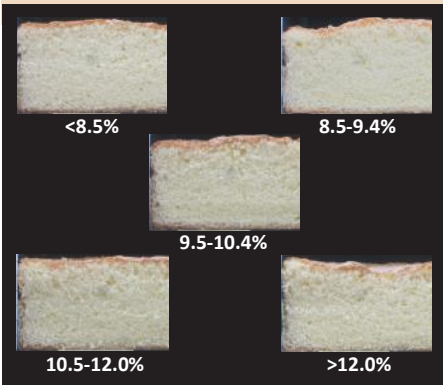
# SPONGE CAKE

## PNW Soft White Wheat Sponge Cake Volume

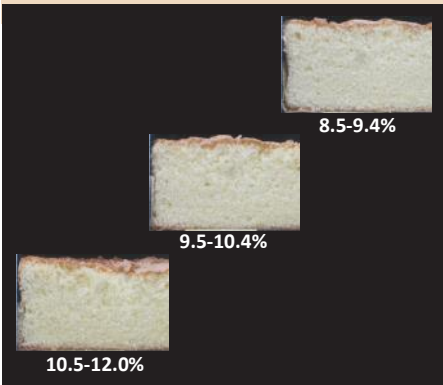
Yearly Average by Production Zone



### North Central Production Zone



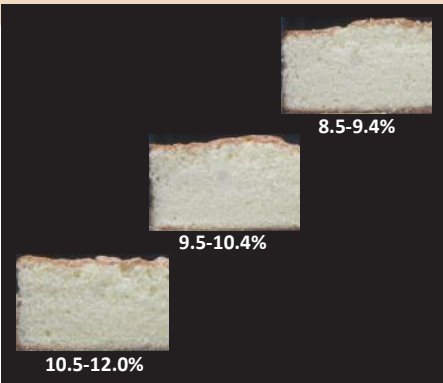
### Northeast Production Zone



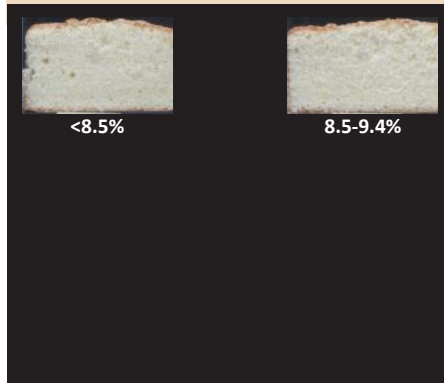
### Central Production Zone



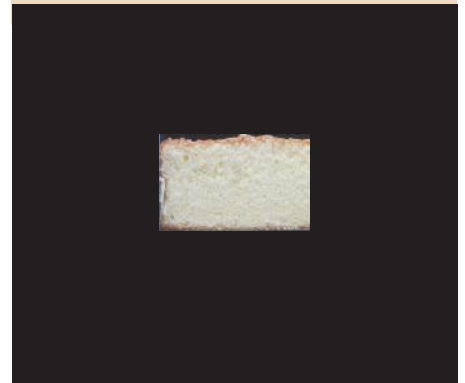
### Southeast Production Zone



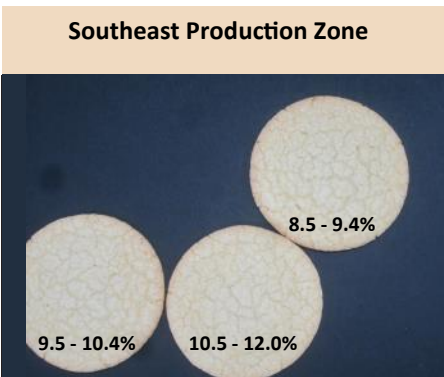
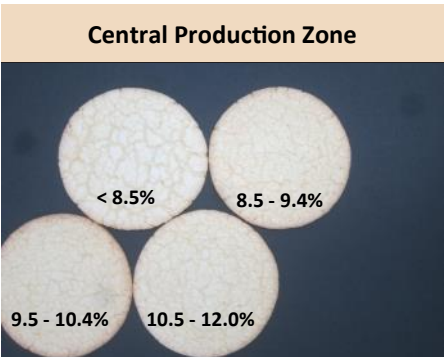
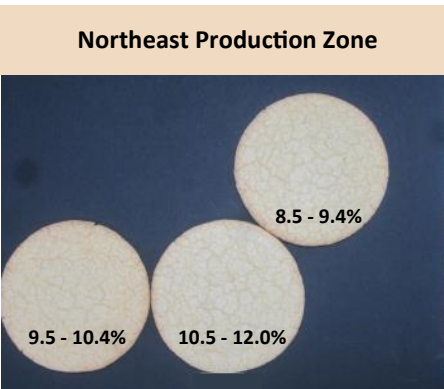
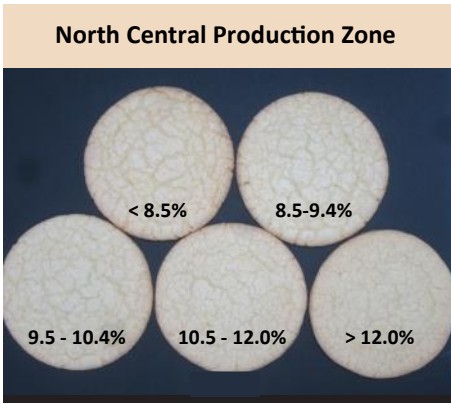
### Southwest Production Zone



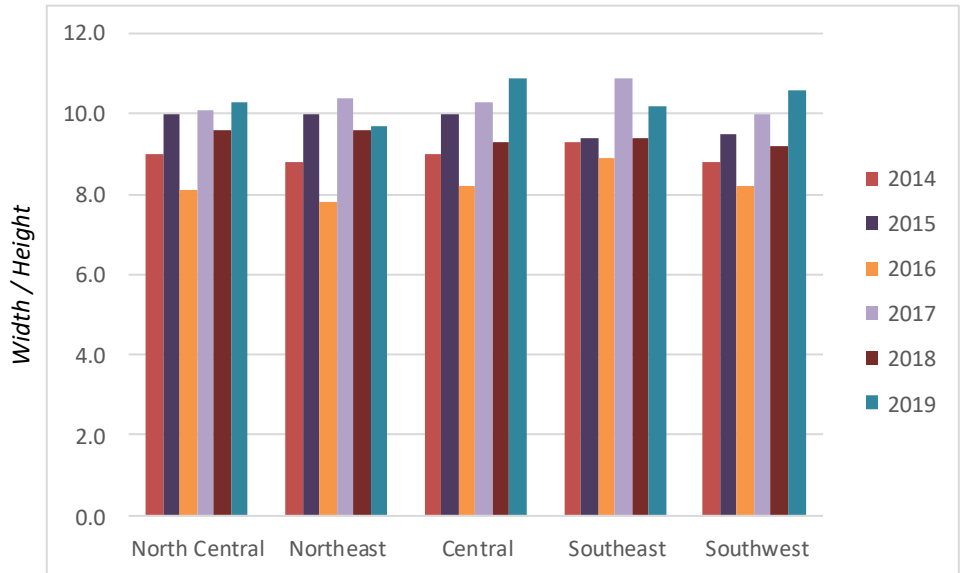
### White Club Wheat



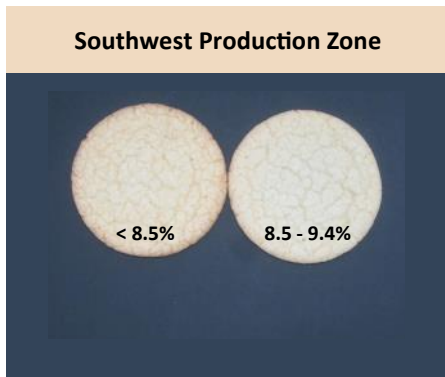
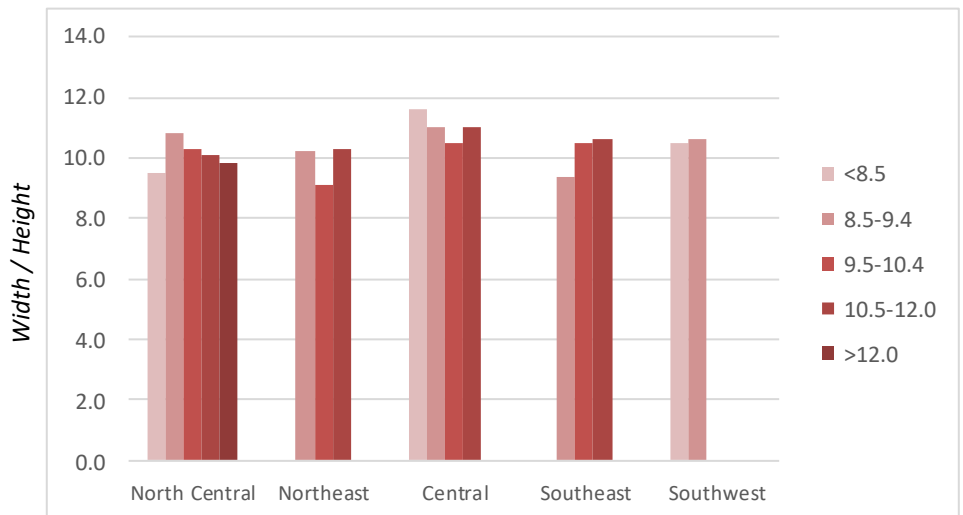
# SUGAR SNAP COOKIE



**PNW Soft White Wheat Sugar Snap Cookie Spread Factor**  
Yearly Average by Production Zone



**PNW Soft White Wheat Sugar Snap Cookie Spread Factor**  
By Production Zone and Protein Content, 2019



*Pictures and bar graphs for Chinese Southern-type steamed bread are available upon request from WMC.*

# SUMMARY

These results were derived from composite samples from the 2019 Pacific Northwest soft white (SW) and white club (WC) wheat harvest. SW wheat composites were prepared by production zone and protein levels, and all WC wheat samples were made into one composite. These composite samples were analyzed for wheat quality, flour quality, solvent retention capacity, physical dough properties, and finished product characteristics. Please note that some production zones did not have low or high protein samples this year, which affects weighted average results. Harvest results are summarized as follows:

## Wheat Quality

Average test weights were over 60 pounds per bushel (lbs/bu) at all protein levels in all areas except for the Southwest production zone. SW dockage averages were similar to last year and the five-year averages in all production zones. WC dockage was higher than last year and five-year averages. Wheat moisture averages were less than 11 percent in the major wheat producing zones of North Central, Northeast, Central, and Southeast. Average falling number values at most protein levels in all production zones exceeded 300 seconds. Average wheat ash content was similar to last year in all production zones. Thousand kernel weights were similar to last year in all production zones. SKCS kernel hardness index values were less than last year in all production zones. Whole meal wet gluten averages were higher than last year and five-year averages in all production zones as a result of higher wheat protein.

## Flour Quality

Average flour yields were less than last year and five-year averages in all production zones. Average flour ash contents were similar to last year in all production zones. WC flour ash was higher than last year and five-year averages. Flour color L\* averages were similar to last year in all production zones, except for the Southwest zone. Flour quality parameters indicated higher wet gluten content in samples with higher protein content. Flour falling number values were greater than 300 seconds in all production zones for most protein levels. Amylograph peak viscosity averages were greater than last year in North Central and Central production zones, and lower in the other zones.

## Solvent Retention Capacity (SRC)

Water SRC average values were lower than last year and five-year averages in all production zones. Sucrose SRC average values were higher than last year in all production zones. Lactic acid SRC averages were higher than last year in North Central, Northeast, and Central production zones. Sodium carbonate SRC averages were lower than last year and five-year averages in all production zones. Gluten performance index values were similar to last year in all production zones.

## Physical Dough Properties

Physical dough property tests indicated generally lower water absorption values and weaker gluten strength, as measured by the Farinograph, in samples with lower protein content in each production zone. Longer dough extensibility, as shown by the Alveograph L value, was observed generally in samples with higher protein content in all production zones. White club wheat had weaker gluten strength than soft white wheat samples, as indicated by much lower Alveograph W values.

## Finished Products

In general, lower protein SW wheat samples made better sugar snap cookies as measured by top grain scores. Sponge cake volumes and total scores were similar to last year when comparing the respective protein levels in all production zones. Steamed bread-specific volumes generally increased with higher protein content within each production zone. Steamed bread-specific volume averages were lower than the five-year average in all production zones. The WC composite sample had similar results as SW wheat. In summary, the overall quality of the crop can be described as very good, characterized by low to very low gluten strength with excellent potential to produce soft wheat flour products and other products made from blends of soft and hard wheat.

*Note: This year, results are compared to five-year averages (rather than three-year) to bring the data into alignment with the USW Crop Quality Report.*

Wheat Marketing Center thanks the many individuals and organizations that provided samples for the 2019 Annual Pacific Northwest Crop Quality Survey, and recognizes with gratitude the project's funding partners:



[www.idahowheat.org](http://www.idahowheat.org)



[www.owgl.org](http://www.owgl.org)



[www.wagrains.org](http://www.wagrains.org)



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[www.wmcinc.org](http://www.wmcinc.org)

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*Photo courtesy of Washington Grain Commission*