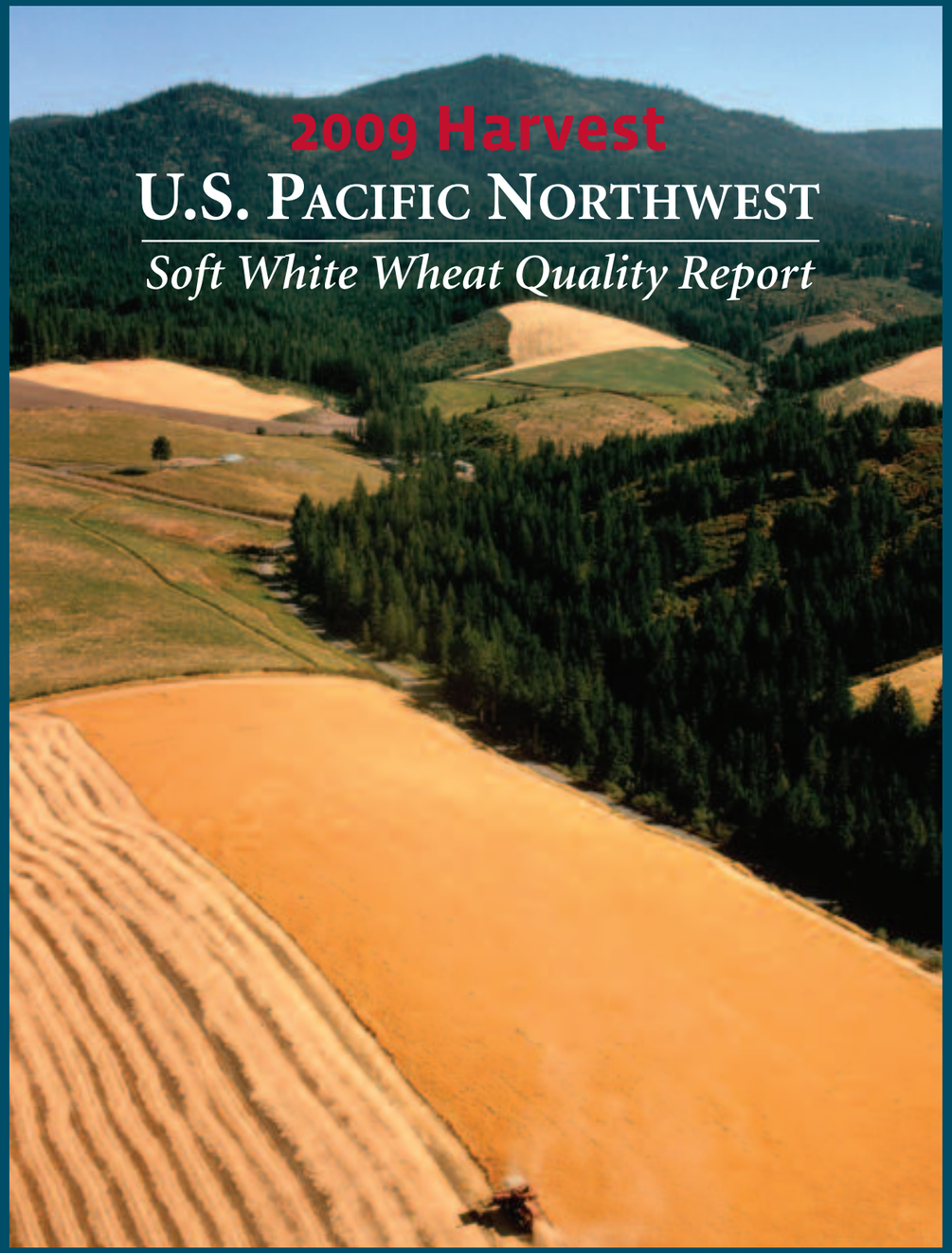


2009 Harvest
U.S. Pacific Northwest
Soft White Wheat Quality Report

This project is funded by the wheat commissions of Idaho, Oregon, and Washington, Wheat Marketing Center, Inc., and U.S. Wheat Associates

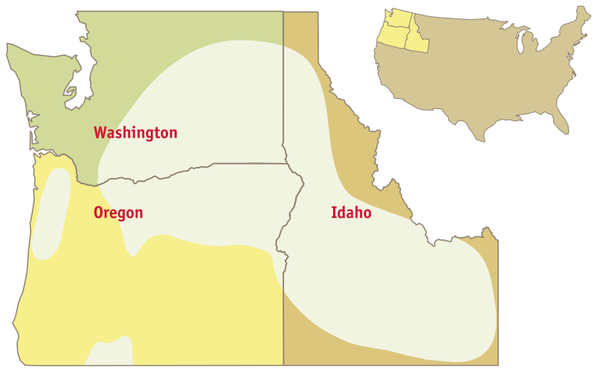
The Pacific Northwest

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

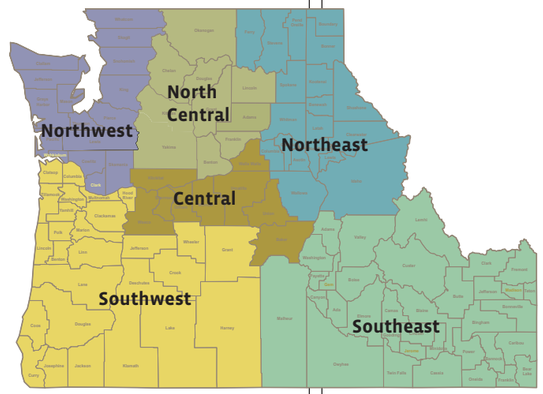
Pacific Northwest soft white wheat is known for its white bran, low moisture content, and weak dough strength characteristics. Soft white wheat is well suited for products such as cakes, pastries, cookies, crackers, pancakes, sponge cakes, snack foods, flat breads, and steamed breads.

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 and any higher amounts are contract specifications that are negotiated between the buyer and seller.

Wheat Growing Areas of the Pacific Northwest



Wheat Production Zones



Wheat Samples

At harvest, National Agricultural Statistics Service collected 354 soft white wheat and 54 white club wheat samples this year, based on wheat production. Federal Grain Inspection Service (FGIS) graded each sample. Wheat Marketing Center conducted wheat, flour, and finished product tests on composites based on production zones and protein levels.

The major soft white wheat varieties were Eltan, Stephens, ORCF102, Louise, and Brundage.

Weather

The Pacific Norwest had dry conditions at planting. Most of the wheat production area received adequate rainfall during the winter and early spring. Generally cool temperatures prevailed early in the growing season with some limited periods of high temperatures. Dry conditions prevailed during the wheat harvest with some localized rain showers.

2009 Soft White and White Club Wheat Production

By production zone

Wheat production estimates courtesy of Washington Wheat Commission

Production Zone	Million Metric Tons (MMT)	Million Bushels
North Central	1.36	50.0
Northeast	1.64	60.3
Central	1.17	43.0
Southeast	0.68	25.0
Southwest	0.21	7.7
Northwest	0.01	0.4
Total	**5.07**	**186.3**

Wheat Quality

Production Zone	Wheat Protein Range 12% mb %	Grade	Test Weight lb/bu	Dockage %	Whole Kernel Moisture %	Falling Number 14% mb seconds	Ash 14% mb %	Thousand Kernel Weight 14% mb g	SKCS Kernel Hardness Index	Whole Meal Wet Gluten 14% mb %
North Central	<8.5	1SWH	60.7	0.3	9.6	325	1.22	35.2	30	18.2
	8.5-9.4	1SWH	61.4	0.2	9.3	307	1.25	33.2	33	23.5
Soft White Wheat Estimated Production = 1.22 MMT	9.5-10.4	1SWH	60.6	0.3	9.3	327	1.21	34.8	26	25.1
	10.5-12.0	1SWH	60.1	0.7	9.7	330	1.31	32.7	28	29.9
	>12.0	2SWH	59.6	0.5	9.6	372	1.37	31.7	28	34.1
	2009 Average	**1SWH**	**60.5**	**0.4**	**9.5**	**331**	**1.27**	**33.4**	**28**	**27.0**
	2008 Average	2SWH	59.6	0.5	9.3	328	1.27	31.8	32	25.9
	3 Year Average	1SWH	60.2	0.5	9.1	332	1.29	32.9	32	23.1
Northeast	<8.5	1SWH	60.2	0.5	10.8	290	1.27	35.4	24	15.1
	8.5-9.4	1SWH	60.9	0.4	9.8	318	1.30	35.9	30	20.4
Soft White Wheat Estimated Production = 1.62 MMT	9.5-10.4	1SWH	60.7	0.7	10.0	328	1.35	35.0	31	24.6
	10.5-12.0	1SWH	60.2	0.7	9.8	315	1.34	34.6	30	28.5
	>12.0	2SWH	58.7	0.3	10.3	323	1.40	29.4	29	34.1
	2009 Average	**1SWH**	**60.4**	**0.6**	**9.9**	**320**	**1.34**	**34.6**	**30**	**25.8**
	2008 Average	3SWH	57.5	0.7	10.1	309	1.41	30.6	30	29.5
	3 Year Average	2SWH	58.9	0.6	9.3	330	1.41	31.5	37	26.6
Central	<8.5	1SWH	60.4	0.3	9.1	311	1.30	35.3	38	12.5
	8.5-9.4	1SWH	60.8	0.3	8.8	347	1.25	33.9	38	20.2
Soft White Wheat Estimated Production = 1.11 MMT	9.5-10.4	1SWH	60.3	0.4	8.9	328	1.31	33.4	38	24.5
	10.5-12.0	2SWH	59.6	0.4	8.6	339	1.38	30.4	32	28.6
	>12.0	2SWH	58.6	0.5	8.6	365	1.46	30.4	31	36.8
	2009 Average	**2SWH**	**59.8**	**0.4**	**8.8**	**340**	**1.35**	**32.2**	**35**	**26.2**
	2008 Average	2SWH	59.1	0.6	9.1	332	1.34	33.8	37	25.3
	3 Year Average	2SWH	59.7	0.6	9.1	332	1.37	36.4	38	23.7
Southeast	<8.5	1SWH	60.5	0.2	9.1	304	1.52	42.6	29	11.3
	8.5-9.4	1SWH	60.5	0.7	9.6	334	1.53	39.0	30	19.3
Soft White Wheat Estimated Production = 0.68 MMT	9.5-10.4	1SWH	60.3	0.8	9.6	305	1.58	34.9	35	25.8
	10.5-12.0	2SWH	59.5	1.4	9.4	348	1.67	31.0	32	26.4
	>12.0	1SWH	60.0	0.8	10.0	357	1.62	34.7	47	29.9
	2009 Average	**1SWH**	**60.1**	**0.9**	**9.5**	**328**	**1.59**	**35.6**	**33**	**23.3**
	2008 Average	2SWH	59.7	1.2	9.3	315	1.58	35.4	29	24.3
	3 Year Average	1SWH	60.1	1.2	9.3	320	1.58	36.4	28	22.5
Southwest	<8.5	1SWH	60.0	0.9	10.4	331	1.28	38.1	40	14.4
Soft White Wheat Estimated Production = 0.21 MMT	8.5-9.4	1SWH	61.9	0.3	10.3	325	1.42	40.9	38	16.6
	9.5-10.4	1SWH	62.0	0.4	10.9	346	1.40	38.0	34	22.1
	2009 Average	**1SWH**	**61.4**	**0.5**	**10.6**	**337**	**1.37**	**38.6**	**36**	**18.7**
	2008 Average	1SWH	60.4	0.6	12.0	309	1.41	41.6	36	20.6
White Club Wheat Estimated Production = 0.22 MMT	**2009 Average**	**1WHCB**	**60.2**	**0.8**	**8.7**	**310**	**1.29**	**31.4**	**29**	**17.2**
	2008 Average	1WHCB	58.8	1.0	9.5	303	1.29	29.6	34	21.8
	3 Year Average	1WHCB	59.7	0.8	8.9	326	1.31	30.4	36	20.0

Flour Quality

Production Zone	Wheat Protein Range 12% mb %	Flour Yield %	Flour Ash 14% mb %	Flour Protein 14% mb %	Flour Color L*	Flour Color a*	Flour Color b*	Wet Gluten 14% mb %	Falling Number 14% mb seconds	Amylograph Peak Viscosity BU
North Central	<8.5	72.4	0.42	7.0	93.0	-2.6	8.3	14.9	319	472
	8.5-9.4	72.4	0.45	7.8	93.0	-2.6	8.3	18.0	369	448
Soft White Wheat Estimated Production = 1.22 MMT	9.5-10.4	69.6	0.39	8.4	93.2	-2.5	7.9	23.5	376	522
	10.5-12.0	70.7	0.44	9.7	92.9	-2.3	7.7	25.1	428	458
	>12.0	69.0	0.50	11.3	92.3	-2.3	7.8	30.9	397	488
	2009 Av.	**70.6**	**0.43**	**9.0**	**92.9**	**-2.4**	**7.9**	**23.3**	**390**	**478**
	2008 Av.	70.9	0.39	9.8	92.8	-2.5	8.0	23.2	354	661
	3 Year Av.	69.1	0.40	8.7	92.6	-2.4	8.1	20.9	341	595
Northeast	<8.5	71.1	0.40	6.8	92.9	-2.5	7.9	14.9	312	460
	8.5-9.4	71.4	0.41	7.3	93.0	-2.4	7.8	17.3	312	402
Soft White Wheat Estimated Production = 1.62 MMT	9.5-10.4	72.1	0.43	8.3	92.8	-2.3	7.6	21.5	356	462
	10.5-12.0	71.0	0.39	9.2	92.7	-2.2	7.5	27.3	337	428
	>12.0	70.7	0.49	11.1	92.5	-2.3	8.0	30.9	342	341
	2009 Av.	**71.4**	**0.42**	**8.7**	**92.8**	**-2.3**	**7.6**	**23.6**	**338**	**427**
	2008 Av.	71.1	0.41	10.2	92.6	-2.4	8.0	26.4	323	522
	3 Year Av.	69.9	0.40	9.5	92.5	-2.3	8.1	24.7	330	536
Central	<8.5	72.6	0.45	6.8	92.7	-2.6	8.6	13.5	315	449
	8.5-9.4	70.4	0.42	7.6	92.9	-2.6	8.4	14.7	319	436
Soft White Wheat Estimated Production = 1.11 MMT	9.5-10.4	70.9	0.47	8.7	92.8	-2.4	8.2	21.5	367	482
	10.5-12.0	70.4	0.50	9.9	92.3	-2.3	7.8	28.2	348	518
	>12.0	68.5	0.49	11.5	92.6	-2.2	7.4	32.4	425	557
	2009 Av.	**70.3**	**0.47**	**9.2**	**92.6**	**-2.4**	**8.0**	**23.7**	**359**	**496**
	2008 Av.	71.1	0.39	9.8	92.7	-2.5	8.3	24.9	333	610
	3 Year Av.	69.6	0.41	9.0	92.5	-2.4	8.2	22.3	348	549
Southeast	<8.5	73.0	0.41	6.6	93.1	-2.6	8.2	12.0	313	382
	8.5-9.4	72.0	0.40	7.3	93.0	-2.4	7.8	18.6	463	457
Soft White Wheat Estimated Production = 0.68 MMT	9.5-10.4	71.1	0.46	8.5	92.8	-2.4	7.9	17.5	324	272
	10.5-12.0	72.1	0.48	9.6	92.4	-2.3	7.9	21.5	386	330
	>12.0	72.6	0.45	11.3	92.4	-2.3	8.2	29.8	339	474
	2009 Av.	**71.9**	**0.44**	**8.5**	**92.7**	**-2.4**	**7.9**	**19.2**	**377**	**360**
	2008 Av.	71.4	0.43	9.2	92.8	-2.4	7.7	22.7	312	572
	3 Year Av.	69.8	0.44	8.8	92.5	-2.3	7.7	22.7	323	539
Southwest	<8.5	73.4	0.43	6.5	92.8	-2.6	8.6	14.4	355	262
Soft White Wheat Estimated Production = 0.21 MMT	8.5-9.4	72.9	0.41	7.2	93.1	-2.5	8.2	11.6	349	365
	9.5-10.4	70.2	0.38	8.2	92.7	-2.1	6.8	21.8	330	449
	2009 Av.	**71.7**	**0.40**	**7.5**	**92.8**	**-2.3**	**7.6**	**17.5**	**341**	**376**
	2008 Av.	73.2	0.45	8.1	92.8	-2.5	8.1	17.5	349	459
White Club Wheat Estimated Production = 0.22 MMT	**2009 Av.**	**71.3**	**0.47**	**9.0**	**92.1**	**-2.3**	**7.2**	**15.0**	**382**	**417**
	2008 Av.	74.1	0.41	9.8	92.3	-2.3	7.6	24.8	336	581
	3 Year Av.	71.8	0.42	9.1	92.2	-2.2	7.6	20.3	335	588

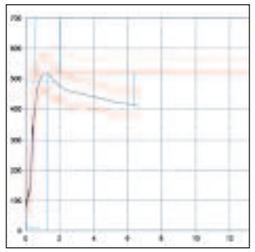
Physical Dough Properties

Production Zone	Wheat Protein Range 12% mb %	Farinograph Absorption 14% mb %	Farinograph Peak Time minutes	Farinograph Stability minutes	Alveograph P mm	Alveograph L mm	Alveograph P/L	Alveograph W 10^{-4} joules
North Central	<8.5	53.1	1.5	1.6	66	65	1.02	131
	8.5-9.4	56.6	1.7	4.2	71	80	0.89	158
Soft White	9.5-10.4	55.6	1.5	5.2	73	91	0.80	194
Wheat Estimated	10.5-12.0	56.5	2.4	6.0	68	118	0.58	200
Production =	>12.0	57.6	3.7	5.7	60	183	0.33	234
1.22 MMT	**2009 Average**	**56.1**	**2.1**	**5.0**	**69**	**109**	**0.70**	**190**
	2008 Average	55.8	2.5	5.2	52	127	0.44	170
	3 Year Average	53.9	1.9	4.8	47	108	0.47	138
Northeast	<8.5	54.9	1.3	1.5	57	40	1.43	79
	8.5-9.4	56.3	1.4	1.7	64	71	0.90	124
Soft White	9.5-10.4	56.8	1.7	3.9	68	78	0.87	150
Wheat Estimated	10.5-12.0	56.3	2.7	5.4	62	95	0.65	156
Production =	>12.0	57.7	2.8	4.3	54	154	0.35	162
1.62 MMT	**2009 Average**	**56.5**	**2.1**	**4.0**	**64**	**88**	**0.76**	**147**
	2008 Average	55.3	2.7	5.1	43	159	0.29	152
	3 Year Average	54.5	2.1	4.8	43	132	0.34	132
Central	<8.5	54.2	1.1	1.4	53	47	1.13	77
	8.5-9.4	56.1	1.5	2.5	64	52	1.23	105
Soft White	9.5-10.4	56.7	1.7	3.1	57	78	0.73	117
Wheat Estimated	10.5-12.0	55.2	2.3	3.7	48	134	0.36	140
Production =	>12.0	57.7	3.5	4.6	55	164	0.34	188
1.11 MMT	**2009 Average**	**56.1**	**2.1**	**3.3**	**55**	**104**	**0.67**	**132**
	2008 Average	56.3	2.1	3.6	55	93	0.66	127
	3 Year Average	55.0	1.9	3.2	47	94	0.51	107
Southeast	<8.5	57.1	1.4	1.4	58	29	2.00	61
	8.5-9.4	55.5	1.7	2.2	42	62	0.68	67
Soft White	9.5-10.4	58.2	1.6	2.7	56	70	0.80	89
Wheat Estimated	10.5-12.0	57.4	2.2	2.4	51	91	0.56	91
Production =	>12.0	58.7	3.7	4.8	60	140	0.43	172
0.68 MMT	**2009 Average**	**57.3**	**1.9**	**2.5**	**51**	**75**	**0.79**	**87**
	2008 Average	54.7	2.1	3.9	38	124	0.34	98
	3 Year Average	53.4	1.9	3.6	35	119	0.29	86
Southwest	<8.5	55.6	1.4	1.9	70	32	2.19	81
Soft White	8.5-9.4	57.5	1.5	1.0	54	33	1.64	57
Wheat Estimated	9.5-10.4	59.0	1.7	4.1	78	64	1.22	140
Production =	**2009 Average**	**57.7**	**1.6**	**2.8**	**71**	**48**	**1.59**	**106**
0.21 MMT	2008 Average	55.8	1.5	2.6	48	80	0.61	102
White Club Wheat	**2009 Average**	**56.0**	**1.3**	**2.1**	**58**	**56**	**1.04**	**81**
	2008 Average	51.6	1.3	2.0	24	93	0.26	44
Estimated	3 Year Average	52.2	1.4	2.0	27	82	0.33	46
Production = 0.22 MMT								

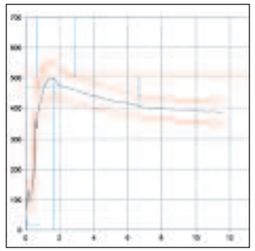
Finished Products

Production Zone	Wheat Protein Range 12% mb %	Sugar Snap Cookie Spread cm	Sugar Snap Cookie Spread Factor width/height	Sugar Snap Cookie Top Grain Score	Sponge Cake Volume cc	Sponge Cake Total Score	Chinese Southern Type Steamed Bread Specific Volume cc/g	Chinese Southern Type Steamed Bread Total Score
North Central	<8.5	8.2	8.4	2.0	1211	61	1.90	62
	8.5-9.4	8.0	8.2	1.0	1189	53	1.90	66
Soft White	9.5-10.4	8.0	8.4	2.0	1169	56	1.80	68
Wheat Estimated	10.5-12.0	8.0	8.0	1.0	1127	51	2.12	71
Production =	>12.0	7.9	7.9	0.0	1234	50	2.42	73
1.22 MMT	**2009 Average**	**8.0**	**8.2**	**1.2**	**1172**	**53**	**2.02**	**69**
	2008 Average	8.0	7.6	0.7	1184	46	2.53	65
	3 Year Average	8.2	8.1	1.5	1192	47	2.53	68
Northeast	<8.5	8.5	9.5	2.0	1205	52	1.87	64
	8.5-9.4	8.2	8.4	1.0	1215	54	1.98	68
Soft White	9.5-10.4	8.0	7.8	1.0	1120	43	1.96	69
Wheat Estimated	10.5-12.0	8.0	8.0	0.6	1192	53	2.11	73
Production =	>12.0	7.9	7.7	0.0	1193	51	2.44	72
1.62 MMT	**2009 Average**	**8.0**	**8.0**	**0.8**	**1175**	**50**	**2.06**	**70**
	2008 Average	8.0	7.3	0.5	1180	50	2.62	66
	3 Year Average	8.0	7.5	0.6	1191	50	2.58	68
Central	<8.5	8.1	9.0	1.5	1166	52	1.85	65
	8.5-9.4	7.9	7.5	1.5	1137	47	1.95	62
Soft White	9.5-10.4	8.0	7.8	0.5	1165	49	2.09	66
Wheat Estimated	10.5-12.0	8.1	7.9	0.0	1144	40	2.18	67
Production =	>12.0	7.7	6.9	0.0	1183	38	2.60	72
1.11 MMT	**2009 Average**	**8.0**	**7.7**	**0.5**	**1157**	**44**	**2.17**	**66**
	2008 Average	7.8	6.9	0.2	1157	50	2.42	63
	3 Year Average	8.0	7.2	0.9	1167	50	2.43	65
Southeast	<8.5	8.0	8.0	1.5	1161	46	1.55	58
	8.5-9.4	8.2	8.2	1.0	1200	57	1.78	64
Soft White	9.5-10.4	7.9	7.2	1.5	1200	52	1.88	66
Wheat Estimated	10.5-12.0	8.0	8.0	0.5	1149	50	2.05	67
Production =	>12.0	7.8	7.1	0.0	1104	45	2.14	71
0.68 MMT	**2009 Average**	**8.0**	**7.7**	**1.0**	**1175**	**52**	**1.89**	**65**
	2008 Average	8.2	7.8	1.0	1184	55	2.50	68
	3 Year Average	8.3	8.2	1.7	1197	53	2.42	68
Southwest	<8.5	7.9	7.5	1.0	1201	61	1.81	62
Soft White	8.5-9.4	7.9	7.2	3.0	1169	52	1.78	64
Wheat Estimated	9.5-10.4	7.9	7.3	0.0	1185	54	1.81	68
Production =	**2009 Average**	**7.9**	**7.3**	**0.9**	**1187**	**56**	**1.80**	**65**
0.21 MMT	2008 Average	7.9	7.7	1.4	1155	47	2.37	68
White Club Wheat	**2009 Average**	**8.2**	**8.8**	**2.0**	**1177**	**52**	**2.17**	**67**
	2008 Average	8.4	9.8	1.5	1213	48	2.74	65
Estimated	3 Year Average	8.5	9.6	2.7	1232	51	2.75	67
Production = 0.22 MMT								

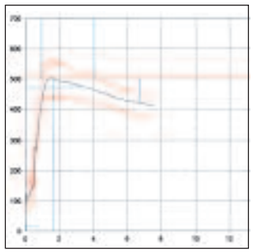
Farinograph



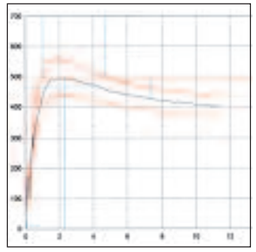
<8.5 % Wheat Protein Range



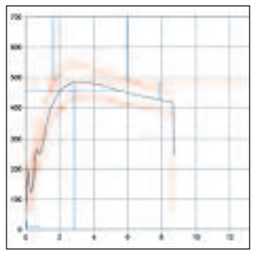
8.5-9.4% Wheat Protein Range



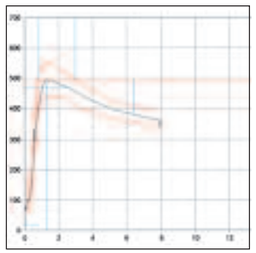
9.5-10.4% Wheat Protein Range



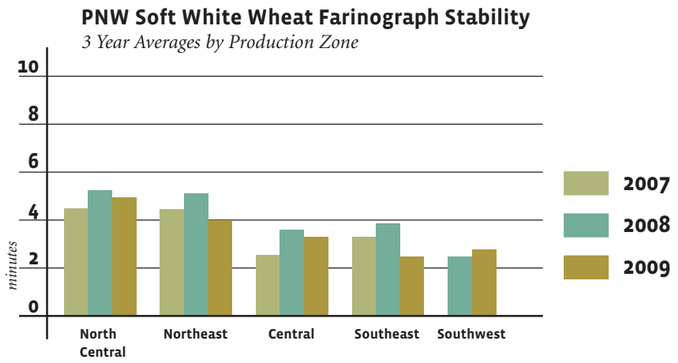
10.5-12.0% Wheat Protein Range

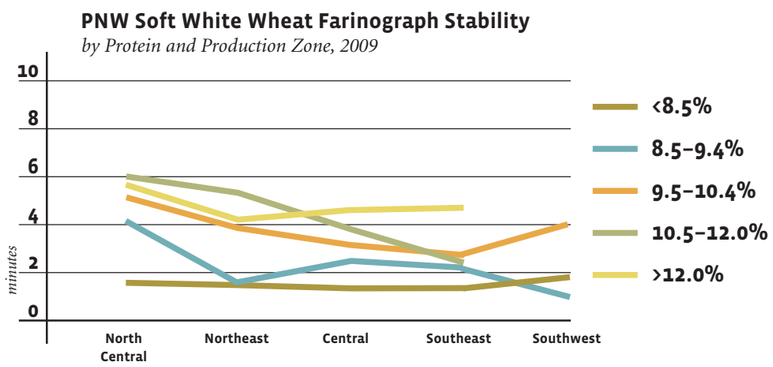


>12.0% Wheat Protein Range

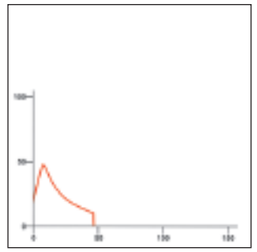


White Club Wheat

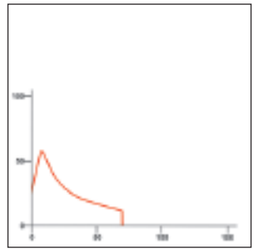




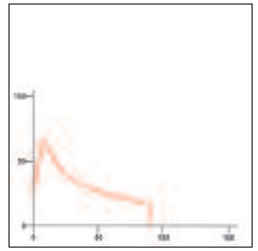
Alveograph



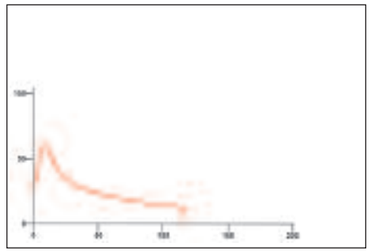
<8.5 % Wheat Protein Range



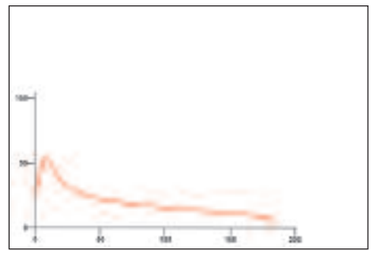
8.5-9.4% Wheat Protein Range



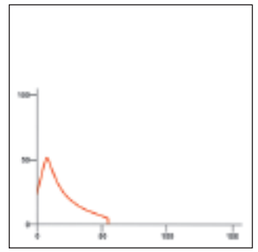
9.5-10.4% Wheat Protein Range



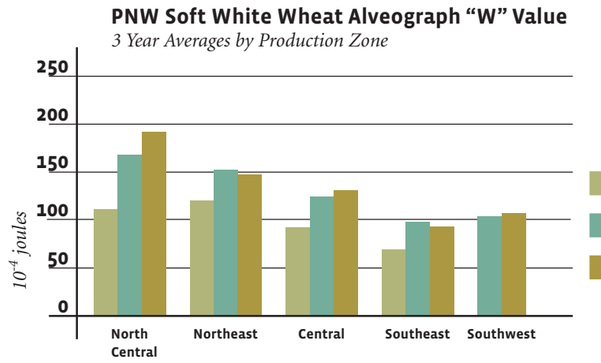
10.5-12.0% Wheat Protein Range

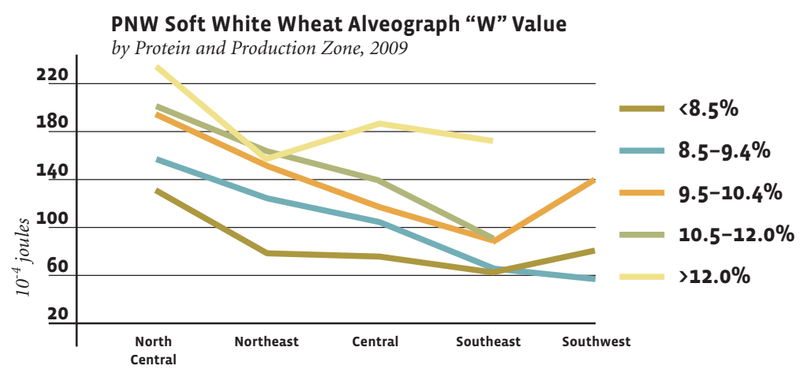


>12.0% Wheat Protein Range

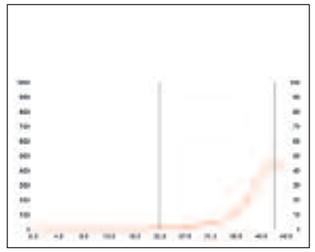


White Club Wheat

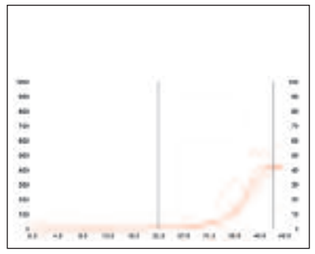




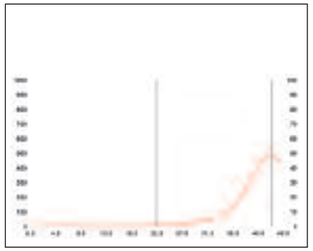
Amylograph



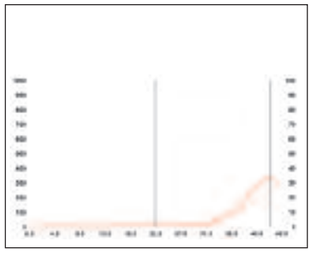
North Central Production Zone



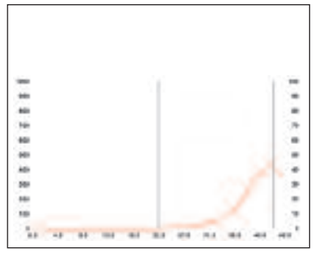
Northeast Production Zone



Central Production Zone

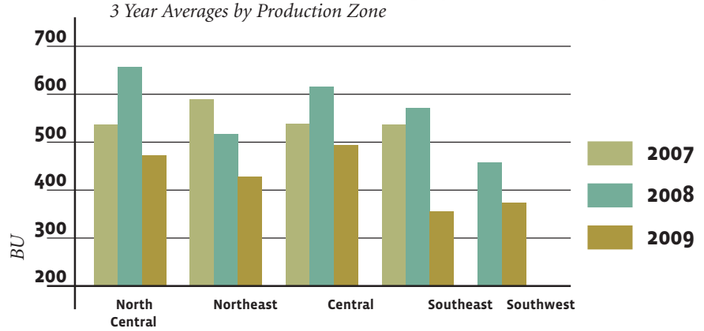


Southeast Production Zone

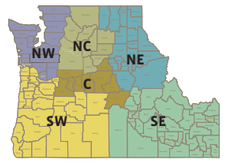


White Club Wheat

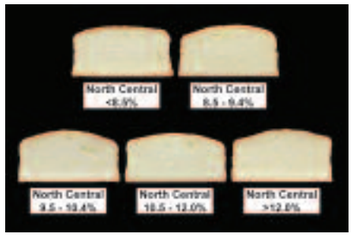
PNW Soft White Wheat Amylograph Peak Viscosity
3 Year Averages by Production Zone



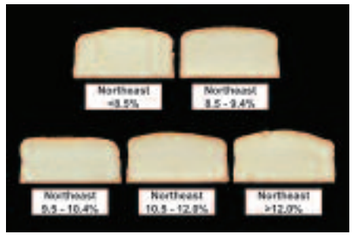
PNW Soft White Wheat Amylograph Peak Viscosity
by Protein and Production Zone, 2009



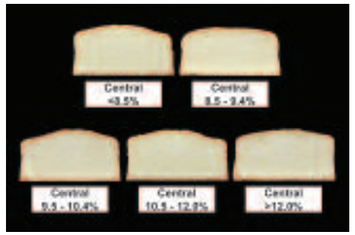
Sponge Cake



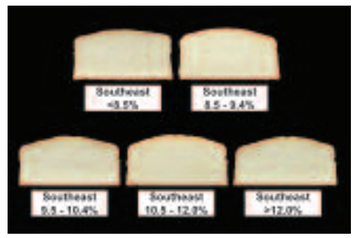
North Central Production Zone



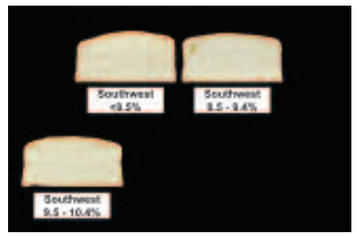
Northeast Production Zone



Central Production Zone



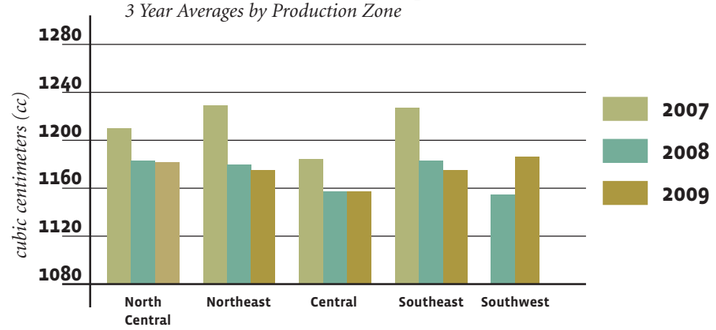
Southeast Production Zone



Southwest Production Zone

White Club Wheat

PNW Soft White Wheat Sponge Cake Volume
3 Year Averages by Production Zone



PNW Soft White Wheat Sponge Cake Volume
by Protein and Production Zone, 2009

Summary

These results were from composite samples of the Pacific Northwest soft white wheat and white club wheat harvest. Composite samples were prepared by production zones and protein levels. These composite samples were analyzed for wheat and flour quality, physical dough properties, and finished product characteristics. Harvest information is summarized as follows:

Wheat Quality

Wheat data indicated higher test weights at most protein levels in most production zones when compared to the 2008 averages. Lower dockage levels were evident in all soft white wheat production zones. In general, low wheat moisture at less than 10 percent prevailed in the major wheat producing zones of North Central and Central. Average falling number values in North Central, Northeast, Central,

Southeast, and Southwest production zones were greater than 300 seconds at most protein ranges. Lower wheat ash contents were present in the Northeast and Southwest production zones. Wheat samples from North Central and Northeast production zones had higher thousand kernel weights when compared to last year.

Flour Quality

Flour quality parameters indicated higher wet gluten contents in wheat samples with higher protein levels. Falling number values were greater than 300 seconds at all protein ranges.

Amylograph peak viscosities above 450 BU were present in most protein ranges in samples from North Central and Central production zones.

Physical Dough Properties

Physical dough property tests indicated generally lower water absorption and weaker gluten strength, as measured by the farinograph, in samples with lower protein content. Longer gluten extensibility, as shown by alveograph L values, was observed in samples, with higher protein content.

White club wheat had weaker gluten strength than soft white wheat, as indicated by alveograph W values.

Finished Products

Within a production zone, lower protein samples made better sugar snap cookies. Average sponge cake volumes were higher in samples from the North Central, Northeast, Southeast, and Southwest production zones. Steamed bread specific volumes generally increased with increasing protein content.