2006 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

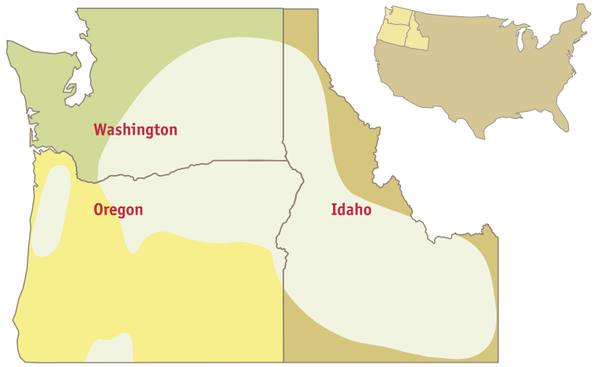
U. S. soft white wheat is grown in the Pacific Northwest, which includes the states of Idaho, Oregon, and Washington.

The Pacific Northwest

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, and flat 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 10-90%. The minimum percentage of white club wheat in western white wheat is 10% 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 349 soft white wheat and 53 white club wheat samples this year, based on wheat production. Federal Grain Inspection Service (FGIS) graded each wheat 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, Madsen, Stephens, and Tubbs.

Weather

The Pacific Northwest had dry conditions at planting. Most of the wheat production area received adequate rainfall during winter and early spring. Hot weather occurred during June. Hot and dry conditions prevailed during the wheat harvest of the Pacific Northwest.

2006 Soft White and White Club Wheat Production

By production zone

Wheat production estimates courtesy of Washington Wheat Commission

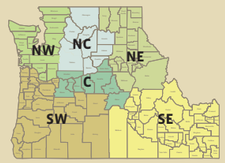
Production Zone	Million Metric Tons (MMT)	Million Bushels
North Central	1.44	53.0
Northeast	1.95	71.8
Central	1.25	46.1
Southeast	0.79	29.0
Southwest	0.24	8.7
Northwest	0.01	0.2
Total	**5.68**	**208.8**

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 Kernal Hardness Index	Whole Meal Wet Gluten 14% mb %
North Central	<8.5	1 SWH	60.7	0.4	9.1	317	1.31	33.8	29	16.7
	8.5-9.4	1 SWH	60.9	0.7	8.7	336	1.32	33.6	34	19.3
Soft White	9.5-10.4	1 SWH	60.9	0.4	8.7	327	1.32	34.3	36	22.6
Wheat Estimated	10.5-12.0	1 SWH	61.1	0.5	8.7	345	1.41	32.8	39	26.2
Production =	>12.0	1 SWH	60.1	0.5	8.8	363	1.38	32.7	36	30.3
1.26 MMT	2006 Av.	1 SWH	60.8	0.5	8.8	337	1.35	33.5	35	22.8
	2005 Av.	1 SWH	60.3	0.4	8.5	352	1.28	31.7	31	30.6
	3 Year Av.	1 SWH	60.6	0.4	8.8	355	1.29	33.7	32	27.5
Northeast	<8.5	1 SWH	60.8	0.3	8.7	332	1.31	33.2	38	15.2
	8.5-9.4	1 SWH	61.1	0.4	8.8	337	1.46	33.9	42	19.7
Soft White	9.5-10.4	1 SWH	60.4	0.7	9.0	330	1.40	33.1	41	22.8
Wheat Estimated	10.5-12.0	2 SWH	59.8	0.9	9.0	344	1.46	32.8	42	25.5
Production =	>12.0	3 SWH	56.2	0.9	8.8	349	1.61	26.7	39	30.9
1.91 MMT	2006 Av.	2 SWH	59.5	0.7	8.9	337	1.46	31.7	41	24.6
	2005 Av.	1 SWH	60.4	0.5	8.8	367	1.44	32.7	39	38.9
	3 Year Av.	1 SWH	60.0	0.6	9.0	363	1.42	33.0	37	31.8
Central	<8.5	2 SWH	59.7	0.6	9.3	313	1.45	40.3	32	14.3
	8.5-9.4	1 SWH	60.7	0.8	8.8	332	1.40	39.1	35	18.7
Soft White	9.5-10.4	1 SWH	61.1	0.4	9.1	337	1.37	40.8	38	21.5
Wheat Estimated	10.5-12.0	1 SWH	60.5	0.5	8.5	351	1.44	38.1	40	25.4
Production =	>12.0	2 SWH	58.5	0.5	8.6	361	1.52	33.7	37	30.2
1.23 MMT	2006 Av.	1 SWH	60.1	0.6	8.7	339	1.44	37.2	37	23.2
	2005 Av.	2 SWH	59.5	0.7	8.5	347	1.36	33.7	37	37.1
	3 Year Av.	1 SWH	60.0	0.6	8.8	354	1.37	37.1	34	29.8
Southeast	<8.5	1 SWH	60.7	0.7	9.1	311	1.49	40.3	23	13.6
	8.5-9.4	1 SWH	61.1	1.0	9.2	321	1.53	38.5	31	16.9
Soft White	9.5-10.4	1 SWH	61.0	2.0	9.5	327	1.58	37.7	30	20.1
Wheat Estimated	10.5-12.0	1 SWH	60.6	1.1	9.2	325	1.66	35.3	32	22.9
Production =	>12.0	2 SWH	59.1	1.5	9.2	319	1.61	30.1	28	29.4
0.79 MMT	2006 Av.	1 SWH	60.4	1.3	9.2	319	1.60	35.2	30	22.1
	2005 Av.	1 SWH	60.5	1.0	9.4	337	1.58	36.2	31	30.7
	3 Year Av.	1 SWH	60.5	1.1	9.3	341	1.56	37.2	30	26.9
White Club Wheat	2006 Av.	1 WHCB	60.0	0.7	8.4	338	1.36	30.5	38	18.4
	2005 Av.	1 WHCB	60.4	0.9	8.2	333	1.32	30.5	38	15.8
Estimated	3 Year Av.	1 WHCB	60.2	0.8	8.5	339	1.31	31.0	37	—
Production = 0.24 MMT										

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	70.6	0.40	6.6	92.7	-2.4	8.0	12.1	332	650
	8.5-9.4	69.3	0.42	7.4	92.5	-2.3	8.1	18.9	303	645
Soft White	9.5-10.4	69.7	0.41	8.3	92.5	-2.3	7.8	20.8	327	570
Wheat Estimated	10.5-12.0	69.0	0.40	9.2	92.4	-2.4	7.8	23.8	355	515
Production =	>12.0	66.7	0.38	9.3	92.4	-2.4	8.0	24.9	362	535
1.26 MMT	2006 Av.	69.1	0.41	8.2	92.5	-2.3	7.9	20.4	332	585
	2005 Av.	65.7	0.34	8.6	92.6	-2.5	7.8	20.6	377	651
	3 Year Av.	67.5	0.38	8.5	92.5	-2.5	7.5	21.9	370	635
Northeast	<8.5	70.1	0.40	7.4	92.4	-2.3	7.8	18.7	334	590
	8.5-9.4	71.2	0.40	8.2	92.1	-2.4	8.2	19.8	372	585
Soft White	9.5-10.4	71.9	0.41	8.2	92.4	-2.3	8.1	21.8	308	440
Wheat Estimated	10.5-12.0	69.6	0.39	9.2	92.3	-2.3	8.1	24.6	335	454
Production =	>12.0	69.3	0.43	10.7	92.7	-2.4	8.1	29.2	364	580
1.91 MMT	2006 Av.	70.5	0.41	9.0	92.3	-2.4	8.1	23.8	336	492
	2005 Av.	67.8	0.39	7.9	92.4	-2.5	8.2	23.1	366	562
	3 Year Av.	69.5	0.38	8.6	92.4	-2.5	7.8	24.0	357	504
Central	<8.5	70.5	0.45	6.5	92.2	-2.4	8.2	15.2	332	540
	8.5-9.4	70.9	0.43	7.5	92.3	-2.3	8.4	17.6	347	520
Soft White	9.5-10.4	71.0	0.41	8.2	92.5	-2.4	8.0	19.2	332	440
Wheat Estimated	10.5-12.0	70.6	0.43	9.2	92.4	-2.4	8.1	22.6	375	460
Production =	>12.0	67.2	0.41	11.0	92.3	-2.2	7.4	28.6	364	545
1.23 MMT	2006 Av.	70.0	0.43	8.8	92.3	-2.3	8.0	21.5	357	496
	2005 Av.	64.8	0.34	8.3	92.5	-2.5	8.4	24.5	389	464
	3 Year Av.	67.9	0.39	8.7	92.4	-2.5	7.8	23.2	373	508
Southeast	<8.5	71.7	0.40	6.4	92.7	-2.4	8.1	13.9	323	485
	8.5-9.4	70.9	0.42	6.9	92.5	-2.4	8.3	16.2	319	370
Soft White	9.5-10.4	71.8	0.46	8.3	92.3	-2.4	7.6	20.1	307	465
Wheat Estimated	10.5-12.0	67.9	0.46	9.2	92.3	-2.3	7.5	24.0	320	465
Production =	>12.0	67.0	0.45	10.6	92.3	-2.0	6.7	31.2	344	650
0.79 MMT	2006 Av.	69.3	0.45	8.8	92.4	-2.3	7.5	22.9	323	502
	2005 Av.	67.1	0.42	8.4	92.5	-2.4	7.6	23.6	348	503
	3 Year Av.	68.3	0.43	8.7	92.4	-2.4	7.3	22.2	344	496
White Club Wheat	2006 Av.	71.3	0.43	8.6	92.1	-2.1	7.2	17.8	343	620
	2005 Av.	67.6	0.39	7.6	92.5	-2.5	7.0	20.7	356	530
Estimated	3 Year Av.	69.3	0.40	8.3	92.3	-2.4	7.0	18.8	351	565
Production = 0.24 MMT										

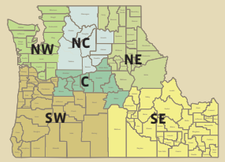


Physical Dough Properties

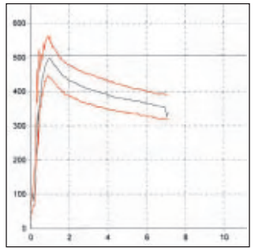
Production Zone	Wheat Protein Range 12% mb %	Farinograph Absorption 14% mb %	Farinograph Peak Time minutes	Farinograph Stability minutes	Alveograph P mm	Alveograph L mm	Alveograph P/L	Alveograph W 10^{-4} joules
North Central	<8.5	52.3	1.3	1.5	48	56	0.86	96
	8.5-9.4	52.5	1.5	3.3	36	86	0.42	100
Soft White Wheat Estimated Production = 1.26 MMT	9.5-10.4	53.5	1.4	4.9	53	88	0.60	144
	10.5-12.0	53.8	1.6	6.3	51	104	0.49	156
	>12.0	54.2	1.8	7.0	50	131	0.38	172
	2006 Average	53.2	1.5	4.6	47	93	0.48	132
	2005 Average	52.3	2.1	5.2	42	125	0.34	145
	3 Year Average	51.7	1.7	4.4	43	116	0.37	140
Northeast	<8.5	54.3	1.2	1.7	46	71	0.65	94
	8.5-9.4	53.6	1.4	3.8	50	96	0.52	140
Soft White Wheat Estimated Production = 1.91 MMT	9.5-10.4	53.7	1.4	4.1	38	106	0.36	103
	10.5-12.0	54.6	1.8	5.1	44	116	0.38	120
	>12.0	54.6	2.8	6.1	42	158	0.27	148
	2006 Average	54.2	1.8	4.7	42	117	0.37	121
	2005 Average	53.9	1.8	3.7	40	124	0.32	117
	3 Year Average	52.8	1.7	3.7	40	120	0.33	116
Central	<8.5	52.8	1.0	1.1	36	47	0.77	53
	8.5-9.4	53.8	1.4	1.5	41	83	0.49	88
Soft White Wheat Estimated Production = 1.23 MMT	9.5-10.4	54.2	1.5	3.1	45	82	0.55	97
	10.5-12.0	55.1	2.3	4.0	45	94	0.48	101
	>12.0	55.5	2.7	6.1	47	163	0.29	171
	2006 Average	54.5	1.9	3.4	44	99	0.44	107
	2005 Average	52.5	1.6	3.3	36	110	0.33	99
	3 Year Average	52.4	1.6	2.9	38	112	0.34	102
Southeast	<8.5	52.8	1.1	1.3	34	64	0.53	57
	8.5-9.4	52.9	1.2	1.3	29	63	0.46	40
Soft White Wheat Estimated Production = 0.79 MMT	9.5-10.4	53.6	1.5	2.3	34	97	0.35	72
	10.5-12.0	52.8	2.1	4.6	34	133	0.26	92
	>12.0	53.5	2.9	5.5	35	194	0.18	142
	2006 Average	53.1	2.0	3.6	34	125	0.27	91
	2005 Average	53.1	1.7	3.2	29	117	0.25	71
	3 Year Average	52.3	1.6	2.9	31	118	0.26	77
White Club Wheat	2006 Average	52.9	1.2	1.8	30	77	0.39	52
	2005 Average	51.5	1.2	1.9	24	93	0.26	47
Estimated Production = 0.24 MMT	3 Year Average	51.2	1.1	1.5	26	85	0.31	46

Finished Products

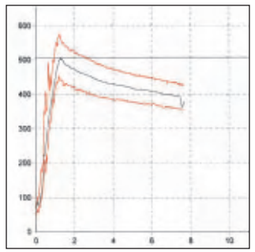
Production Zone	Wheat Protein Range 12% mb %	Sugar Snap Cookie Spread cm	Sugar Snap Cookie Spread Factor width/height	Sugar Snap Cookie Top Grain Score	Sponge Cake Volume cc	Sponge Cake Total Score	Chinese Southern Type Steamed Bread Specific Volume cc/g	Chinese Southern Type Steamed Bread Total Score
North Central	<8.5	8.4	8.7	3.5	1222	56	2.43	73
	8.5-9.4	8.4	8.7	3.0	1179	47	2.41	73
Soft White Wheat Estimated Production = 1.26 MMT	9.5-10.4	8.3	7.8	0.5	1160	46	2.56	71
	10.5-12.0	8.1	7.2	0.5	1179	54	2.54	72
	>12.0	8.1	6.9	0.0	1173	51	2.53	72
	2006 Average	8.2	7.9	1.5	1180	50	2.49	72
	2005 Average	8.3	—	1.5	1190	48	2.71	68
	3 Year Average	8.3	—	2.0	1214	49	2.60	69
Northeast	<8.5	8.0	7.7	2.0	1128	50	2.33	71
	8.5-9.4	8.1	7.9	1.0	1189	46	2.55	74
Soft White Wheat Estimated Production = 1.91 MMT	9.5-10.4	8.1	8.4	1.5	1177	51	2.47	69
	10.5-12.0	8.0	7.0	0.0	1139	44	2.35	71
	>12.0	7.9	7.2	0.0	1162	51	2.73	69
	2006 Average	8.0	7.6	0.7	1161	48	2.48	70
	2005 Average	8.2	—	2.5	1186	53	2.64	68
	3 Year Average	8.2	—	1.8	1179	49	2.62	69
Central	<8.5	8.3	8.5	2.5	1194	53	2.37	69
	8.5-9.4	8.2	8.3	2.0	1139	47	2.36	70
Soft White Wheat Estimated Production = 1.23 MMT	9.5-10.4	8.0	6.8	0.5	1146	53	2.42	66
	10.5-12.0	7.9	6.2	0.0	1099	43	2.44	70
	>12.0	7.9	7.0	0.0	1198	51	2.64	70
	2006 Average	8.0	7.1	0.8	1143	48	2.45	69
	2005 Average	8.0	—	1.1	1182	49	2.60	67
	3 Year Average	8.1	—	1.4	1177	48	2.57	68
Southeast	<8.5	8.4	8.8	4.0	1162	54	2.21	69
	8.5-9.4	8.5	9.4	4.0	1187	55	2.26	66
Soft White Wheat Estimated Production = 0.79 MMT	9.5-10.4	8.2	7.2	1.0	1154	49	2.24	69
	10.5-12.0	8.1	7.5	0.5	1168	52	2.55	69
	>12.0	8.1	7.7	0.0	1182	51	2.55	75
	2006 Average	8.2	7.8	1.2	1168	52	2.42	70
	2005 Average	8.4	—	2.5	1189	53	2.63	65
	3 Year Average	8.4	—	2.4	1195	51	2.54	67
White Club Wheat	2006 Average	8.5	8.9	2.0	1221	53	2.60	67
	2005 Average	8.7	—	5.0	1164	46	2.57	62
Estimated Production = 0.24 MMT	3 Year Average	8.7	—	3.7	1217	49	2.70	66



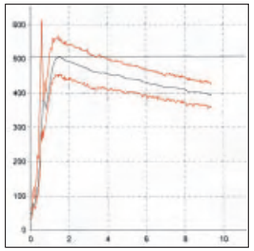
Farinograph



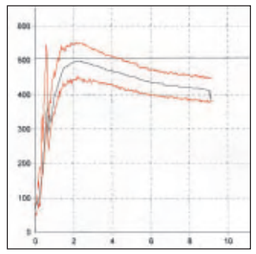
<8.5 % Wheat Protein Range



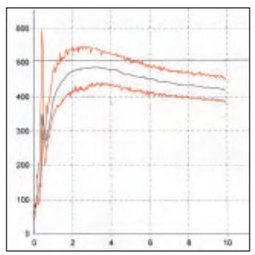
8.5-9.4% Wheat Protein Range



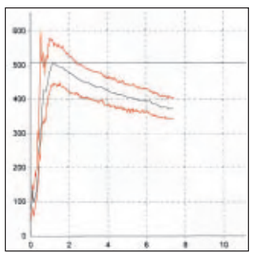
9.5-10.4% Wheat Protein Range



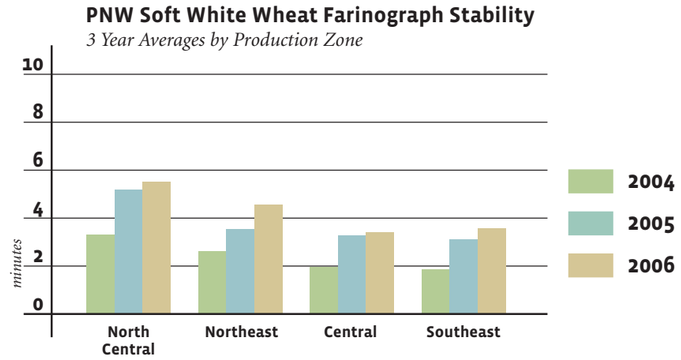
10.5-12% Wheat Protein Range

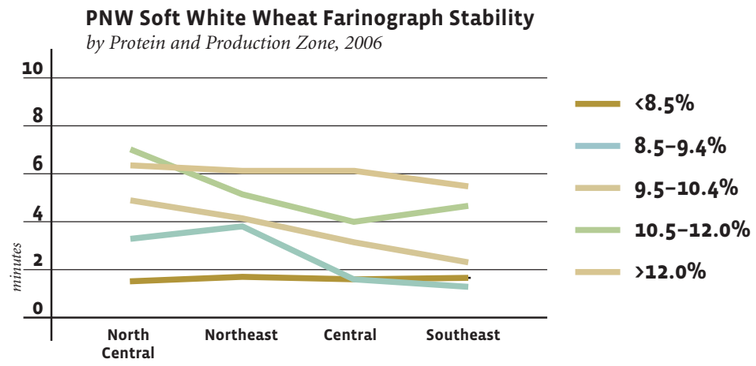


>12% Wheat Protein Range

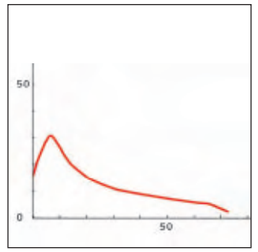


White Club Wheat

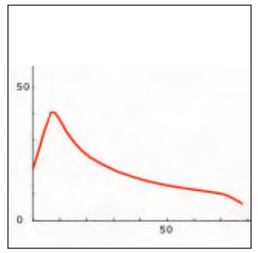




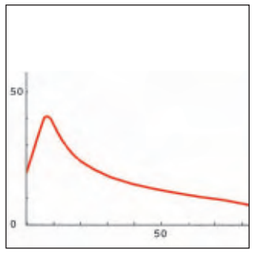
Alveograph



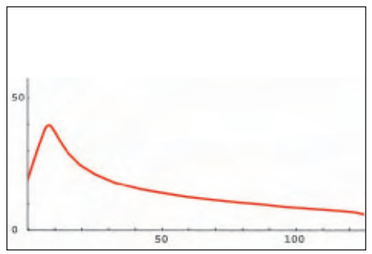
<8.5 % Wheat Protein Range



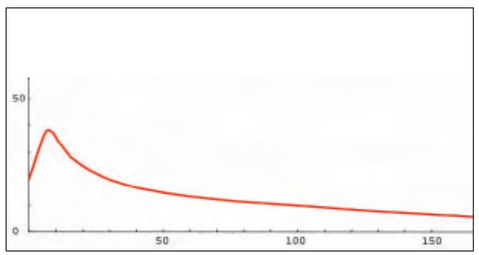
8.5-9.4% Wheat Protein Range



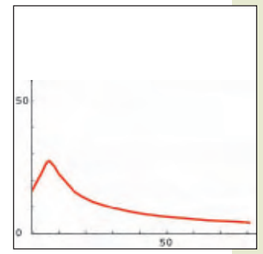
9.5-10.4% Wheat Protein Range



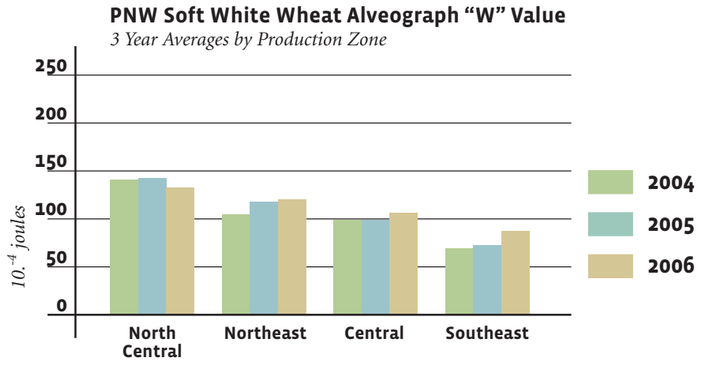
10.5-12% Wheat Protein Range

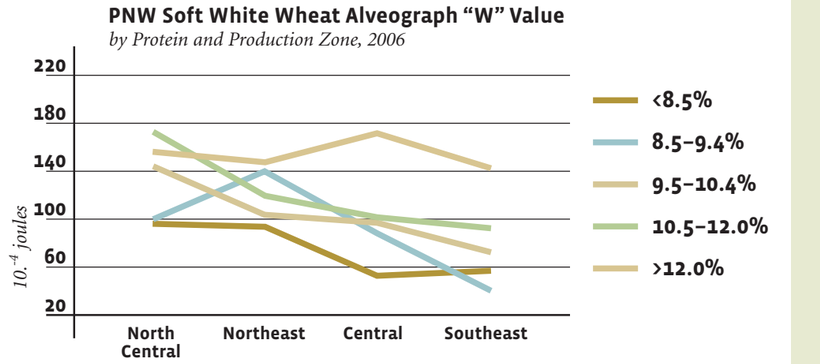


>12% Wheat Protein Range

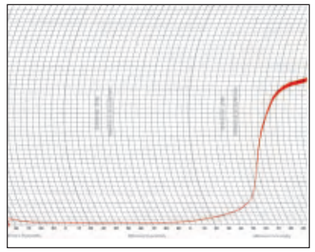


White Club Wheat

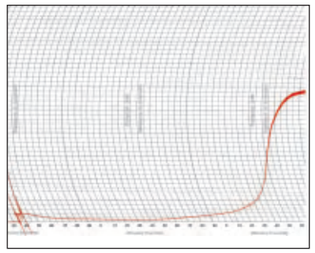




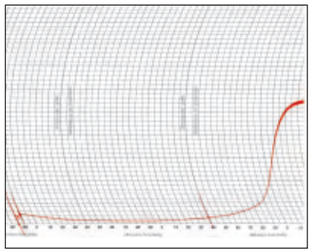
Amylograph



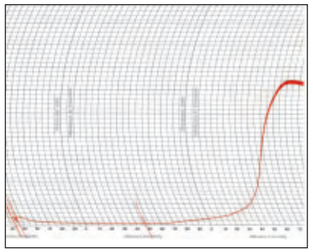
North Central Production Zone



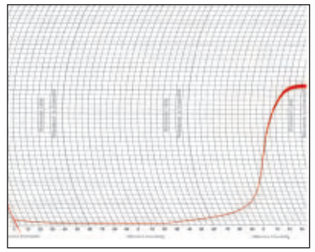
Northeast Production Zone



Central Production Zone

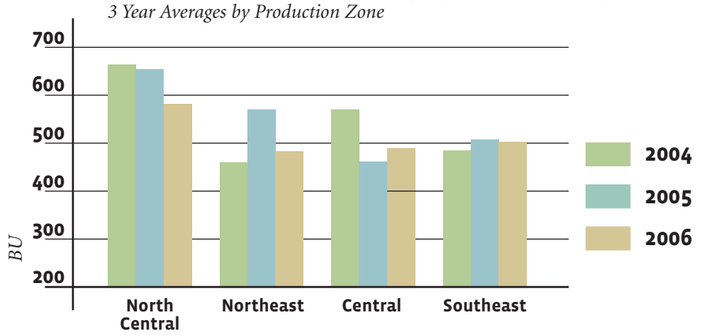


Southeast Production Zone

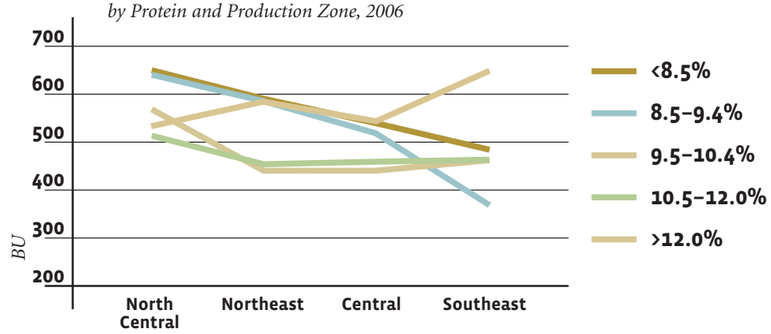


White Club Wheat

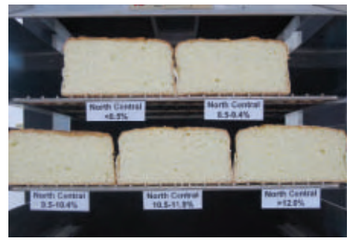
PNW Soft White Wheat Amylograph Peak Viscosity
3 Year Averages by Production Zone



PNW Soft White Wheat Amylograph Peak Viscosity
by Protein and Production Zone, 2006



Sponge Cake

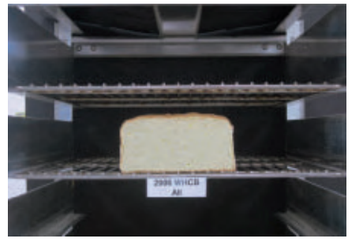


North Central Production Zone

Northeast Production Zone

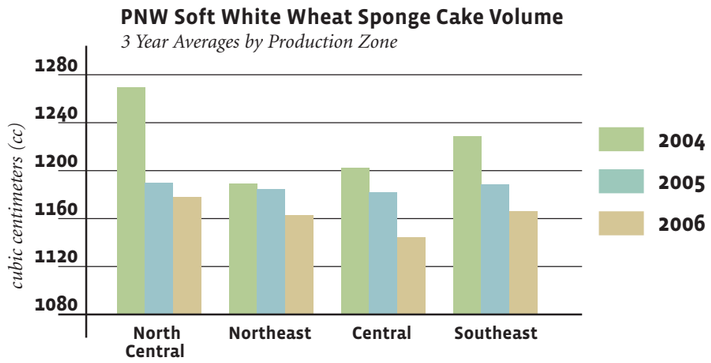
Central Production Zone

Southeast Production Zone

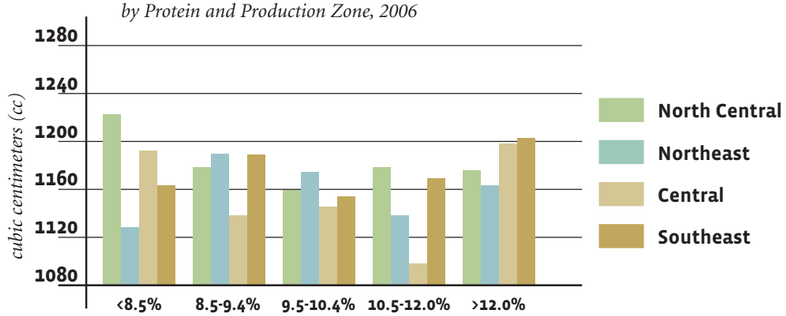


White Club Wheat

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, 2006



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 zone and protein levels. These composite samples were analyzed for wheat and flour quality, physical dough properties, and finished product characteristics for the 2004, 2005, and 2006 harvests. Information on the 2006 harvest is summarized as follows:

Wheat Quality

Wheat data indicated good test weights at most protein levels in all of the production zones. The Southeast Production Zone indicated generally higher dockage levels than the other production zones. Generally, low moisture wheat, less than 10%, prevailed in the major wheat producing zones of North Central, Northeast, Central, and Southeast. Low wheat ash contents were present in

the North Central Production Zone. Wheat samples from the Central Production Zone had high thousand kernel weights.

Flour Quality

Flour quality parameters indicated higher wet gluten contents in wheat samples with higher protein levels. Average falling number values in the North Central, Northeast, Central, and Southeast Production Zones were greater than 300 seconds at all protein ranges. Amylograph peak viscosities above 500 BU were present in all protein ranges in samples from the North Central Production Zone.

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 generally weaker gluten strength than soft white wheat.

Finished Products

Finished product tests indicated that good sugar snap cookies were made using low protein samples from the North Central, Northeast, Central, and Southeast Production Zones. Average sponge cake scores and volumes were higher in samples from the North Central and Southeast Production Zones. Steamed bread specific volumes generally increased with increasing protein content.

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