



2011 Harvest
U.S. PACIFIC NORTHWEST
Soft White Wheat Quality Report

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

THE PACIFIC NORTHWEST

Roy Chung



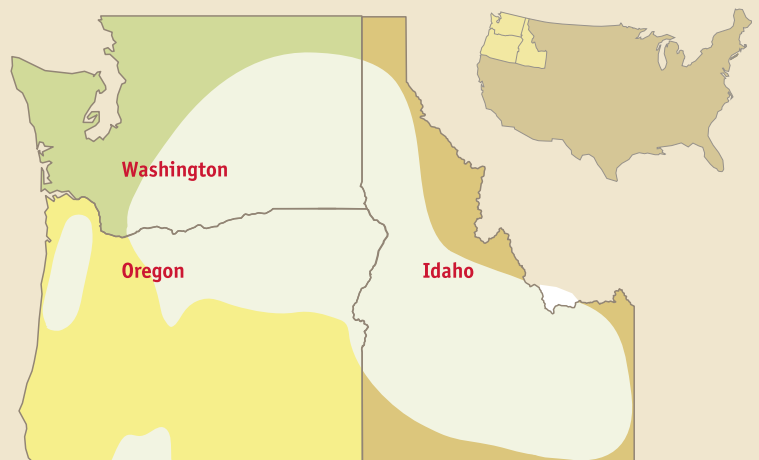
Barges transport wheat from farms in Idaho, Oregon and Washington to export terminals in the Columbia River District.

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

Wheat Growing Areas of the Pacific Northwest



Cover photo: John McManigal

WHEAT PRODUCTION ZONES



John McManigal



Wheat Samples

At harvest, National Agricultural Statistics Service collected 395 soft white wheat and 67 white club wheat samples this year, based on wheat production. Federal Grain Inspection Service (FGIS) graded each sample. Wheat Marketing Center conducted wheat, flour, dough, and finished product tests on

composites based on production zones and protein levels. The major soft white wheat varieties were ORCF-102, Louise, Brundage, ORCF-101, Eltan, Stephens, and Tubbs06. The major club wheat variety was Bruehl.

2011 Weather

The Pacific Northwest had adequate soil moisture at

planting. Most of the wheat production area received adequate rainfall during the winter and spring.

Generally cool temperatures prevailed during the growing season. Dry conditions prevailed during the wheat harvest with some localized rain showers.



2011 Soft White and White Club Wheat Production

By production zone

Wheat production estimates courtesy of Washington Grain Commission

Production Zone	Million Metric Tons (MMT)	Million Bushels
North Central	2.04	74.9
Northeast	2.09	76.8
Central	1.60	58.8
Southeast	0.87	32.0
Southwest	0.55	20.2
Northwest	0.01	0.4
Total	7.16	263.1

Top and middle photos: Roy Chung; lab photo: Nate Trivette

W H E A T Q U A L I T Y

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	60.6	0.2	9.5	303	1.21	34.5	28	14.1	
	8.5-9.4	1SWH	60.9	0.6	9.3	316	1.23	35.4	35	19.6	
	Soft White	9.5-10.4	1SWH	61.7	0.1	9.2	327	1.13	33.8	38	26.5
	Wheat Estimated	10.5-12.0	1SWH	61.0	0.6	9.5	318	1.28	33.6	36	31.8
	Production =	>12.0	1SWH	61.8	0.3	9.1	332	1.41	34.1	38	33.1
	1.71 MMT	2011 Average	1SWH	60.9	0.4	9.4	314	1.23	34.6	33	21.2
		2010 Average	1SWH	60.1	0.5	9.3	349	1.28	33.2	32	22.5
	3 Year Average	1SWH	60.1	0.5	9.4	336	1.27	32.8	31	25.2	
Northeast	<8.5	1SWH	61.1	0.5	9.5	301	1.37	32.0	34	10.8	
	8.5-9.4	1SWH	61.8	0.5	9.5	284	1.35	35.5	33	18.6	
	Soft White	9.5-10.4	1SWH	61.7	0.6	9.4	313	1.30	34.2	35	24.0
	Wheat Estimated	10.5-12.0	1SWH	61.9	0.6	9.5	317	1.38	32.9	39	27.2
	Production =	>12.0	3SWH	57.7	1.5	8.3	331	1.43	28.8	40	35.1
	2.09 MMT	2011 Average	1SWH	61.5	0.6	9.4	302	1.34	33.8	35	20.0
		2010 Average	2SWH	59.5	0.6	9.4	334	1.41	31.5	38	21.7
	3 Year Average	2SWH	59.1	0.6	9.8	321	1.39	32.3	32	25.7	
Central	<8.5	1SWH	61.1	0.4	9.6	311	1.22	35.8	33	8.3	
	8.5-9.4	1SWH	61.2	0.4	9.5	317	1.26	34.2	39	19.8	
	Soft White	9.5-10.4	1SWH	61.2	0.3	9.3	327	1.35	34.8	38	22.7
	Wheat Estimated	10.5-12.0	1SWH	61.1	0.5	9.7	307	1.40	35.6	38	24.3
	Production =	2011 Average	1SWH	61.1	0.4	9.5	314	1.28	35.2	36	15.7
	1.55 MMT	2010 Average	1SWH	60.4	0.6	9.1	337	1.34	34.3	37	20.1
		3 Year Average	2SWH	59.8	0.5	9.0	336	1.34	33.4	36	23.9
Southeast	<8.5	1SWH	61.0	0.3	9.5	324	1.47	37.1	35	8.8	
	8.5-9.4	1SWH	61.1	1.2	9.3	315	1.51	36.7	33	19.5	
	Soft White	9.5-10.4	1SWH	61.2	1.0	9.4	321	1.45	34.8	36	22.4
	Wheat Estimated	10.5-12.0	1SWH	60.5	1.2	9.4	313	1.61	33.5	36	24.9
	Production =	>12.0	1SWH	61.6	0.5	10.8	331	1.62	33.7	42	30.9
	0.87 MMT	2011 Average	1SWH	61.0	1.0	9.5	318	1.51	35.0	35	21.9
		2010 Average	1SWH	60.4	0.7	9.8	317	1.56	35.3	30	21.9
	3 Year Average	1SWH	60.1	0.9	9.5	320	1.58	35.4	31	23.1	
Southwest	<8.5	1SWH	60.7	0.4	11.9	297	1.38	39.7	35	15.6	
	8.5-9.4	1SWH	61.0	0.5	11.3	304	1.47	38.1	36	19.6	
	Soft White	9.5-10.4	1SWH	61.4	0.5	11.1	330	1.45	35.5	38	24.0
	Wheat Estimated	2011 Average	1SWH	60.9	0.4	11.6	307	1.41	38.3	36	18.5
	Production =	2010 Average	1SWH	60.6	0.5	11.0	324	1.47	35.7	37	18.0
	0.43 MMT	3 Year Average	1SWH	60.8	0.5	11.2	323	1.41	38.6	37	19.1
White Club Wheat	2011 Average	1WHCB	59.9	1.0	9.2	284	1.23	33.0	35	13.1	
	2010 Average	1WHCB	60.0	1.1	9.4	338	1.29	32.7	36	18.2	
	3 Year Average	1WHCB	59.7	1.0	9.2	317	1.29	31.2	33	19.1	
Estimated Production = 0.50 MMT											

FLOUR QUALITY

Production Zone	Wheat Protein Range 12% mb %	Flour Yield %	Flour Ash 14% mb %	Flour Protein 14% mb %	Flour Color			Wet Gluten 14% mb %	Falling Number 14% mb seconds	Amylograph Peak Viscosity BU
					L*	a*	b*			
North Central	<8.5	75.0	0.48	6.4	92.3	-2.6	8.1	12.0	339	421
	8.5-9.4	76.0	0.49	7.6	92.3	-2.5	8.0	15.5	341	419
Soft White	9.5-10.4	75.2	0.47	8.7	92.3	-2.5	8.2	20.4	353	486
Wheat Estimated	10.5-12.0	74.8	0.52	10.3	91.5	-2.3	7.9	31.2	385	508
Production =	>12.0	73.7	0.55	12.0	91.5	-2.1	7.1	31.7	351	556
1.71 MMT	2011 Av.	75.3	0.49	7.9	92.1	-2.5	8.0	18.3	350	446
	2010 Av.	71.3	0.45	8.4	92.3	-2.5	8.1	17.7	368	525
	3 Year Av.	70.9	0.43	9.1	92.7	-2.5	8.0	21.4	371	555
Northeast	<8.5	76.7	0.50	7.0	92.1	-2.5	8.3	13.8	354	429
	8.5-9.4	76.6	0.49	7.8	91.8	-2.4	8.1	17.0	343	421
Soft White	9.5-10.4	76.2	0.49	8.7	91.7	-2.5	8.4	21.5	329	428
Wheat Estimated	10.5-12.0	76.4	0.52	9.9	91.6	-2.3	8.0	25.1	327	429
Production =	>12.0	76.4	0.56	11.6	91.2	-2.4	8.5	28.7	404	576
2.09 MMT	2011 Av.	76.5	0.50	8.3	91.8	-2.4	8.2	19.0	341	430
	2010 Av.	71.3	0.47	8.6	91.9	-2.5	8.4	20.7	347	505
	3 Year Av.	71.3	0.43	9.2	92.4	-2.4	8.0	23.5	336	485
Central	<8.5	75.7	0.49	6.6	91.7	-2.6	8.4	10.9	323	560
	8.5-9.4	76.2	0.50	8.1	91.5	-2.5	8.4	15.6	334	525
Soft White	9.5-10.4	74.4	0.47	8.9	91.2	-2.4	8.0	19.5	367	519
Wheat Estimated	10.5-12.0	76.1	0.51	9.9	91.0	-2.3	8.2	26.2	332	384
Production =	>12.0	75.7	0.49	7.8	91.5	-2.5	8.3	15.6	333	519
1.55 MMT	2011 Av.	75.7	0.49	7.8	91.5	-2.5	8.3	15.6	333	519
	2010 Av.	71.2	0.47	8.0	91.9	-2.5	8.4	18.4	359	567
	3 Year Av.	70.9	0.44	9.0	92.4	-2.5	8.2	22.3	350	558
Southeast	<8.5	77.5	0.53	7.4	91.3	-2.4	8.0	13.7	344	508
	8.5-9.4	77.3	0.51	7.9	91.1	-2.5	8.1	17.5	354	479
Soft White	9.5-10.4	77.1	0.53	8.9	90.8	-2.3	7.9	21.1	320	462
Wheat Estimated	10.5-12.0	75.9	0.56	9.9	90.8	-2.2	7.8	25.3	313	442
Production =	>12.0	74.6	0.58	11.0	90.3	-2.0	7.1	30.9	339	415
0.87 MMT	2011 Av.	76.7	0.54	8.9	90.9	-2.3	7.9	21.3	328	461
	2010 Av.	71.3	0.48	8.5	92.2	-2.4	8.2	21.7	329	462
	3 year Av.	71.5	0.45	8.7	92.6	-2.4	7.9	21.2	339	465
Southwest	<8.5	75.8	0.53	6.7	90.6	-2.6	8.5	12.1	314	326
	8.5-9.4	74.4	0.53	7.6	90.8	-2.4	8.0	17.5	316	419
Soft White	9.5-10.4	75.9	0.50	8.8	90.2	-2.2	7.6	22.0	323	260
Wheat Estimated	10.5-12.0	75.6	0.52	7.5	90.5	-2.4	8.2	15.7	317	319
Production =	>12.0	69.8	0.48	7.4	92.0	-2.3	8.1	14.6	328	507
0.43 MMT	2011 Av.	75.6	0.52	7.5	90.5	-2.4	8.2	15.7	317	319
	2010 Av.	69.8	0.48	7.4	92.0	-2.3	8.1	14.6	328	507
	3 Year Av.	71.6	0.44	7.7	92.5	-2.4	7.9	16.6	339	447
White Club	2011 Av.	77.1	0.48	8.0	92.3	-2.6	7.8	10.4	312	458
Wheat	2010 Av.	71.7	0.48	8.7	91.9	-2.4	8.0	18.7	349	554
Estimated	3 Year Av.	72.4	0.45	9.2	92.1	-2.3	7.6	19.5	356	517
Production =										
0.50 MMT										

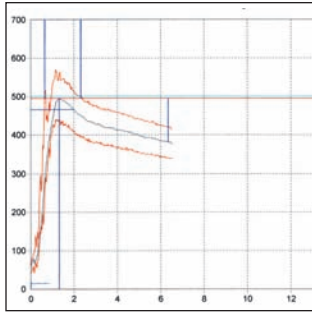
PHYSICAL DOUGH PROPERTIES

Production Zone	Wheat Protein Range 12% mb %	Farinograph			Alveograph				
		Absorption 14% mb %	Peak Time minutes	Stability minutes	P mm	L mm	P/L	W 10 ⁴ joules	
North Central	<8.5	51.8	1.4	1.9	46	72	0.64	89	
	8.5-9.4	52.8	1.4	2.0	39	79	0.49	79	
	Soft White	9.5-10.4	53.6	2.2	3.8	45	111	0.41	118
	Wheat Estimated	10.5-12.0	54.2	3.2	4.3	40	161	0.25	122
	Production =	>12.0	55.7	3.3	4.5	36	189	0.19	129
	1.71 MMT	2011 Average	52.9	1.9	2.6	42	99	0.48	95
		2010 Average	51.6	2.1	5.0	42	122	0.36	128
	3 Year Average	54.5	2.2	5.1	54	119	0.50	163	
Northeast	<8.5	52.4	1.4	1.3	40	66	0.61	71	
	8.5-9.4	52.8	1.5	2.3	35	92	0.38	74	
	Soft White	9.5-10.4	53.5	1.5	2.8	39	105	0.37	89
	Wheat Estimated	10.5-12.0	54.4	2.1	3.1	36	127	0.28	85
	Production =	>12.0	54.7	2.8	3.7	40	192	0.21	133
	2.09 MMT	2011 Average	53.2	1.6	2.4	38	97	0.41	81
		2010 Average	52.1	2.2	3.9	36	114	0.36	97
	3 Year Average	54.6	2.3	4.3	48	120	0.47	132	
Central	<8.5	51.6	1.4	1.4	40	66	0.61	70	
	8.5-9.4	53.0	1.5	2.5	40	100	0.40	87	
	Soft White	9.5-10.4	53.3	1.4	3.1	40	115	0.35	100
	Wheat Estimated	10.5-12.0	53.4	2.3	3.0	34	143	0.24	81
	Production =	2011 Average	52.5	1.6	2.2	39	93	0.46	80
	1.55 MMT	2010 Average	52.2	1.5	2.7	36	96	0.43	84
		3 Year Average	54.9	1.9	3.2	49	98	0.59	114
Southeast	<8.5	53.9	1.3	2.1	38	48	0.79	53	
	8.5-9.4	52.7	1.4	1.7	32	83	0.39	53	
	Soft White	9.5-10.4	53.8	1.7	2.6	35	99	0.35	69
	Wheat Estimated	10.5-12.0	53.9	1.2	2.4	33	125	0.26	67
	Production =	>12.0	54.8	2.5	2.6	30	168	0.18	79
	0.87 MMT	2011 Average	53.6	1.5	2.3	34	102	0.36	64
		2010 Average	51.6	1.8	2.4	27	109	0.26	56
	3 Year Average	54.5	1.9	3.0	39	103	0.46	80	
Southwest	<8.5	53.3	1.2	1.1	40	50	0.80	57	
	8.5-9.4	53.7	1.4	1.8	35	79	0.44	64	
	Soft White	9.5-10.4	53.5	1.7	3.4	36	125	0.29	91
	Wheat Estimated	2011 Average	53.4	1.4	1.9	38	76	0.61	68
	Production =	2010 Average	52.3	1.2	2.5	39	90	0.54	77
	0.43 MMT	3 Year Average	55.3	1.4	2.6	52	73	0.91	95
White Club Wheat	2011 Average	51.2	1.4	1.5	24	71	0.34	38	
	2010 Average	50.7	2.0	2.1	24	112	0.21	53	
	Estimated	3 Year Average	52.8	1.5	2.1	35	87	0.50	59
Production =									
0.50 MMT									

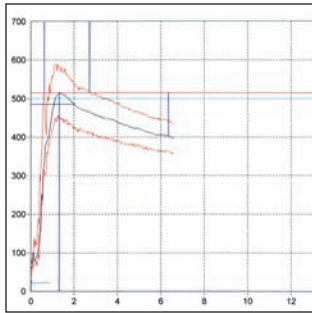
FINISHED PRODUCTS

Production Zone	Wheat Protein Range 12% mb %	Sugar Snap Cookie			Sponge Cake		Chinese Southern Type Steamed Bread		
		Spread cm	Spread Factor width/height	Top Grain Score	Volume cc	Total Score	Specific Volume cc/g	Total Score	
North Central	<8.5	9.0	11.3	7.0	1245	53	1.84	68	
	8.5-9.4	8.8	11.0	4.5	1240	51	2.02	68	
	Soft White	9.5-10.4	8.8	11.0	4.5	1193	42	2.18	70
	Wheat Estimated	10.5-12.0	8.4	9.1	3.5	1153	41	2.27	70
	Production =	>12.0	8.4	8.9	3.0	1168	45	2.35	69
	1.71 MMT	2011 Average	8.8	10.7	5.1	1219	49	2.03	69
		2010 Average	9.0	11.5	3.7	1227	50	2.26	67
	3 Year Average	8.3	9.1	1.9	1194	50	2.27	67	
Northeast	<8.5	8.7	10.3	6.5	1208	56	1.99	67	
	8.5-9.4	8.8	11.0	6.0	1193	54	2.03	67	
	Soft White	9.5-10.4	8.6	10.4	5.0	1173	53	2.11	69
	Wheat Estimated	10.5-12.0	8.6	9.6	3.0	1181	53	2.13	69
	Production =	>12.0	8.4	8.9	0.5	1169	33	2.45	69
	2.09 MMT	2011 Average	8.7	10.4	5.3	1188	53	2.07	68
		2010 Average	8.8	10.5	4.5	1223	51	2.23	68
	3 Year Average	8.3	8.6	1.9	1193	50	2.30	68	
Central	<8.5	9.0	10.3	5.0	1201	47	1.97	65	
	8.5-9.4	8.7	10.3	5.0	1194	53	2.06	67	
	Soft White	9.5-10.4	8.6	9.5	5.0	1205	45	2.21	68
	Wheat Estimated	10.5-12.0	8.4	9.7	4.0	1197	45	2.24	67
	Production =	2011 Average	8.8	10.1	4.9	1199	48	2.07	66
	1.55 MMT	2010 Average	9.0	11.1	5.7	1221	51	2.14	66
		3 Year Average	8.3	8.6	2.1	1179	48	2.24	65
Southeast	<8.5	8.7	9.9	6.0	1196	54	2.02	65	
	8.5-9.4	9.0	11.3	7.0	1181	48	2.10	65	
	Soft White	9.5-10.4	8.7	9.2	5.0	1161	47	2.20	67
	Wheat Estimated	10.5-12.0	8.6	9.4	5.0	1167	41	2.36	64
	Production =	>12.0	8.6	9.1	3.5	1062	26	2.30	67
	0.87 MMT	2011 Average	8.7	9.7	5.4	1165	45	2.21	65
		2010 Average	9.2	11.8	4.6	1211	54	2.22	67
	3 Year Average	8.5	9.1	2.2	1190	54	2.20	67	
Southwest	<8.5	8.7	9.2	5.5	1168	45	1.95	67	
	8.5-9.4	8.6	9.5	5.0	1244	52	2.10	67	
	Soft White	9.5-10.4	8.7	9.0	5.0	1154	49	2.21	70
	Wheat Estimated	2011 Average	8.7	9.2	5.3	1174	47	2.04	67
	Production =	2010 Average	9.0	10.9	4.9	1220	53	2.15	67
	0.43 MMT	3 Year Average	8.3	8.7	2.4	1187	52	2.11	67
White Club Wheat	2011 Average	9.0	11.9	5.5	1247	53	2.13	68	
	2010 Average	9.5	13.4	7.5	1229	48	2.28	66	
	3 Year Average	8.7	10.7	3.7	1206	49	2.40	66	
Estimated Production =									
0.50 MMT									

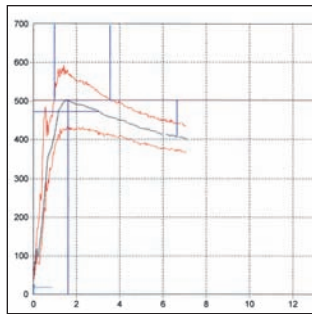
F A R I N O G R A P H



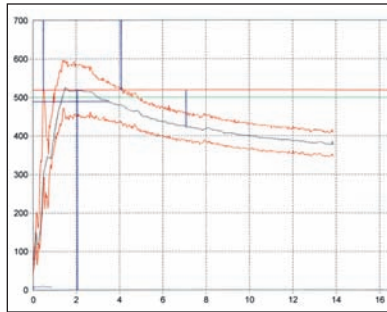
<8.5% Wheat Protein Range



8.5-9.4% Wheat Protein Range

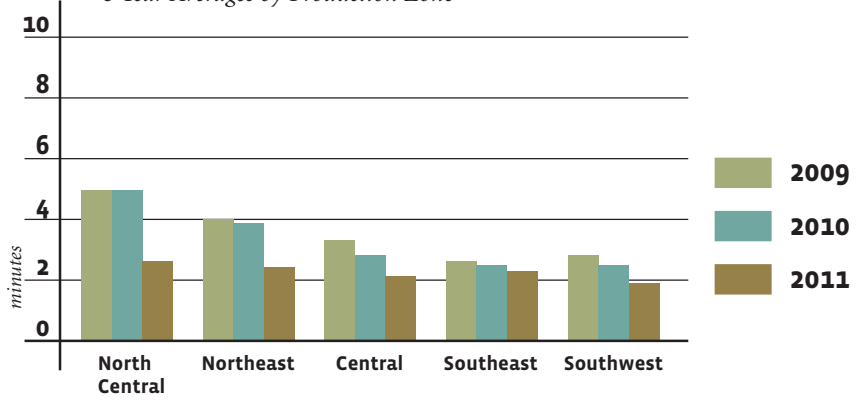


9.5-10.4% Wheat Protein Range

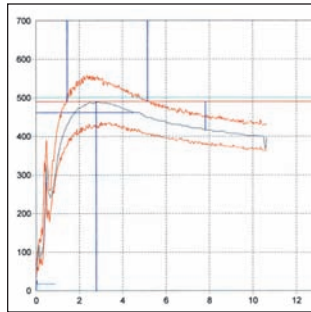
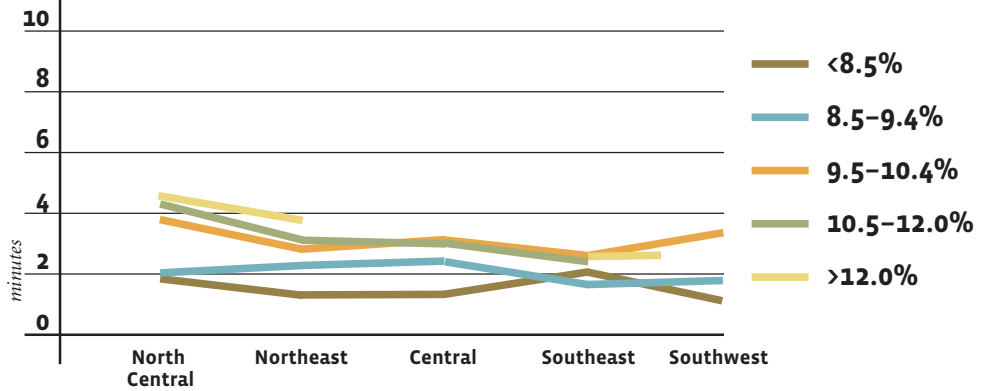


10.5-12.0% Wheat Protein Range

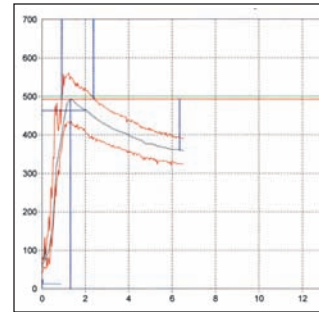
PNW Soft White Wheat Farinograph Stability
3 Year Averages by Production Zone



PNW Soft White Wheat Farinograph Stability
by Protein and Production Zone, 2011

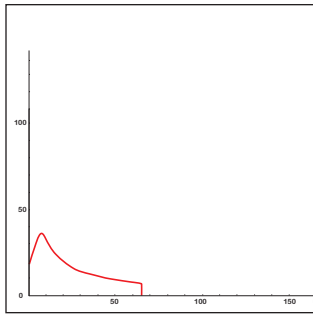


>12.0% Wheat Protein Range

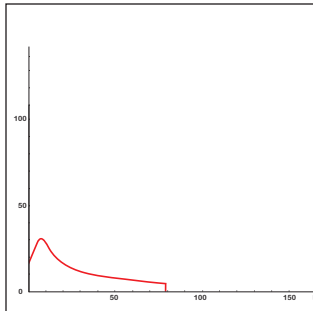


White Club Wheat

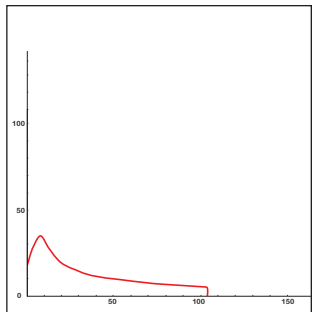
ALVEOGRAPH



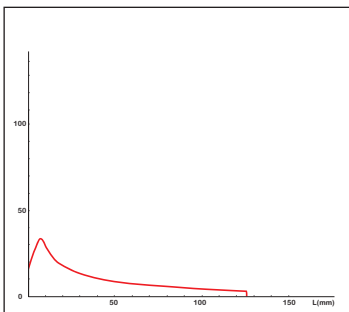
<8.5% Wheat Protein Range



8.5-9.4% Wheat Protein Range

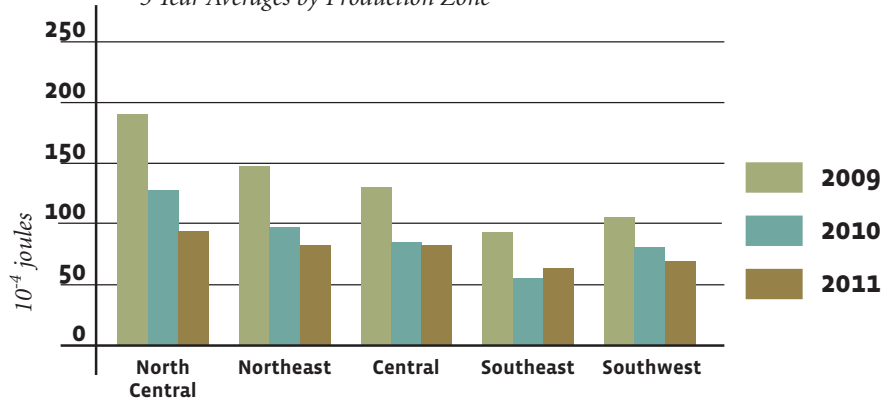


9.5-10.4% Wheat Protein Range

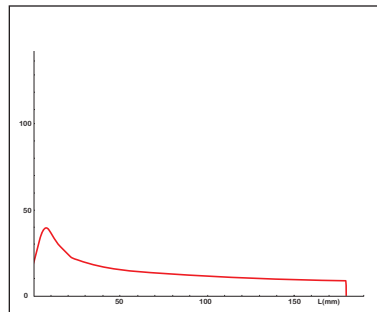
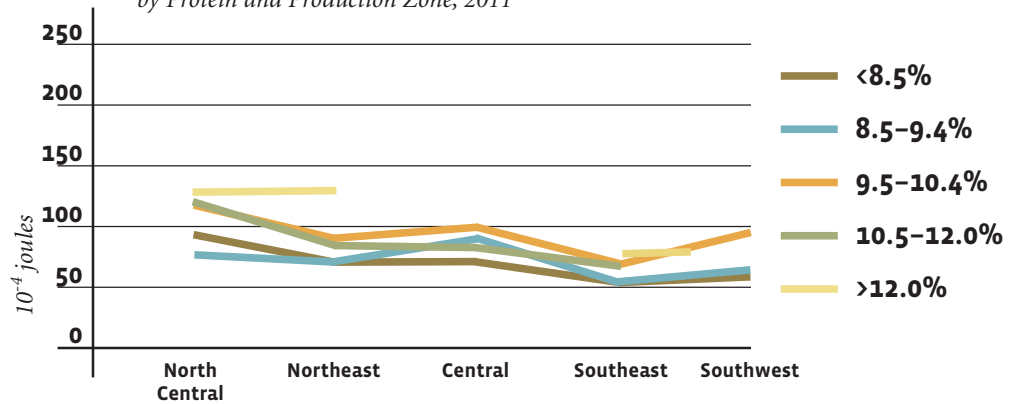


10.5-12.0% Wheat Protein Range

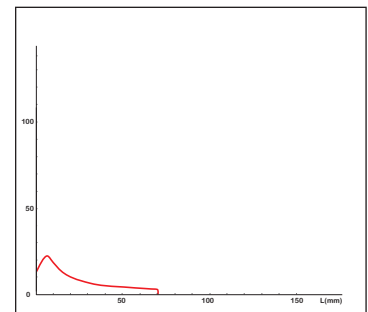
PNW Soft White Wheat Alveograph "W" Value
3 Year Averages by Production Zone



PNW Soft White Wheat Alveograph "W" Value
by Protein and Production Zone, 2011

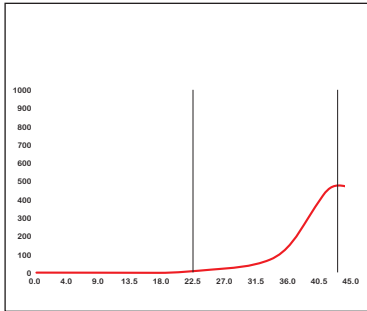


>12.0% Wheat Protein Range

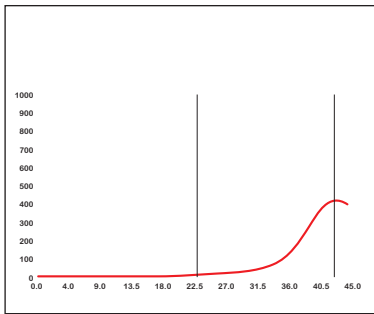


White Club Wheat

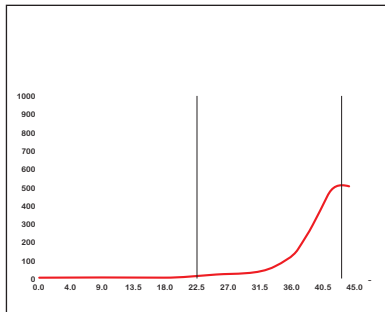
AMYLOGRAPH



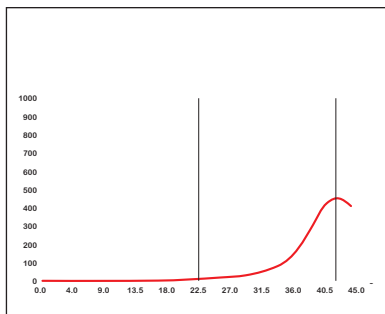
North Central Production Zone



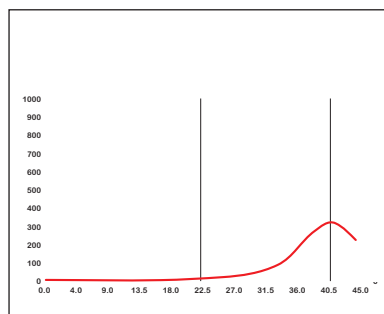
Northeast Production Zone



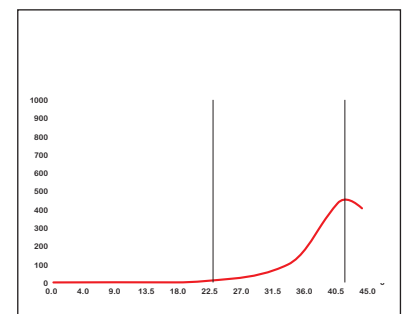
Central Production Zone



Southeast Production Zone

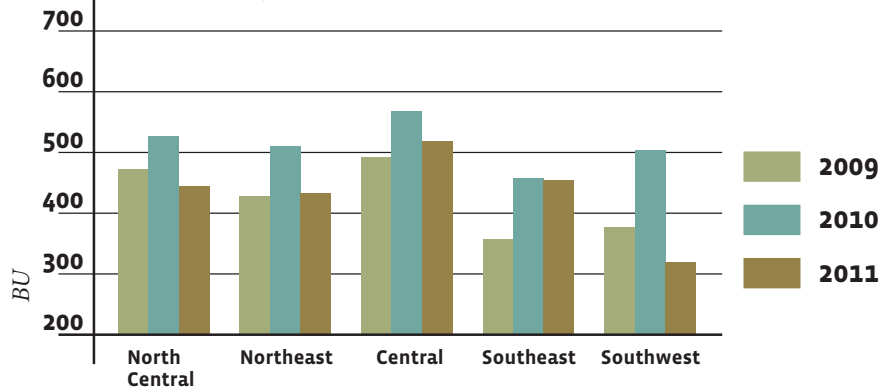


Southwest Production Zone

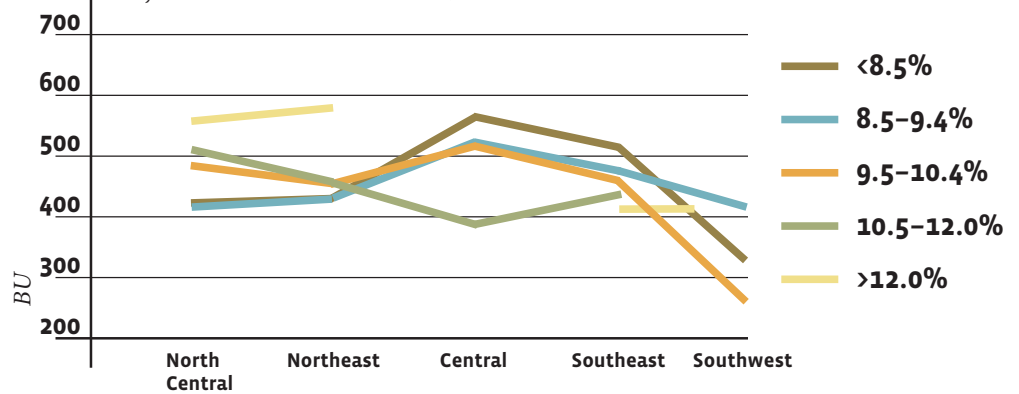


White Club Wheat

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

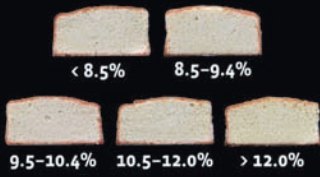


PNW Soft White Wheat Amylograph Peak Viscosity
by Protein and Production Zone, 2011

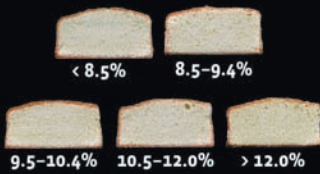


SPONGE CAKE

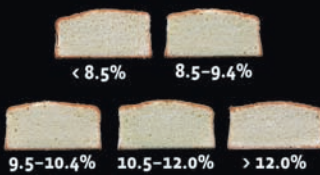
North Central Production Zone



Northeast Production Zone



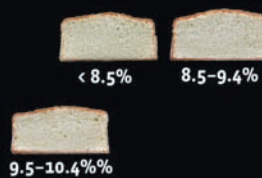
Central Production Zone



Southeast Production Zone



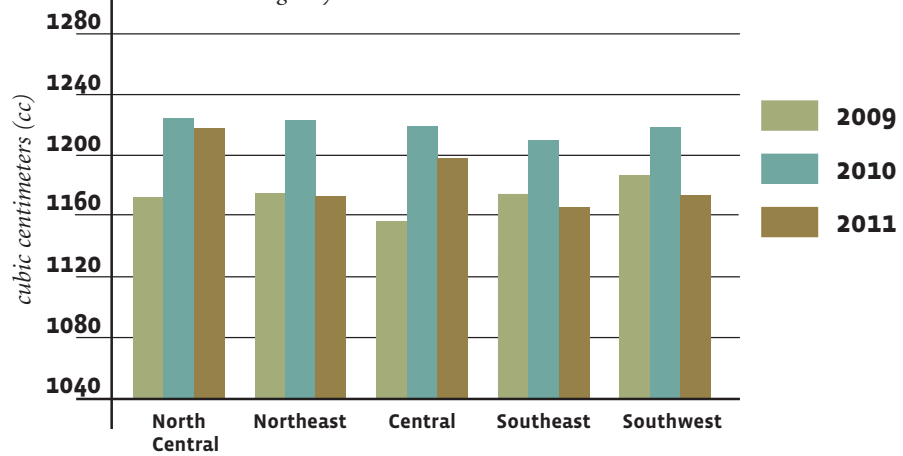
Southwest Production Zone



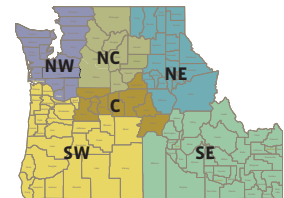
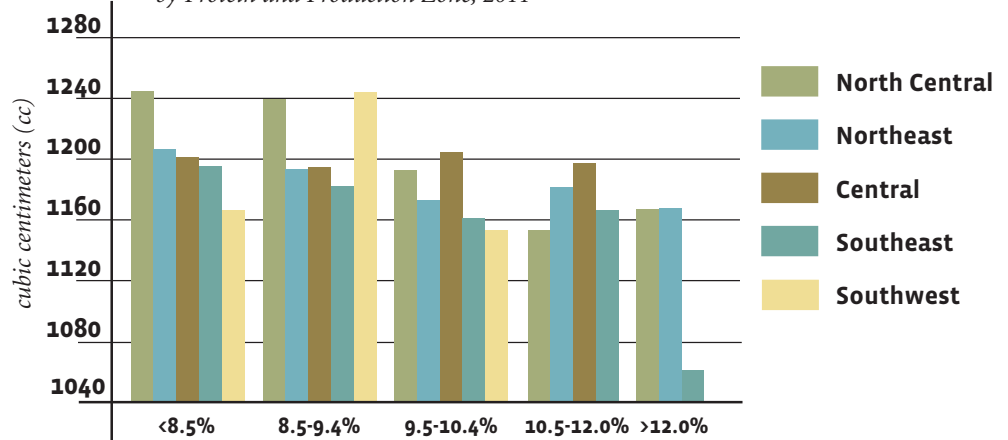
White Club Wheat



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, 2011



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. One composite sample was prepared from all club wheat samples. These composite samples were analyzed for wheat quality, flour quality, physical dough properties, and finished product characteristics. Harvest information is summarized as follows:

Wheat Quality

Wheat data indicated generally higher test weights at most protein levels in most production zones when compared to the three year averages. Dockage levels were similar to the three year averages in most 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, Northeast, Central,



and Southeast. Average falling number values in North Central, Central, and Southeast production zones were greater than 300 seconds at all protein ranges. Low wheat ash contents were present in the North Central, Northeast, Central and Southeast Production Zones. Wheat samples from North Central, Northeast, Central and Southwest production zones had thousand kernel weights greater than last year.

Flour Quality

Flour quality parameters indicated higher wet gluten contents in samples with higher protein content.

Falling number values were greater than 300 seconds at all protein ranges in all production zones.

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

Physical Dough Properties

Physical dough property tests indicated low average water absorption values and weak gluten strength, as measured by the farinograph, in samples with lower protein content. Longer gluten extensi-

bility, as shown by alveograph L values, was observed in samples with higher protein content. White club wheat had weaker gluten strength than most soft white wheat samples, 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 lower in all production zones when compared to last year. Steamed bread specific volumes generally increased with increasing protein content.

