

2013 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

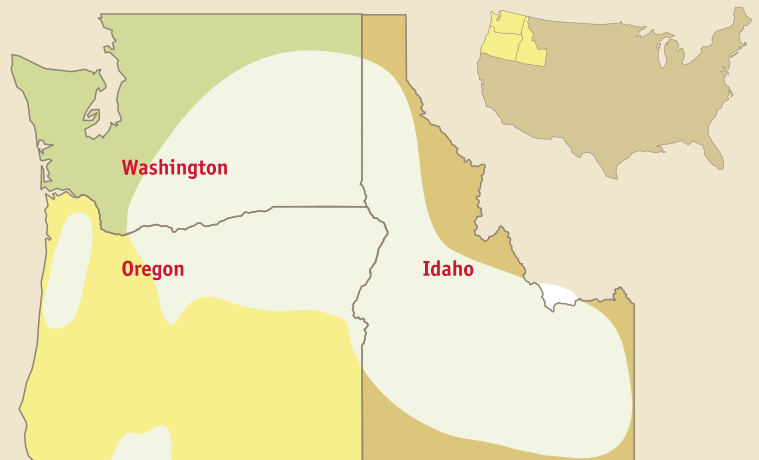


Pacific Northwest soft white wheat is known for its white bran, low moisture content, and weak dough strength characteristics. Soft white wheat is well suited for products such as cakes, pastries, cookies, crackers, pancakes, sponge cakes, snack foods, flat breads, and Chinese southern-type steamed breads.

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.

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

Wheat Growing Areas of the Pacific Northwest



Cover photo: Peter Roise
Above: Lamont

WHEAT PRODUCTION ZONES



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. Sample collection was based on wheat production. For the 2013 harvest, Wheat Marketing Center received 464 soft white wheat and 72 white club wheat samples from the states of Idaho, Oregon, and Washington. 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- 101, ORCF-102, Xerpha, Westbred 528, and Eltan. The major club wheat variety was Bruehl.

2013 Weather

The Pacific Northwest had limited to adequate soil moisture at planting. Most of



the wheat production area received adequate rainfall during the winter and spring. Timely rains occurred in May and June. Generally cool temperatures prevailed during the growing season. Hot, dry conditions occurred during the end of wheat kernel development and continued during wheat harvest. Some, limited wheat growing areas received rainfall at harvest.



2013 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	1.86	68.3
Northeast	1.86	68.3
Central	1.24	45.6
Southeast	0.74	27.3
Southwest	0.47	17.1
Northwest	0.03	1.0
Total	6.20	227.6



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	60.9	0.2	9.7	337	1.21	38.4	31	14.8
Soft White Wheat Estimated Production = 1.64 MMT	8.5-9.4	1SWH	60.1	0.5	9.2	338	1.26	36.6	28	18.9
	9.5-10.4	1SWH	60.9	0.8	9.5	350	1.24	37.4	25	21.4
	10.5-12.0	1SWH	61.2	0.5	8.8	367	1.23	33.9	33	28.2
	>12.0	1SWH	60.3	0.3	9.2	361	1.33	33.5	25	28.6
	2013 Average	1SWH	60.7	0.5	9.2	352	1.25	35.8	29	23.0
	2012 Average	1SWH	61.6	0.3	8.8	348	1.28	34.5	34	22.7
	3 Year Average	1SWH	60.9	0.4	9.2	337	1.26	34.1	33	22.1
Northeast	8.5-9.4	1SWH	61.4	0.3	9.1	317	1.34	36.9	27	22.1
Soft White Wheat Estimated Production = 1.78 MMT	9.5-10.4	1SWH	61.1	0.5	9.6	319	1.33	35.8	31	22.5
	10.5-12.0	1SWH	61.2	0.5	9.7	365	1.31	35.2	26	24.7
	2013 Average	1SWH	61.2	0.5	9.6	340	1.32	35.7	28	23.5
	2012 Average	1SWH	61.9	0.3	9.1	341	1.34	34.6	34	21.6
	3 Year Average	1SWH	61.0	0.5	9.3	326	1.36	33.3	36	21.1
Central	<8.5	1SWH	61.3	0.2	9.6	328	1.29	38.4	33	15.4
Soft White Wheat Estimated Production = 1.21 MMT	8.5-9.4	1SWH	61.5	0.5	8.9	346	1.31	38.1	32	18.9
	9.5-10.4	1SWH	60.9	0.4	8.5	359	1.29	35.7	34	21.1
	10.5-12.0	1SWH	60.6	1.1	8.6	378	1.31	32.3	38	26.4
	>12.0	1SWH	60.4	0.6	8.6	397	1.44	31.7	39	29.2
	2013 Average	1SWH	61.0	0.6	8.8	362	1.32	35.2	35	22.3
	2012 Average	1SWH	61.4	0.4	9.9	338	1.28	36.2	39	20.5
3 Year Average	1SWH	61.0	0.5	9.5	330	1.30	35.2	37	18.8	
Southeast	8.5-9.4	1SWH	61.3	0.6	9.1	329	1.52	36.6	33	17.4
Soft White Wheat Estimated Production = 0.74 MMT	9.5-10.4	1SWH	61.2	0.5	9.2	343	1.53	35.7	30	19.3
	10.5-12.0	1SWH	60.2	0.6	8.8	356	1.58	34.9	34	19.8
	2013 Average	1SWH	60.9	0.6	9.0	343	1.54	35.7	32	18.9
	2012 Average	1SWH	61.8	0.1	9.0	337	1.53	36.4	32	21.0
	3 Year Average	1SWH	61.1	0.6	9.4	324	1.53	35.6	33	21.6
Southwest	<8.5	1SWH	61.6	0.4	11.8	354	1.34	45.2	32	17.3
Soft White Wheat Estimated Production = 0.47 MMT	8.5-9.4	1SWH	61.4	0.3	11.2	323	1.42	39.4	31	21.8
	9.5-10.4	1SWH	61.3	0.2	10.4	380	1.49	37.1	33	22.4
	10.5-12.0	1SWH	61.7	0.4	10.0	331	1.53	32.5	36	25.9
	2013 Average	1SWH	61.5	0.3	10.9	342	1.44	38.7	32	21.9
	2012 Average	1SWH	61.5	0.3	10.6	316	1.42	37.3	36	19.1
	3 Year Average	1SWH	61.0	0.4	11.0	316	1.43	37.1	36	18.5
White Club Wheat	2013 Average	1WHCB	60.7	0.6	9.0	330	1.28	35.1	32	16.3
Estimated Production = 0.32 MMT	2012 Average	1WHCB	60.3	0.7	8.9	308	1.31	33.3	32	17.4
	3 Year Average	1WHCB	60.1	0.9	9.2	310	1.28	33.0	34	16.2

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	76.9	0.45	7.0	91.9	-2.5	8.0	16.1	376	470
	8.5-9.4	75.6	0.46	7.8	91.4	-2.5	7.8	19.0	379	444
Soft White Wheat Estimated	9.5-10.4	75.7	0.45	8.6	91.9	-2.4	7.7	22.2	383	435
Production = 1.64 MMT	10.5-12.0	74.2	0.46	10.0	91.6	-2.4	7.8	27.0	403	496
	>12.0	74.6	0.49	11.2	91.7	-2.2	7.4	32.1	380	509
	2013 Av.	75.2	0.46	9.0	91.7	-2.4	7.8	23.3	387	468
	2012 Av.	77.0	0.47	9.0	91.9	-2.4	7.7	21.7	342	486
	3 Year Av.	74.5	0.47	8.5	92.1	-2.5	7.9	19.2	353	486
Northeast	8.5-9.4	77.7	0.47	8.2	90.8	-2.4	7.7	20.8	356	462
	9.5-10.4	76.9	0.44	8.8	92.5	-2.4	7.8	22.8	361	473
Soft White Wheat Estimated	10.5-12.0	77.3	0.45	10.0	92.0	-2.1	7.3	27.1	344	580
Production = 1.78 MMT	2013 Av.	77.2	0.45	9.3	92.0	-2.3	7.6	24.5	352	521
	2012 Av.	77.7	0.47	8.9	91.6	-2.4	8.0	18.9	350	451
	3 Year Av.	75.1	0.48	8.6	91.8	-2.4	8.2	19.5	346	462
Central	<8.5	77.0	0.46	7.4	92.4	-2.6	8.6	15.2	370	471
	8.5-9.4	76.3	0.46	7.9	91.7	-2.5	8.3	19.8	370	481
Soft White Wheat Estimated	9.5-10.4	76.4	0.45	8.8	92.4	-2.5	8.3	24.1	389	516
Production = 1.21 MMT	10.5-12.0	74.9	0.47	10.4	90.7	-2.3	7.9	29.4	392	551
	>12.0	73.9	0.45	12.2	91.8	-2.2	7.9	42.6	402	555
	2013 Av.	75.8	0.46	9.2	91.7	-2.4	8.2	25.6	384	516
	2012 Av.	77.0	0.50	8.6	92.2	-2.5	8.5	21.4	349	502
	3 Year Av.	74.6	0.49	8.1	91.9	-2.5	8.4	18.5	347	529
Southeast	8.5-9.4	77.3	0.47	8.1	92.3	-2.4	8.1	22.2	371	444
	9.5-10.4	76.3	0.49	8.7	92.0	-2.4	7.9	25.8	362	422
Soft White Wheat Estimated	10.5-12.0	76.3	0.54	10.4	92.1	-2.3	8.2	34.0	405	455
Production = 0.74 MMT	2013 Av.	76.6	0.50	9.1	92.1	-2.4	8.1	27.4	379	440
	2012 Av.	76.6	0.55	9.1	92.0	-2.4	8.1	23.0	352	429
	3 Year Av.	74.9	0.52	8.8	91.7	-2.4	8.1	22.0	336	451
Southwest	<8.5	77.0	0.46	7.3	92.3	-2.5	8.3	17.3	338	429
	8.5-9.4	76.1	0.48	7.9	92.4	-2.3	7.6	20.2	338	450
Soft White Wheat Estimated	9.5-10.4	75.8	0.48	8.3	92.0	-2.3	7.6	21.4	386	566
Production = 0.47 MMT	10.5-12.0	75.7	0.52	10.2	91.7	-2.1	7.3	29.0	362	560
	2013 Av.	76.1	0.49	8.3	92.2	-2.3	7.7	21.6	352	491
	2012 Av.	76.8	0.54	8.1	91.7	-2.3	7.7	17.4	333	427
	3 Year Av.	74.1	0.51	7.7	91.4	-2.3	8.0	15.9	326	418
White Club Wheat	2013 Av.	76.7	0.46	9.4	91.3	-2.3	7.3	24.3	356	372
	2012 Av.	75.3	0.49	9.1	91.9	-2.4	7.7	23.5	353	464
Estimated Production = 0.32 MMT	3 Year Av.	74.7	0.48	8.6	92.0	-2.5	7.8	17.5	338	492

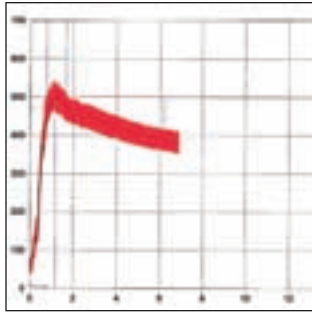
PHYSICAL DOUGH PROPERTIES

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	53.4	1.2	1.4	52	42	1.24	72
Soft White Wheat Estimated Production = 1.64 MMT	8.5-9.4	53.2	1.4	2.3	53	79	0.67	120
	9.5-10.4	53.7	1.5	3.2	51	98	0.52	127
	10.5-12.0	53.7	3.2	4.1	52	139	0.37	167
	>12.0	54.2	3.3	3.3	38	197	0.19	146
	2013 Average	53.6	2.2	3.1	50	111	0.55	134
	2012 Average	53.8	2.3	3.9	45	130	0.38	126
3 Year Average	52.8	2.1	3.8	43	117	0.41	116	
Northeast	8.5-9.4	52.1	1.4	2.0	38	93	0.41	84
Soft White Wheat Estimated Production = 1.78 MMT	9.5-10.4	52.8	1.4	2.2	45	99	0.45	101
	10.5-12.0	52.9	2.9	3.1	37	140	0.26	107
	2013 Average	52.7	2.1	2.6	40	117	0.36	101
	2012 Average	52.9	1.5	3.2	35	135	0.27	96
	3 Year Average	52.7	1.8	3.2	36	115	0.35	91
Central	<8.5	52.2	1.4	1.5	44	73	0.60	85
Soft White Wheat Estimated Production = 1.21 MMT	8.5-9.4	52.7	1.7	2.2	37	83	0.45	74
	9.5-10.4	53.3	1.8	2.3	42	87	0.48	89
	10.5-12.0	54.0	2.4	2.5	36	130	0.28	91
	>12.0	55.8	2.7	2.3	36	157	0.23	96
	2013 Average	53.5	2.0	2.2	39	104	0.40	86
	2012 Average	54.3	1.7	2.5	42	102	0.48	89
3 Year Average	53.0	1.6	2.5	39	97	0.45	84	
Southeast	8.5-9.4	52.3	1.4	1.5	33	79	0.42	57
Soft White Wheat Estimated Production = 0.74 MMT	9.5-10.4	52.6	1.2	1.5	32	100	0.32	61
	10.5-12.0	53.4	2.0	1.9	33	102	0.32	60
	2013 Average	52.8	1.5	1.6	33	94	0.35	59
	2012 Average	53.9	1.7	2.4	32	101	0.32	60
	3 Year Average	53.0	1.7	2.4	31	104	0.31	60
Southwest	<8.5	53.4	1.2	0.9	46	53	0.87	69
Soft White Wheat Estimated Production = 0.47 MMT	8.5-9.4	52.3	1.5	2.7	39	81	0.48	81
	9.5-10.4	51.9	1.4	3.2	40	97	0.41	94
	10.5-12.0	53.5	3.0	3.6	37	166	0.22	119
	2013 Average	52.7	1.7	2.6	40	96	0.49	89
	2012 Average	53.8	1.9	3.0	44	107	0.48	99
	3 Year Average	53.2	1.5	2.4	40	91	0.54	81
White Club Wheat	2013 Average	52.5	1.7	1.6	31	91	0.34	56
Estimated Production = 0.32 MMT	2012 Average	51.9	1.3	1.9	28	98	0.29	53
	3 Year Average	51.3	1.6	1.8	25	94	0.28	48

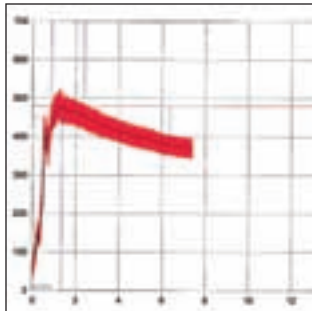
FINISHED PRODUCTS

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	8.9	10.4	5.5	1298	56	1.69	65
Soft White Wheat Estimated Production = 1.64 MMT	8.5-9.4	8.6	9.6	5.0	1274	54	1.71	67
	9.5-10.4	8.5	9.5	3.5	1220	48	1.85	66
	10.5-12.0	8.6	9.2	0.5	1207	46	1.95	68
	>12.0	8.6	9.2	1.0	1263	49	1.97	68
	2013 Average	8.6	9.5	2.9	1244	50	1.84	67
	2012 Average	8.6	9.8	3.6	1190	47	2.24	68
	3 Year Average	8.8	10.7	4.1	1212	48	2.18	68
Northeast	8.5-9.4	8.7	10.9	5.5	1251	50	1.78	67
Soft White Wheat Estimated Production = 1.78 MMT	9.5-10.4	8.8	10.3	4.0	1260	51	1.92	68
	10.5-12.0	8.6	10.1	1.5	1215	47	1.97	68
	2013 Average	8.7	10.4	3.1	1237	49	1.92	68
	2012 Average	8.7	10.0	4.2	1215	50	2.16	69
	3 Year Average	8.7	10.3	4.7	1209	51	2.15	68
Central	<8.5	8.9	10.2	5.5	1270	51	1.75	66
Soft White Wheat Estimated Production = 1.21 MMT	8.5-9.4	8.9	10.4	4.5	1230	48	1.77	66
	9.5-10.4	8.7	9.9	4.0	1198	44	2.03	63
	10.5-12.0	8.5	9.4	2.0	1202	41	1.85	68
	>12.0	8.4	8.4	1.5	1233	44	2.12	64
	2013 Average	8.7	9.8	3.5	1219	45	1.90	65
	2012 Average	8.5	9.2	3.6	1196	51	2.08	68
3 Year Average	8.7	10.1	4.7	1205	50	2.09	67	
Southeast	8.5-9.4	8.8	10.6	5.0	1278	53	1.87	66
Soft White Wheat Estimated Production = 0.74 MMT	9.5-10.4	9.0	10.6	5.0	1243	53	1.98	62
	10.5-12.0	8.6	9.3	4.0	1230	44	2.04	60
	2013 Average	8.8	10.2	4.7	1249	50	1.97	63
	2012 Average	8.7	9.7	3.6	1218	51	2.05	68
	3 Year Average	8.9	10.4	4.6	1198	50	2.16	67
Southwest	<8.5	8.7	9.1	5.0	1274	54	1.78	66
Soft White Wheat Estimated Production = 0.47 MMT	8.5-9.4	8.7	9.7	5.0	1254	51	1.74	66
	9.5-10.4	8.8	9.7	5.0	1235	50	1.79	68
	10.5-12.0	8.5	8.5	1.0	1208	46	2.03	67
	2013 Average	8.7	9.3	4.2	1245	50	1.82	66
	2012 Average	8.6	9.4	3.5	1192	52	1.95	68
	3 Year Average	8.8	9.8	4.5	1195	51	2.05	67
White Club Wheat	2013 Average	8.9	11.1	4.0	1217	50	2.17	66
Estimated Production = 0.32 MMT	2012 Average	9.1	12.0	5.5	1239	53	2.25	66
	3 Year Average	9.2	12.4	6.2	1238	51	2.22	67

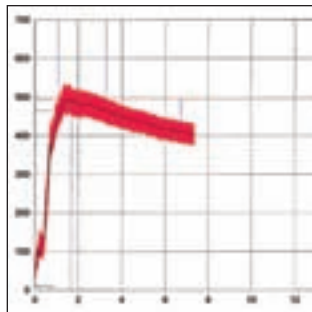
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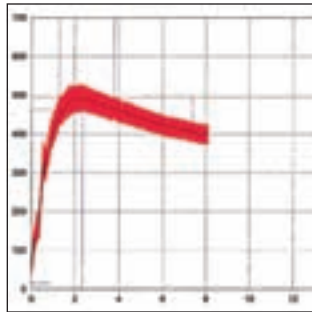
<8.5 % Wheat Protein Range



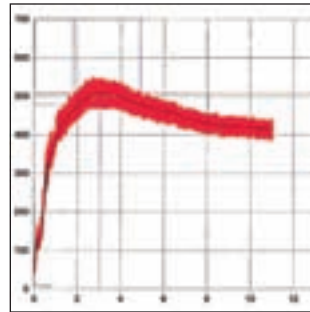
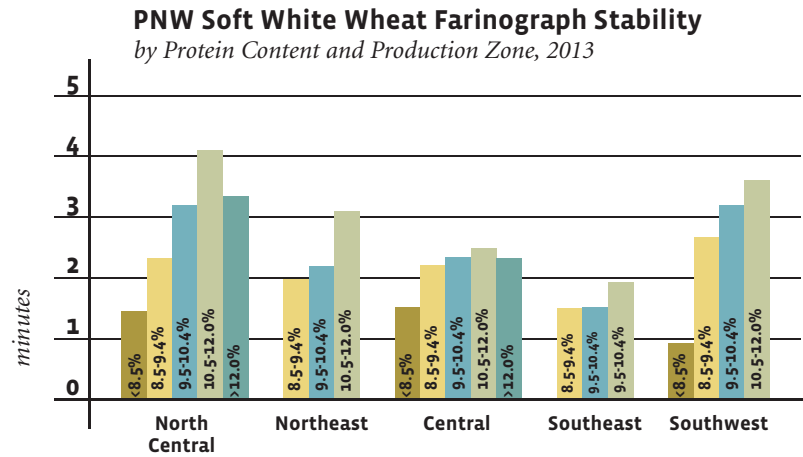
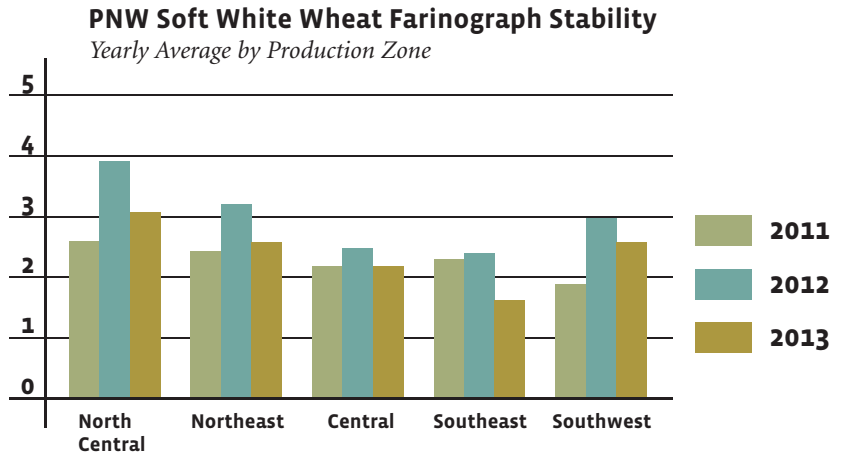
8.5-9.4% Wheat Protein Range



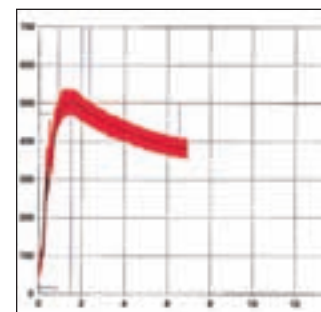
9.5-10.4% Wheat Protein Range



10.5-12.0% Wheat Protein Range

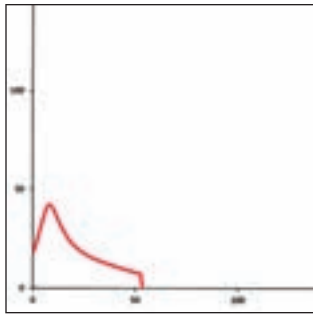


>12.0% Wheat Protein Range

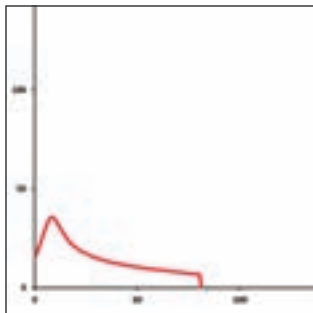


White Club Wheat

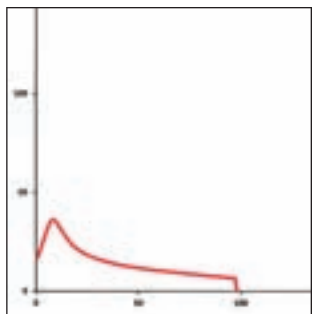
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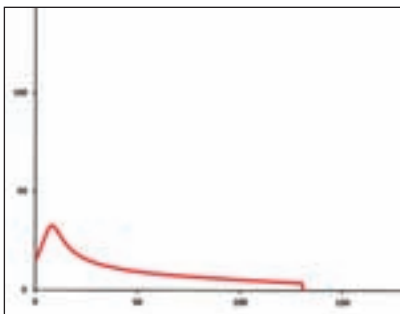
<8.5% Wheat Protein Range



8.5-9.4% Wheat Protein Range

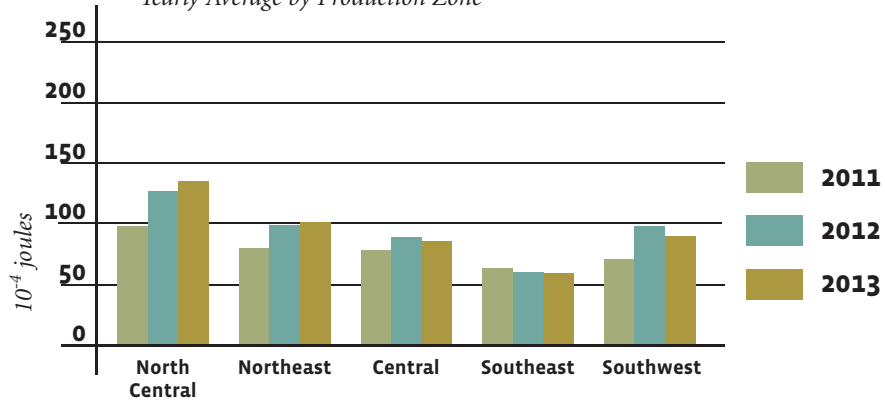


9.5-10.4% Wheat Protein Range

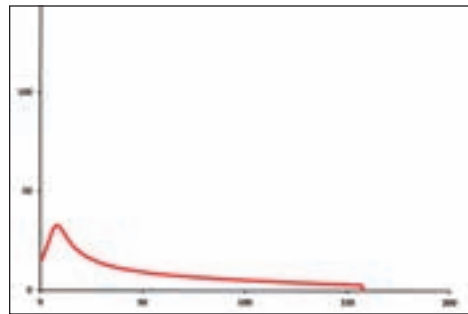
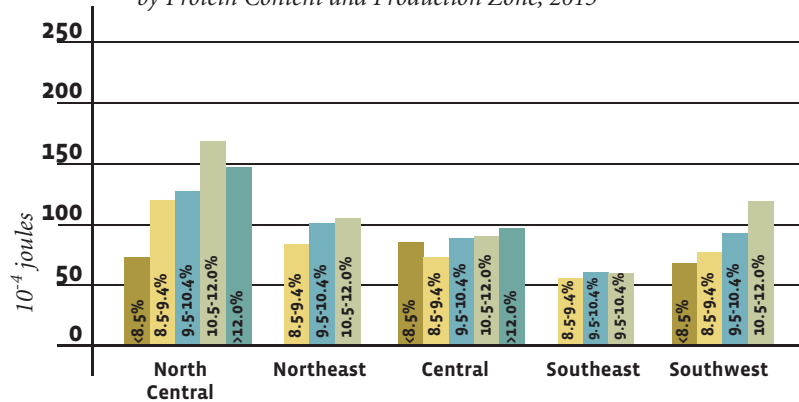


10.5-12.0% Wheat Protein Range

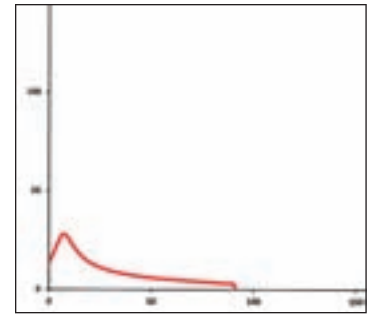
PNW Soft White Wheat Alveograph "W" Value
Yearly Average by Production Zone



PNW Soft White Wheat Alveograph "W" Value
by Protein Content and Production Zone, 2013

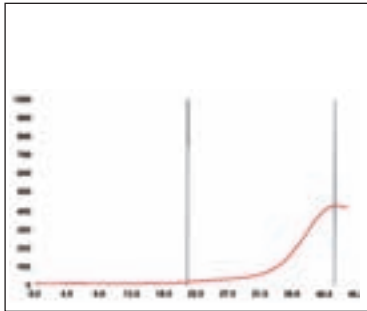


>12.0% Wheat Protein Range

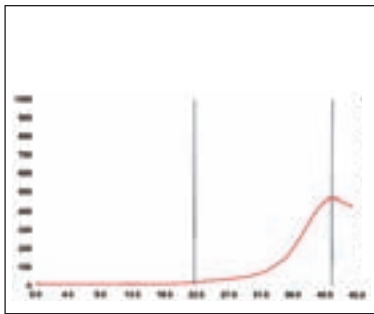


White Club Wheat

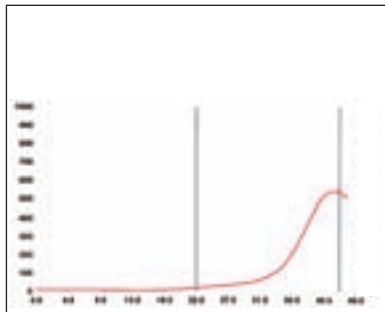
AMYLOGRAPH



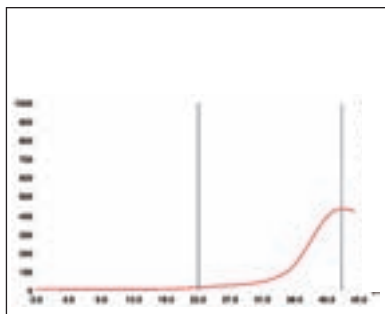
North Central Production Zone



Northeast Production Zone



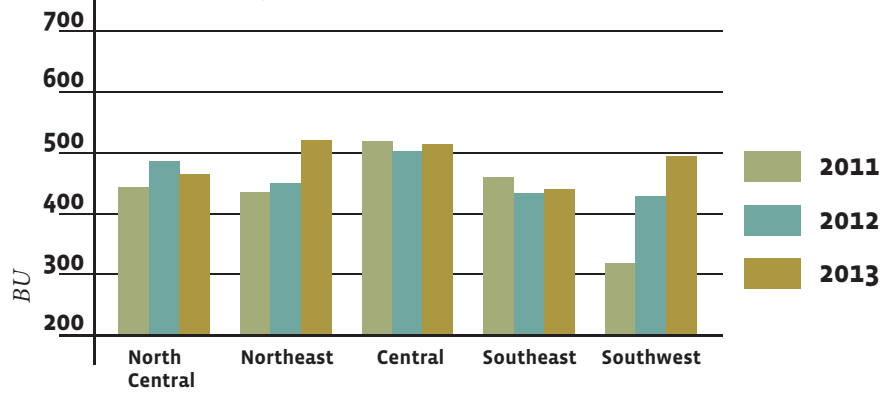
Central Production Zone



Southeast Production Zone

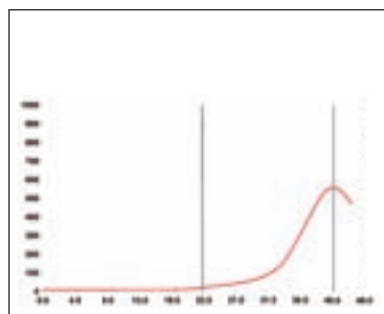
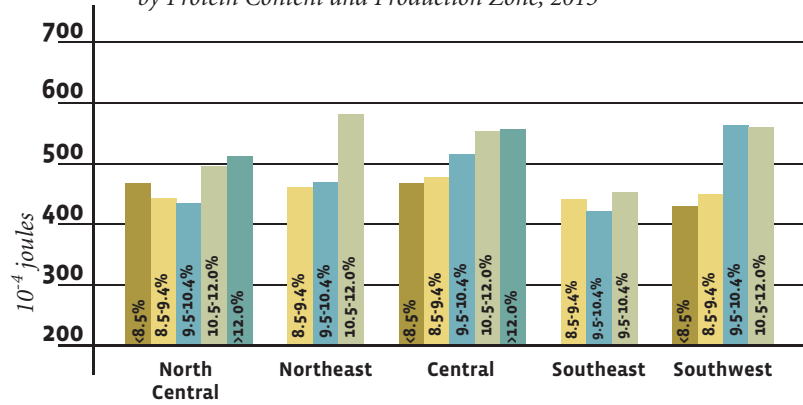
PNW Soft White Wheat Amylograph Peak Viscosity

Yearly Average by Production Zone

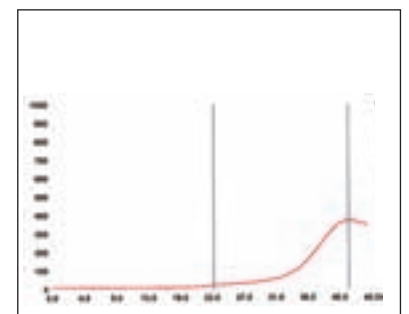


PNW Soft White Wheat Amylograph Peak Viscosity

by Protein Content and Production Zone, 2013



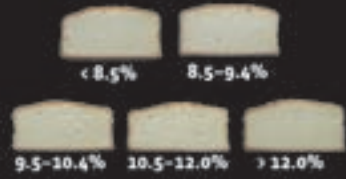
Southwest Production Zone



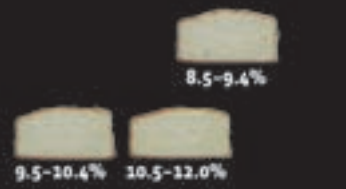
White Club Wheat

SPONGE CAKE

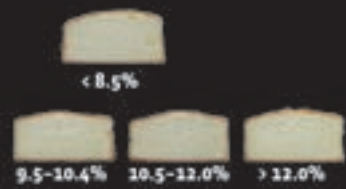
North Central Production Zone



Northeast Production Zone



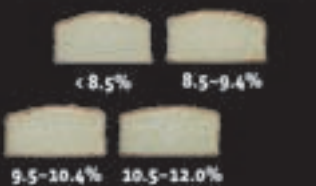
Central Production Zone



Southeast Production Zone



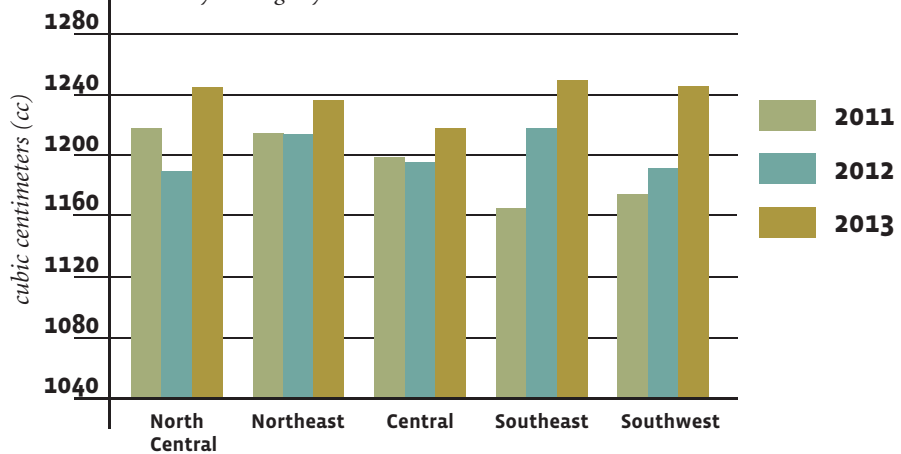
Southwest Production Zone



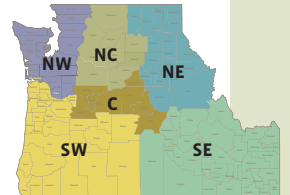
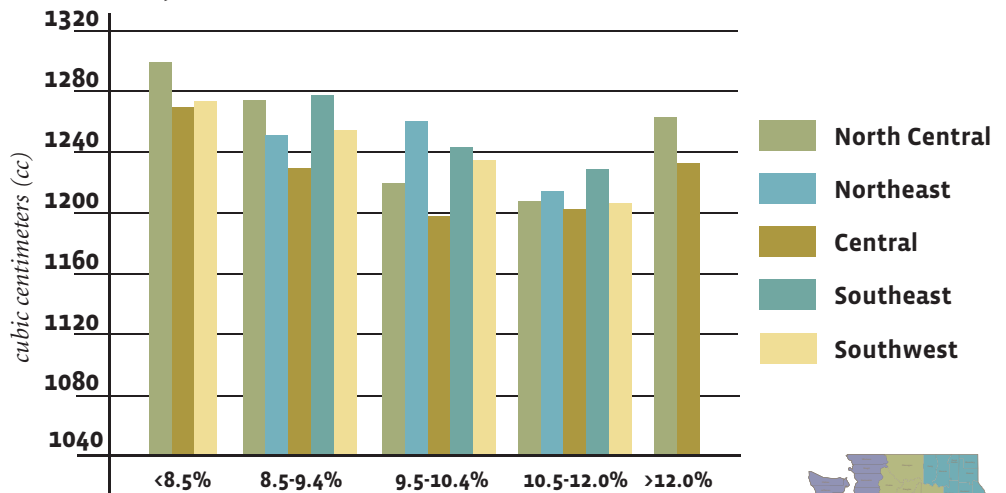
White Club Wheat



PNW Soft White Wheat Sponge Cake Volume
Yearly Average by Production Zone



PNW Soft White Wheat Sponge Cake Volume
by Protein Content and Production Zone, 2013



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 average test weights greater than 60 pounds per bushel (lbs/bu) at all protein levels in all production zones. Dockage levels were similar to the three year average in 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,



Northeast, Central, Southeast, and Southwest production zones were greater than 300 seconds at all protein ranges. Wheat ash contents were similar to the three year averages in the North Central, Northeast, Central, Southeast, and Southwest Production Zones. Wheat samples from North Central, Northeast, and Southwest production zones had thousand kernel weights greater than last year.

Flour Quality

Average flour extraction values were greater than the three-year averages at similar flour ash contents. Flour quality parameters indicated higher wet gluten contents in

samples with higher protein content. Flour 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, Northeast, Central, and Southwest production zones.

Physical Dough Properties

Physical dough property tests indicated generally lower average water absorption values and weak 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 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 higher in the North Central, Northeast, Central, Southeast, and Southwest production zones when compared to last year. Steamed bread specific volumes generally increased with increasing protein content.

