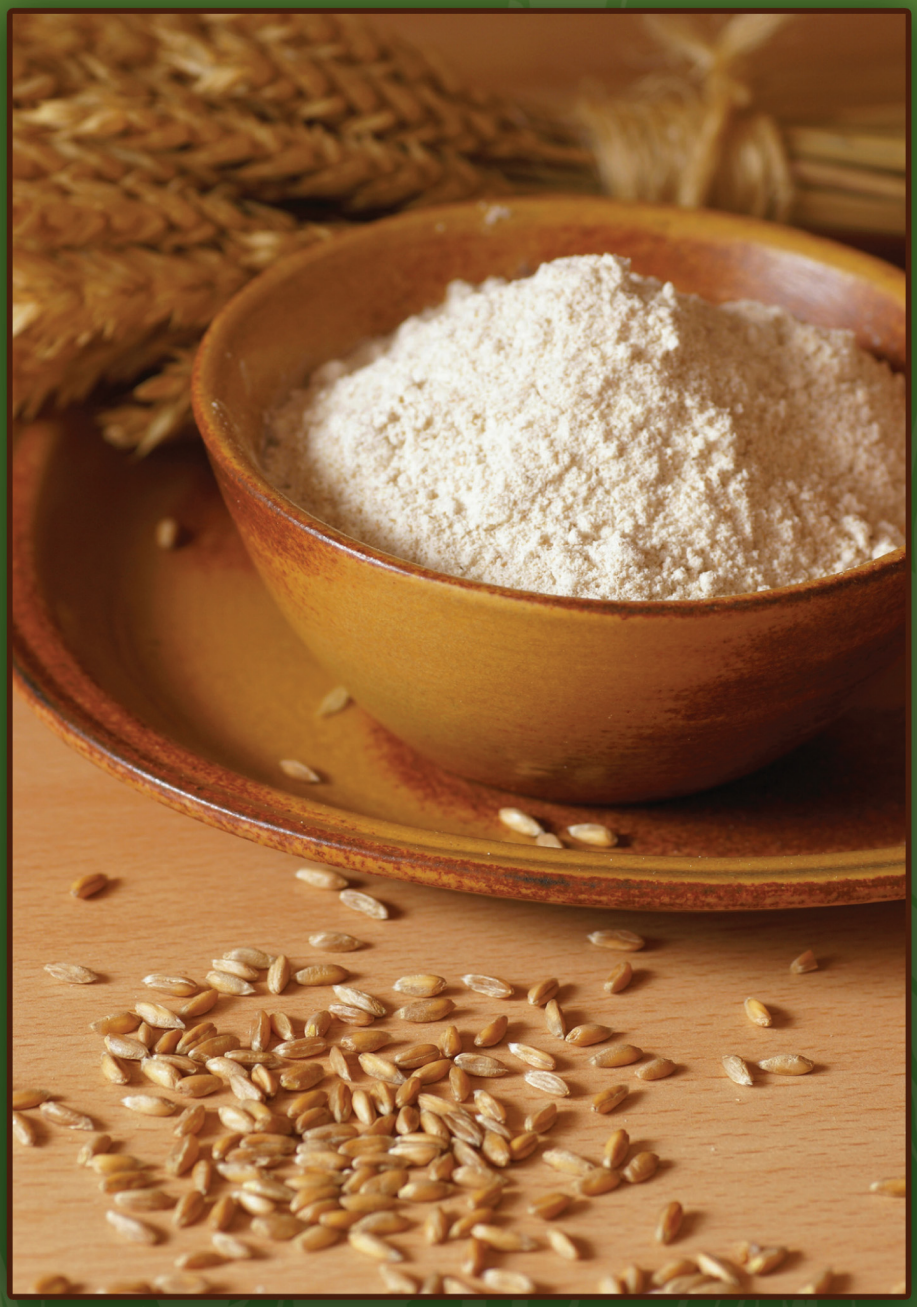
2013 CROP QUALITY REPORT



U.S. WHEAT ASSOCIATES

The world's most reliable choice.

U.S. WHEAT ASSOCIATES

Greetings!

On behalf of U.S. Wheat Associates and the entire U.S. wheat industry, I'm pleased to present this Crop Quality Report featuring data for all six classes of U.S. wheat harvested in 2013.

As always, our farmers had to battle tough weather and higher input costs to produce another high quality wheat crop that is sure to meet the needs of the world's wheat buyers, millers, bakers and food processers. The drought was severe in the central and southern plains and dry conditions intensified in the Pacific Northwest. Late season thunderstorms damaged fields in the northern plains and in soft red winter production regions. But thanks to the geographic diversity and experience of U.S. wheat farmers, final production volume and quality was better than expected.

This year U.S. farmers stepped up to provide considerable volumes of wheat when several of the world's top wheat consuming countries were forced to seek supplies from outside their normal routine, proving once again that U.S. wheat is the world's most reliable supply. A sophisticated marketing system enables the U.S. wheat industry to deliver those supplies in consistently good condition and in ways that help our customers effectively manage their risks.

I encourage you to carefully consider the information in this report and meet with your local USW representative to reveal the true value of U.S wheat. On behalf of our producers, our 19 state wheat commission members, our educational partners and the U.S. Department of Agriculture's Foreign Agricultural Service, thank you for choosing U.S. wheat.

Sincerely,

Alan T. Tracy, President
U.S. Wheat Associates

U.S. WHEAT ASSOCIATES

U.S. Wheat Associates is funded by the U.S. Department of Agriculture, Foreign Agricultural Service, and by wheat producers through the following member organizations:

- Arizona Grain Research and Promotion Council
- Arkansas Wheat Promotion Board
- California Wheat Commission
- Colorado Wheat Administrative Committee
- Idaho Wheat Commission
- Kansas Wheat Commission
- Maryland Grain Producers Utilization Board
- Minnesota Wheat Research and Promotion Council
- Montana Wheat and Barley Committee
- Nebraska Wheat Board
- North Dakota Wheat Commission
- Ohio Small Grains Marketing Program
- Oklahoma Wheat Commission
- Oregon Wheat Commission
- South Dakota Wheat Commission
- Texas Wheat Producers Board
- Virginia Small Grains Board
- Washington Grain Commission
- Wyoming Wheat Marketing Commission

U.S. Wheat Associates (USW) is the industry's market development organization working in more than 100 countries. Its mission is to "develop, maintain, and expand international markets to enhance the profitability of U.S. wheat producers." The activities of USW are made possible by producer checkoff dollars managed by 19 state wheat commissions and through cost-share funding provided by USDA's Foreign Agricultural Service. For more information, visit www.uswheat.org.

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2013 CROP QUALITY REPORT OVERVIEW

SUMMARY OF CLASSES

	Hard Red Winter[1]		Hard Red Spring		Northern Durum[2]		Desert Durum®		Soft White		Soft Red Winter	
	2013	5-Year Avg	2013	5-Year Avg	2013	5-Year Avg	2013	5-Year Avg	2013	5-Year Avg	2013	5-Year Avg
Test Weight (lb/bu)	59.9	60.8	62.5	61.1	60.7	60.4	62.8	62.7	61.1	60.0	58.4	58.7
(kg/hl)	78.8	79.9	82.2	80.4	79.0	78.7	81.7	81.6	80.4	79.0	76.8	77.3
Grade	2 HRW	1 HRW	1 NS	1 NS	1 HAD	1 HAD	I HAD	1 HAD	1 SW	1 SW	2 SRW	2 SRW
Dockage (%)	0.6	0.5	0.6	0.7	0.9	1.1	0.5	0.3	0.5	0.6	0.5	0.8
Wheat Moisture (%)	10.9	11.0	12.2	12.1	12.1	11.4	6.3	6.5	9.1	9.5	13.4	12.9
Wheat Protein (%)[3]	13.4	12.2	13.6	14.1	12.8	14.0	13.2	13.4	10.3	10.0	9.9	10.0
Wheat Ash (%)[3]	1.59	1.54	1.53	1.59	1.57	1.55	1.79	1.72	1.36	1.37	1.49	1.54
1000 Kernel Weight (g)	26.0	29.8	32.4	30.9	44.4	38.2	46.4	50.4	36.6	34.6	33.6	32.8
Wheat Falling Number (sec)	421	414	401	385	375	368	n/a	n/a	349	322	294	328
Flour/Semolina Extraction (%)	76.1	72.2	69.5	69.1	65.2	64.2	62.1	62.3	75.9	72.7	70.2	70.1
Flour/Semolina Ash (%)[3]	0.60	0.48	0.53	0.52	0.66	0.64	0.93	0.86	0.49	0.47	0.42	0.44
Wet Gluten (%)	31.1	28.3	35.3	35.1	34.8	36.4	34.6	33.0	24.4	21.5	20.7	22.4
Farinograph:												
Peak Time (min)	5.6	5.0	6.6	6.8	n/a	n/a	n/a	n/a	1.5	1.7	1.3	1.6
Stability (min)	12.3	12.1	11.0	11.2	n/a	n/a	n/a	n/a	2.2	3.6	2.8	2.7
Absorption (%)	59.8	57.9	64.0	65.4	n/a	n/a	n/a	n/a	53.3	53.4	53.2	52.2
Alveograph W (10^{-4} joules)	250	243	345	379	134	121	233	180	83	105	85	85
Loaf Volume (cc)	860	804	962	964	n/a	n/a	n/a	n/a	n/a	n/a	695	717
Production (mmt)	20.3	16.9	13.3	13.9	1.3	1.7	0.4	0.7	6.7	3.2	15.4	8.7
	Page 9		Page 16		Page 27		Page 29		Page 31		Page 36	

[1]HRW data does not include California.

[2] Durum extraction and ash values are for semolina.

[3]Protein - 12% moisture basis; ash - 14% moisture basis.



US Production by Class

Crop Year (Beginning June 1)
(million metric tons)

	2013	2012	2011	2010	2009
Hard Red Winter	20.3	27.3	21.2	27.7	25.0
Hard Red Spring	13.3	13.7	11.0	15.8	14.9
Hard White	0.6	0.7	0.8	0.7	0.5
Durum	1.7	2.2	1.4	2.9	3.0
Soft White	6.7	6.5	7.9	6.9	5.7
Soft Red Winter	15.4	11.4	12.5	6.5	11.0
Total	**57.9**	**61.8**	**54.4**	**60.1**	**60.4**

Based on USDA crop estimates of September 30, 2013.

US Supply and Demand

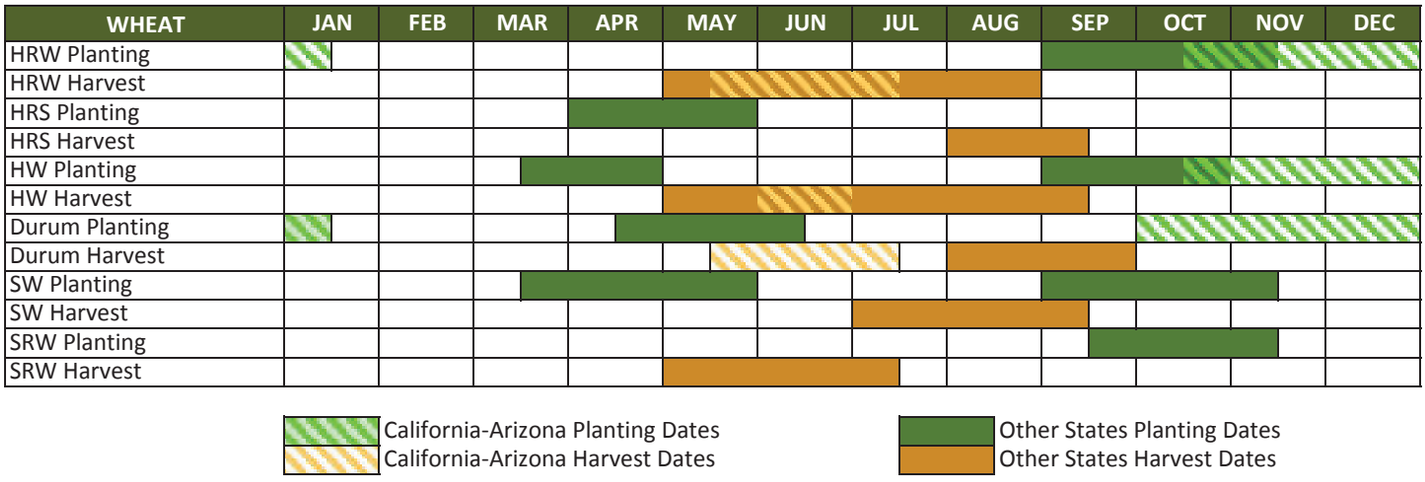
Estimated for 2013/2014 (year beginning June 1)
(million metric tons)

	HRW	HRS	Durum	White	SRW	TOTAL
Beginning Stocks	9.3	4.5	0.6	1.7	3.4	19.5
Production*	21.5	12.9	1.6	6.7	14.8	57.5
Imports	0.3	1.4	1.4	0.2	0.5	3.8
Total Supply	**31.1**	**18.8**	**3.6**	**8.6**	**18.7**	**80.9**
Domestic Use	14.5	7.8	2.2	3.2	8.0	35.7
Exports	11.3	6.1	0.7	4.1	7.8	29.9
Total Demand	**25.8**	**13.9**	**2.9**	**7.2**	**15.8**	**65.6**
Ending Stocks	**5.4**	**4.9**	**0.8**	**1.4**	**2.9**	**15.3**
Stocks Five-year Average	**9.2**	**4.8**	**0.8**	**1.9**	**4.9**	**21.5**

Based on USDA Supply/Demand estimates of September 12, 2013.

*USDA updated production estimates on September 30, but has not yet issued revised supply and demand estimates.

Planting and Harvest Dates



WHAT THE TESTS MEAN

Wheat Grades reflect the physical quality and condition of a sample and thus may indicate the general suitability for milling. The U.S. grade of a sample is determined by measurement of such factors as test weight, damaged kernels, foreign material, shrunken and broken kernels, and wheat of contrasting classes. (See table on page 42.) All numeric factors other than test weight are reported as a percentage by weight of the sample. Grade determining factors include:

- **Test Weight** is a measure of the density of the sample and may be an indicator of milling yield and the general condition of the sample, as problems that occur during the growing season or at harvest often reduce test weight.
- **Damaged Kernels** are kernels which may be undesirable for milling because of disease, insect activity, frost or sprout damage, etc.
- **Foreign Material** is any material other than wheat that remains after dockage is removed. Because foreign material may not be removed by normal cleaning equipment, it may have an adverse effect on milling quality.
- **Shrunken and Broken Kernels** are kernels which either were insufficiently filled during growing and have a shrunken or shriveled appearance or have been broken in handling. Such kernels may reduce milling yield.
- **Total Defects** is the sum of damaged kernels, foreign material and shrunken and broken kernels.
- **Vitreous Kernels** in hard red spring wheat are kernels which are uniformly dark and have no spots which appear chalky or soft. In durum, vitreous kernels have a glassy and translucent appearance without any spots that appear chalky.

Dockage is the percentage by weight of any material easily removed from a wheat sample using the Carter Dockage Tester. Dockage, because it can be easily removed, should not have any effect on milling quality but may have other economic effects for buyers. Grade factors are determined only after dockage is removed.

Moisture content is the percentage water by weight of a sample and is an important indicator of profitability in milling. Flour millers add water to adjust wheat moisture to a standard level before milling. Lower wheat moisture allows more water to be added, increasing the weight of grain to be milled at virtually no cost. Moisture content is also an indicator of grain storability as wheat and flour with low moisture are more stable during storage. Because moisture can be readily added to or physically removed from a sample, other analysis results are often mathematically converted to a standard moisture basis, such as 14%, 12% or dry matter, so results can be meaningfully compared.

Protein content is the percentage protein by weight in a sample. Protein can be quickly and easily measured and therefore is an important factor in determining the value of wheat since it relates to many processing properties, such as water absorption and gluten strength. Low protein is desired for products such as snacks or cakes. High protein is desired for products such as pan breads, buns and frozen yeast-raised products.

Ash content is the percentage of minerals by weight in wheat or flour. In wheat, ash is primarily concentrated in the bran and is an indication of the flour yield that can be expected during milling. In flour, ash content indicates milling performance by indirectly revealing the amount of bran contamination in flour. Ash in flour can impart a darker color to finished products. Products requiring particularly white flour call for low ash content while whole wheat flour has higher ash content.

1000 Kernel Weight is the weight in grams of one thousand kernels of wheat and may indicate grain size and expected milling yield.

Kernel Size is a measure of the percentage by weight of large, medium and small kernels in a sample. Large kernels or more uniform kernel size may help improve milling yield.

Single Kernel Characterization System (SKCS) measures 300 individual kernels from a sample for size (diameter), weight, hardness (based on the force needed to crush) and moisture. Detailed SKCS results (not reported in this booklet) include the distribution of these factors, which may be an indicator of the uniformity of the sample and may help millers experienced with the system optimize flour milling yields. Kernel characteristics are related to milling properties such as tempering, roll gap settings, and flour starch damage content.

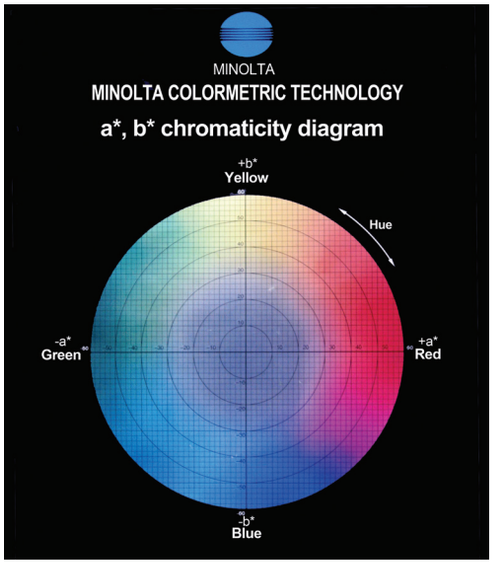
Sedimentation value is a measure of the sediment that results when lactic acid is added to a sifted ground wheat sample and can be used as an indicator of gluten quality and thus the baking quality of wheat flour.

Falling Number indirectly indicates alpha-amylase activity, which results from sprout damage. High Falling Number values indicate low alpha-amylase activity. Sufficient alpha-amylase activity is required in flour for some products such as yeast-raised bread. However, excessive alpha-amylase in wheat cannot be removed and is difficult to blend to lower alpha-amylase content, and the resulting flour produces a sticky dough that can cause problems during processing and products with poor color and weak texture. Falling Number usually correlates closely with amylograph.

Extraction is the percentage by weight of flour obtained from a wheat sample. In a commercial flour mill the extraction rate is critically important to mill profitability. In a laboratory, milling with the Buhler Laboratory Mill is mainly done to

obtain flour for other tests. **The Buhler Laboratory Mill extraction rate is always significantly lower than the rate that can be obtained on a commercial mill, but may be useful for comparison between crop years.**

Color is a numerical system to measure a sample's lightness (L*) on a scale of 0 to 100 and "chromaticity" or hue on two scales each running from -60 to +60 for green-red (a*) and blue-yellow (b*). High L* values indicate a bright color, and higher b* values indicate more yellow. Flour color is influenced by the wheat's endosperm color particle size and the ash content of the flour and often affects the color of the finished product. Durum semolina color is heavily influenced by particle size.



Wet Gluten is a measure of the quantity of gluten in wheat or flour samples as determined using the Glutomatic system. Gluten forms when water is added to the protein in wheat and is responsible for the elasticity and extensibility characteristics of flour dough.

Gluten Index is also determined by the Glutomatic system and is a measure of gluten strength regardless of the quantity of gluten present. Gluten index is used commercially to select durum samples with strong gluten characteristics. In bread wheat a variety of factors other than gluten quality can affect the results though very low gluten index may be an indication of protein damage from insect or disease activity.

Amylograph measures flour starch pasting properties that are important to some end products such as sheeted Asian noodles. Amylograph also measures enzyme (alpha-amylase) activity which results from sprout damage. Amylograph results usually correlate very closely with Falling Number results.

Starch Damage, the percentage by weight of damaged starch in a flour sample, is a measure of the physical damage done to starch granules during milling. Bread (hard) wheat flour typically has higher starch damage than soft wheat flour. Highly damaged starch readily absorbs more water which affects dough mixing and other processing properties. Because starch damage depends on how the sample was milled, starch damage is important for interpreting other results reported.

Farinograph generates a curve that indicates the power being used over time as flour and water are mixed into dough. The results describe the mixing properties of the dough and include:

- **Peak Time** is the time interval from the first addition of water to the maximum consistency immediately prior to the first indication of weakening. Long peak times indicate strong gluten and dough properties while short peak times may indicate weak gluten.
- **Stability** is the interval between the point where the top of the curve first intersects the 500-BU line (called the "arrival time") and the point where the top of the curve departs the 500-BU line ("departure time"). Long stability times also indicate strong gluten and dough properties, useful in such products as yeast-raised breads while short stability times indicate weaker gluten useful in many confectionary products.
- **Absorption** is the amount of water (as a percent by weight of 14 percent moisture wheat flour) required to center the curve peak on the 500-BU line. High water absorption provides economic advantages for producing more dough pieces than flour with lower water absorption.
- **Classification** rates the curves produced by the farinograph ("farinograms") on a scale of 1 to 8, with higher values indicating stronger gluten and dough mixing properties for hard red spring wheat flour.

FARINOGRAPH



Photo courtesy of Wheat Marketing Center

WHAT THE TESTS MEAN

Alveograph generates a curve indicating the air pressure necessary to inflate a piece of dough like a bubble to the point of rupture and indicates the gluten strength and extensibility of dough. Values reported include:

- **P** ("overpressure" or resistance), measured in millimeters to the maximum height of the curve, reflects the maximum pressure while blowing the bubble of dough and indicates dough resistance to extension.
- **L** (length), the length of the curve measured in millimeters, reflects the size of the bubble and indicates dough extensibility.
- **W** (the area under the curve) reflects the amount of energy needed to inflate the dough to the point of rupture and indicates dough strength.

The alveograph is well suited for measuring the dough characteristics of weaker gluten wheat and, with adaptive hydration and mix time, of stronger wheats including durum. Requirements differ depending on intended flour use. For example, low P value (indicating weak gluten) and long L value (high extensibility) are preferred for cakes and confectionery products; P/L close to 1 and high W values (strong gluten) are preferred for pan breads; and low P and long L values are favored for durum for pasta semolina.

Extensograph generates a force-time curve for a piece of dough stretched until it breaks. Results include:

- **Resistance**, measured at the maximum curve height in Brabender units (B.U.), reflects the maximum force applied and indicates the resistance of the dough to extension.
- **Extensibility**, measured as the total length of the curve at the base line in centimeters, reflects how far the dough was stretched.
- **Area** is the area under the curve reported in square centimeters.

These factors help describe the gluten strength and dough extensibility characteristics of flour for a wide range of end products. The extensograph can also evaluate the effects of fermentation time and additives on dough performance.

Mixograph, similar to the farinograph but quicker and using a smaller amount of flour sample, generates a graph that records the force needed to mix flour or semolina and water into dough. The graph is classified on a scale of 1 to 8, with higher values indicating stronger gluten characteristics for durum milled fractions.

Solvent Retention Capacity (SRC) is the weight of solvent held by flour after centrifugation, and expressed as a percent of the flour weight on a 14 percent moisture basis. The different solvents used relate flour functionality to specific flour components and thus can be useful for predicting commercial baking performance, especially for soft wheat flours.

Baking Absorption is the water required for optimum dough mixing performance, expressed as a percent of flour weight on a 14 percent moisture basis.

Crumb Grain and Texture is determined on a scale of 1 to 10 by visual comparison to a standard using a constant illumination source. Higher scores are preferred.

Loaf Volume is the volume of the test loaf after baking. Higher loaf volumes indicate better baking performance for pan breads.

Specks are visually counted in a semolina sample and reported as the number in 10 square inches. Specks, which can detract from pasta appearance and desirability, are small particles of bran or other material that escaped the wheat cleaning and semolina purifying process and thus depend on the milling process as well as the characteristics of the durum.

Sugar Snap Cookie, Sponge Cake, Chinese Southern-Type Steamed Bread, Spaghetti, and the Hard White noodle and steamed bread tests all use standardized methods to prepare specific end products to evaluate the suitability of the sample for that product or similar products. Details on many of these tests can be found in the Analysis Methods.

ALVEOGRAPH

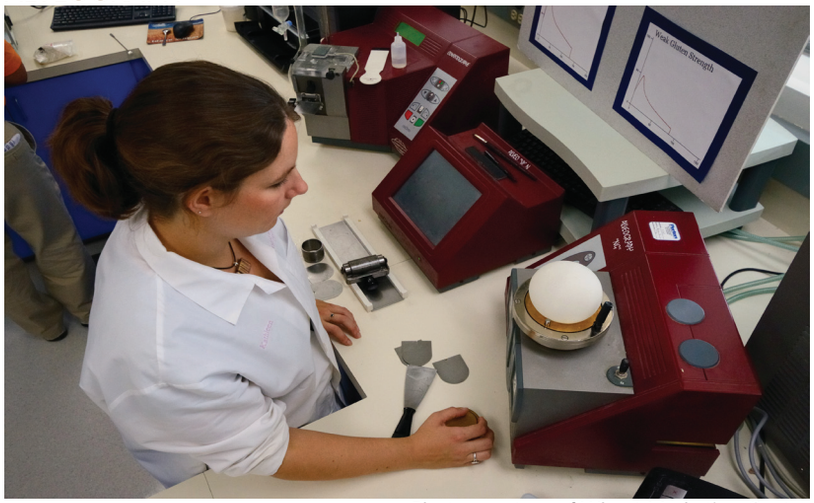


Photo courtesy of Wheat Marketing Center

MIDWEST AND PNW HARVEST SURVEY

Weather and Harvest: Planting dates and crop conditions for the 2013 hard red winter (HRW) crop were highly variable as they were for the previous two crops. Planting and emergence were delayed due to drought in all production areas with the exception of the Pacific Northwest. Timely moisture in the later stages of plant development helped boost yields in much of Texas, Oklahoma, Kansas and Nebraska. However, the drought persisted in most areas of western Texas, eastern Colorado, western Nebraska, Wyoming and South Dakota. Montana suffered severe storms, which locally reduced production by 30% to 50%, and below normal temperatures which delayed maturity and harvest.

These conditions reduced the potential yield from all HRW production regions and affected kernel characteristics. The crop has smaller kernels and lower test weight and thousand kernel weight than the 2012 crop and the 5-year averages. In contrast, overall wheat and flour protein significantly exceed last year and the 5-year averages.

Survey Methods: Sample collection and analysis were conducted by the USDA ARS Hard Winter Wheat Quality Lab and Plains Grains, Inc. A total of 534 samples were collected from grain elevators in Texas, Oklahoma, Colorado, Kansas, Nebraska, South Dakota, North Dakota, Wyoming, Montana, Washington, Idaho and Oregon. The area sampled represents approximately 80% of HRW production. Official grade and non-grade factors were determined on each individual and composite sample. Milling, dough functionality and bake tests were run on 68 composites based on production regions and protein ranges of <11.5%, 11.5% - 12.5%, and >12.5%. Results were aggregated into Gulf-tributary (about 76% of production), PNW-tributary (24%), and Overall averages. The analytical methods are described in the Analysis Methods section of this booklet.

Wheat and Grade Data: The Overall average grade was US No. 2 HRW, down from last year and 5-year average of No. 1 HRW because average test weight was 59.9 lb/bu (78.8 kg/hl). Forty-nine percent of the samples graded US No. 1 HRW. Nearly all the Overall average wheat characteristics reflected the adverse weather conditions. Test weight and thousand kernel weight were well below the 2012 and 5-year averages. Dockage of 0.6% was slightly above the 2012 and 5-year average of 0.5%, and total defects of 2.0% was significantly above last year's 1.4% and the 5-year average of 1.5%. Both Gulf and PNW samples showed similar changes in kernel characteristics from last year and the 5-year averages.

The average protein of 13.4% was almost a full percentage point above the 2012 average of 12.6% and more than a full point above the 5-year average of 12.2%. For both Gulf and PNW samples approximately 15% are in the less than 11.5% protein category, 25% in the 11.5% – 12.5% category and 60% in the greater than 12.5% category. Average falling number of 421 sec indicatives sound wheat.

Flour and Baking Data: The laboratory mill flour yield averaged 76.1%, above the 2012 average of 75.2%, but with higher flour ash content. The yield is significantly above the 5-year average, a difference mostly attributable to use of a new tandem Buhler Experimental Mill. Wheat to flour protein loss averaged 1.1%, below the 5-year average of 1.3%. Overall average Farinograph peak time and stability were slightly above the 2012 and 5-year averages, and water absorption of 59.8% was higher than the 2012 58.9% and significantly above the 5-year average of 57.9%. The Alveograph W value of 250 (10^{-4} J) is comparable to 2012 and the 5-year average. Overall loaf volume averages 860 cc, significantly higher than the 2012 and 5-year averages. The flour and baking data indicate there is protein quantity and quality in the 2013 HRW crop.

Summary: Despite generally dry growing conditions and slightly below average kernel characteristics, the 2013 HRW crop has unusually high protein content and very good processing characteristics. Water absorption and loaf volumes are very good and significantly exceed long-term averages.

CALIFORNIA HARVEST SURVEY

California's wheat growing regions are defined by climate, value of alternative crops, and distinct differences in variety selection. Hard red wheat is the most prevalent wheat grown in the state. After a wet start at planting time, California experienced very dry weather during the growing season. Yields were average to below average, although better than expected for the weather conditions. Protein and overall quality were excellent. Stripe Rust was present only in susceptible varieties. Harvest takes place in June and July. With strong domestic demand for new crop wheat, export buyers are encouraged to express interest in purchasing California wheat in early spring or even at planting time.

Survey methods: Grade information is provided by FGIS. Milling and end-use quality analysis is conducted by the California Wheat Commission laboratory.

EXPORT CARGO SURVEY

The export cargo data represent 504 individual sublot samples provided by USDA's Federal Grain Inspection Service for marketing years 2013 and 2012. Of 123 2013-crop samples collected in July and August, 108 are from Gulf and 15 from PNW ports. Of the 381 2011-crop samples, 267 are from Gulf and 114 from PNW ports. Grade data are the official grades on the individual sublots. Milling and baking analyses were by Great Plains Analytical Laboratory, Kansas City, MO.



HARD RED WINTER | MIDWESTERN HARVEST DATA



Hard Red Winter	Composite Average					
	2013 By Protein				2012	5-Year
	Low	Med	High	Overall	Overall	Average
Wheat Grade Data:						
Test Weight (lb/bu)	60.8	60.5	59.7	59.9	61.1	60.8
(kg/hl)	79.9	79.6	78.5	78.8	80.4	79.9
Damaged Kernels (%)	0.2	0.2	0.3	0.2	0.1	0.2
Foreign Material (%)	0.3	0.2	0.1	0.1	0.1	0.1
Shrunken & Broken (%)	1.7	1.6	1.6	1.6	1.2	1.1
Total Defects (%)	2.1	1.9	2.0	2.0	1.4	1.5
Grade	1 HRW	1 HRW	2 HRW	2 HRW	1 HRW	1 HRW
Wheat Non-Grade Data:						
Dockage (%)	0.7	0.5	0.6	0.6	0.5	0.5
Moisture (%)	10.6	10.9	11.1	10.9	10.7	11.0
Protein (%) 12%/0% moisture basis	10.9/12.4	12.0/13.6	13.9/15.8	13.4/15.2	12.6/14.3	12.2/13.9
Ash (%) 14%/0% moisture basis	1.54/1.79	1.54/1.80	1.62/1.88	1.59/1.85	1.48/1.72	1.54/1.78
1000 Kernel Weight (g)	27.2	26.1	25.8	26.0	29.0	29.8
Kernel Size (%) lg/md/sm	54/44/2	49/49/2	45/52/3	46/51/3	53/46/1	58/40/1
Single Kernel: Hardness	68.1	69.8	68.9	68.9	73.0	69.5
Weight (mg)	27.2	26.1	25.8	26.0	29.0	29.8
Diameter (mm)	2.57	2.52	2.49	2.50	2.60	2.55
Sedimentation (cc)	40.0	42.9	54.5	52.0	49.3	54.3
Falling Number (sec)	417	420	424	421	409	414
DON (ppm)	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Flour Data:						
Lab Mill Extraction (%)	76.6	76.4	76.0	76.1	75.2	72.2
Color: L*	90.8	90.9	90.8	90.8	91.6	92.0
a*	-2.0	-2.0	-1.8	-1.9	-1.1	-1.7
b*	10.6	10.7	10.4	10.5	10.7	10.2
Protein (%) 14%/0% moisture basis	9.8/11.5	10.6/12.4	12.8/14.9	12.3/14.3	11.5/13.4	10.8/12.6
Ash (%) 14%/0% moisture basis	0.57/0.67	0.58/0.67	0.61/0.71	0.60/0.70	0.51/0.59	0.48/0.55
Wet Gluten (%)	25.7	26.3	32.7	31.1	28.5	28.3
Gluten Index	96.8	93.4	93.0	93.3	93.9	95.1
Falling Number (sec)	434	454	472	467	442	416
Amylograph Viscosity 65 g (BU)	579	569	584	580	553	812
Starch Damage (%)	6.9	6.6	6.1	6.2	6.1	6.0
Dough Properties:						
Farinograph:						
Peak Time (min)	3.8	4.5	5.9	5.6	5.3	5.0
Stability (min)	8.2	9.3	13.2	12.3	11.1	12.1
Absorption (%)	57.6	57.7	60.4	59.8	58.9	57.9
Alveograph: P (mm)	80	77	81	81	78	77
L (mm)	77	89	101	97	102	93
P/L Ratio	1.08	0.90	0.82	0.86	0.77	0.83
W (10^{-4} joules)	205	217	259	250	254	243
Extensograph: Resistance (BU)	336/442	325/506	326/473	329/481	303/467	331/505
(45/135 min) Extensibility (cm)	14.3/13.4	14.5/13.5	15.8/15.4	15.5/15.0	14.8/14.3	14.8/14.1
Area (sq cm)	83/95	81/109	94/131	92/126	80/116	88/122
Baking Evaluation:						
Crumb Grain (scale 1-10)	5.7	6.7	6.7	6.7	5.2	5.6
Crumb Texture (scale 1-10)	7.0	7.2	7.3	7.2	5.8	6.7
Loaf Volume (cc)	750	795	882	860	789	804
% of Area Production:	**6**	**18**	**76**	**100**		

2013 Protein Range: Low, less than 11.5%; Med, 11.5 - 12.5%; High, 12.5% or greater

Gulf Exportable Average						PNW Exportable Average					
2013 By Protein				2012	5-Year	2013 By Protein				2012	5-Year
Low	Med	High	Overall	Overall	Average	Low	Med	High	Overall	Overall	Average
60.6	60.4	59.6	59.7	60.9	60.6	61.3	61.1	60.1	60.6	61.7	61.3
79.7	79.4	78.4	78.6	80.1	79.7	80.6	80.3	79.1	79.7	81.1	80.6
0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.1	0.6	0.4	0.1	0.2
0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1
1.9	1.8	1.7	1.8	1.3	1.1	1.0	1.0	1.1	1.1	1.0	1.1
2.4	2.1	2.0	2.1	1.6	1.5	1.2	1.2	1.9	1.6	1.1	1.4
1 HRW	1 HRW	2 HRW	2 HRW	1 HRW	1 HRW	1 HRW	1 HRW	1 HRW	1 HRW	1 HRW	1 HRW
0.7	0.5	0.6	0.6	0.5	0.5	0.6	0.5	0.7	0.6	0.5	0.5
10.8	11.0	10.8	10.8	10.9	11.0	9.9	10.8	11.9	11.4	10.3	11.0
10.9/12.4	12.0/13.6	14.0/15.9	13.6/15.5	12.6/14.3	12.3/14.0	10.7/12.2	12.0/13.6	13.5/15.3	12.7/14.4	12.5/14.2	11.9/13.5
1.60/1.86	1.57/1.83	1.62/1.89	1.61/1.88	1.51/1.75	1.57/1.81	1.36/1.58	1.46/1.70	1.59/1.85	1.52/1.77	1.40/1.63	1.47/1.71
25.3	24.7	24.7	24.7	28.1	29.6	33.1	30.5	29.5	30.3	31.5	30.7
48/50/2	43/55/2	40/57/3	41/56/3	50/49/1	57/41/2	75/24/1	67/32/1	61/37/2	64/34/2	60/39/1	61/38/1
69.7	70.8	69.7	69.9	74.3	69.8	62.9	66.7	66.3	66.0	69.2	67.6
25.3	24.7	24.7	24.7	28.1	29.6	33.1	30.5	29.5	30.3	31.5	30.7
2.52	2.48	2.45	2.46	2.57	2.55	2.73	2.67	2.63	2.65	2.69	2.55
36.6	38.9	53.4	50.6	48.4	53.5	50.8	55.6	58.0	56.4	51.6	55.3
431	427	424	425	409	412	372	396	421	408	411	410
< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
77.1	76.6	75.9	76.1	75.3	72.1	75.1	76.1	76.3	76.1	74.8	72.7
90.6	90.8	90.7	90.7	91.6	91.9	91.5	91.4	90.8	91.1	91.6	92.1
-2.0	-2.0	-1.8	-1.9	-1.1	-1.7	-1.9	-2.0	-1.8	-1.9	-1.1	-1.8
11.0	10.9	10.6	10.7	10.8	10.3	9.4	10.1	9.9	9.9	10.4	10.1
9.8/11.5	10.6/12.4	13.0/15.1	12.5/14.6	11.6/13.5	11.0/12.7	9.9/11.5	10.8/12.6	12.2/14.2	11.5/13.4	11.3/13.1	10.5/12.3
0.61/0.71	0.60/0.70	0.63/0.73	0.62/0.73	0.53/0.61	0.49/0.56	0.45/0.52	0.50/0.58	0.54/0.63	0.52/0.60	0.46/0.54	0.45/0.53
27.0	26.4	33.3	32.1	28.4	28.5	21.5	25.9	30.5	28.1	28.6	27.6
96.4	92.1	92.2	92.3	93.3	94.8	98.1	97.4	95.6	96.4	95.5	96.4
441	459	481	477	437	419	410	436	442	437	457	410
599	577	591	590	530	815	517	542	559	548	616	801
6.9	6.7	6.0	6.1	6.2	5.9	6.9	6.5	6.3	6.4	5.8	5.9
3.5	4.2	5.9	5.6	5.3	5.1	4.6	5.5	5.9	5.6	5.3	4.5
8.1	8.4	13.0	12.2	10.7	12.1	8.7	12.1	13.6	12.6	12.0	11.7
57.0	57.7	60.5	60.0	59.2	58.0	59.5	58.0	59.9	59.3	58.1	57.6
75	76	82	81	77	76	96	79	79	81	80	81
80	89	100	97	100	93	71	92	106	97	108	93
0.98	0.90	0.84	0.85	0.78	0.81	1.38	0.91	0.77	0.89	0.76	0.87
187	207	254	245	240	237	261	251	272	264	292	258
316/408	307/495	320/474	318/474	291/434	323/490	400/551	381/542	346/471	363/502	338/560	350/538
14.1/13.2	14.2/13.3	15.7/15.3	15.4/14.9	14.7/14.6	14.9/14.2	15.1/13.9	15.5/14.0	16.0/15.9	15.7/15.1	15.0/13.5	14.9/13.8
73/85	73/104	91/129	88/124	75/110	86/120	113/127	107/124	102/139	105/133	92/135	94/127
5.9	6.7	6.8	6.8	4.9	5.7	5.0	6.8	6.5	6.4	6.0	5.3
7.0	7.2	7.4	7.3	5.6	6.6	7.0	7.0	7.0	7.0	6.4	6.7
753	785	888	868	786	807	743	825	862	836	798	791
3	**11**	**62**	**76**			**3**	**7**	**14**	**24**		

2013 Protein Range: Low, less than 11.5%; Med, 11.5 - 12.5%; High, 12.5% or greater

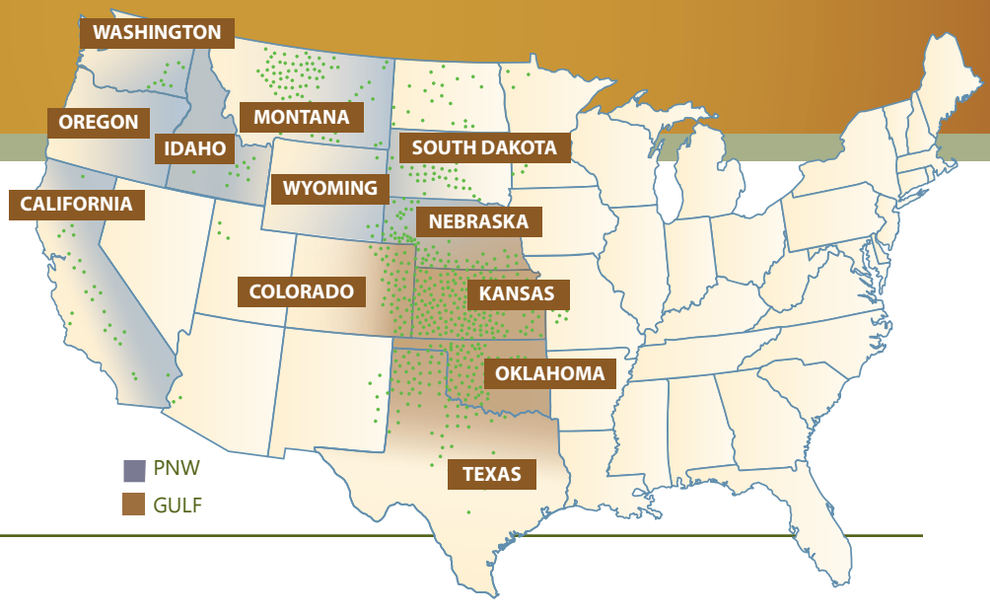
HARD RED WINTER | CALIFORNIA AND EXPORT DATA

Hard Red Winter	California Harvest Data				Export Cargo Data			
	Medium Protein		High Protein		Gulf		PNW	
	2013	2012	2013	2012	2013	2012	2013	2012
Wheat Grade Data:								
Test Weight (lb/bu)	62.9	63.0	63.1	62.6	60.9	61.1	61.7	61.9
(kg/hl)	82.7	82.8	83.0	82.2	80.1	80.4	81.2	81.4
Damaged Kernels (%)	0.0	0.0	0.0	0.0	0.8	0.9	0.2	0.1
Foreign Material (%)	0.1	0.1	0.3	0.1	0.2	0.2	0.1	0.1
Shrunken & Broken (%)	0.7	0.5	0.8	0.8	1.6	1.7	1.6	1.6
Total Defects (%)	0.8	0.6	1.2	0.9	2.6	2.8	1.9	1.8
Grade	1 HRW	1 HRW	1 HRW	1 HRW	1 HRW	1 HRW	1 HRW	1 HRW
Wheat Non-Grade Data:								
Dockage (%)	0.9	0.7	1.1	1.0	0.6	0.6	0.3	0.3
Moisture (%)	8.4	8.1	7.7	8.1	11.4	11.1	10.7	10.5
Protein (%) 12%/0% moisture basis	11.7/13.3	11.9/13.5	13.3/15.1	13.1/14.9	12.2/13.8	12.1/13.8	12.0/13.6	11.9/13.5
Ash (%) 14%/0% moisture basis	1.54/1.79	1.53/1.78	1.61/1.87	1.54/1.79	1.56/1.82	1.55/1.80	1.49/1.74	1.43/1.66
1000 Kernel Weight (g)	39.2	41.2	39.5	41.1	25.5	26.4	27.0	27.6
Kernel Size (%) lg/md/sm	84/16/1	88/12/0	87/13/0	87/13/0	53/45/2	56/42/2	57/41/2	58/40/2
Single Kernel: Hardness	67.0	65.6	70.0	66.3		77.4		76.8
Weight (mg)	39.2	41.2	39.2	41.1		28.0		28.9
Diameter (mm)	2.49	2.51	3.01	2.48		2.55		2.54
Sedimentation (cc)					27.5	27.3	32.0	34.8
Falling Number (sec)		419	403	436	431	427	421	395
DON (ppm)						<0.5		<0.5
Flour Data:								
Lab Mill Extraction (%)	70.7	73.3	72.5	73.3	70.1	71.1	71.8	72.4
Color: L*					92.3	92.3	92.1	92.2
a*					-3.1	-2.9	-3.0	-2.8
b*					9.3	8.6	8.9	8.7
Protein (%) 14%/0% moisture basis	10.3/12	10.6/12.3	11.8/13.7	11.8/13.7	10.7/12.5	10.8/12.6	10.8/12.5	10.8/12.6
Ash (%) 14%/0% moisture basis	0.44/0.51	0.45/0.52	0.43/0.50	0.44/0.52	0.50/0.58	0.51/0.59	0.49/0.57	0.49/0.57
Wet Gluten (%)	28.3	27.1	33.5	31.1	27.8	28.6	27.5	28.5
Gluten Index		99.0	99.0	92.8	97.4	95.7	98.3	96.8
Falling Number (sec)	414	419	438	416	457	506	438	459
Amylograph Viscosity 65 g (BU)					708	779	707	753
Starch Damage (%)								
Dough Properties:								
Farinograph:								
Peak Time (min)	7.3	8.1	11.3	9.1	6.4	5.6	6.9	5.6
Stability (min)	18.3	17.2	19.6	17.0	11.9	11.2	12.2	11.3
Absorption (%)	60.4	62.4	63.9	63.4	58.8	58.1	59.6	58.2
Alveograph: P (mm)		101	102	102	90	91	96	89
L (mm)		87	94	91	91	96	88	99
P/L Ratio		1.16	1.09	1.12	0.99	0.94	1.09	0.90
W (10^{-4} joules)		319	358	333	274	269	292	282
Extensograph: Resistance (BU)								
(45/135 min) Extensibility (cm)								
Area (sq cm)								
Baking Evaluation:								
Crumb Grain (scale 1-10)		8	8	8	6.8	6.5	7.2	6.7
Crumb Texture (scale 1-10)		9	9	9	7.0	6.7	7.3	6.6
Loaf Volume (cc)	919	928	985	963	889	879	958	886
Number of Samples					**108**	**267**	**15**	**114**

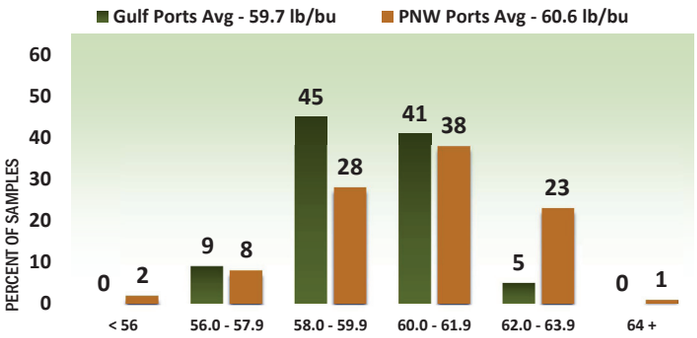
California HRW 2013 Protein Range: Med, 11.0 - 12.4%; High, 12.5% or greater

TWELVE STATES SURVEYED

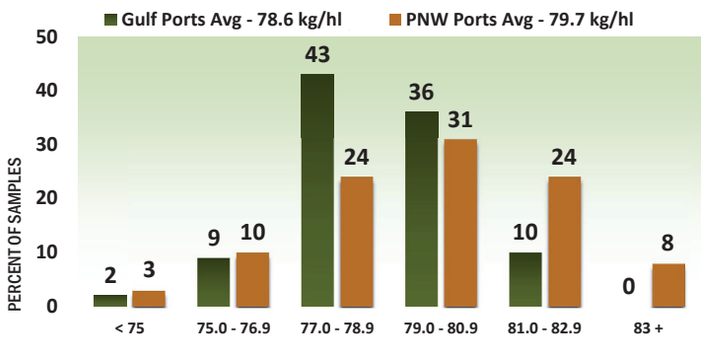
California • Colorado • Idaho • Kansas
Montana • Nebraska • Oklahoma
Oregon • South Dakota • Texas
Washington • Wyoming



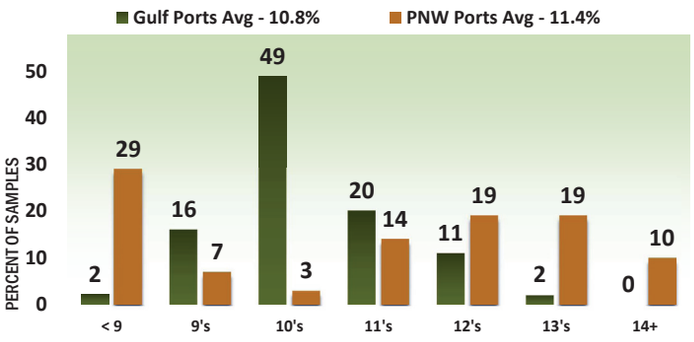
TEST WEIGHT | Pounds/Bushel



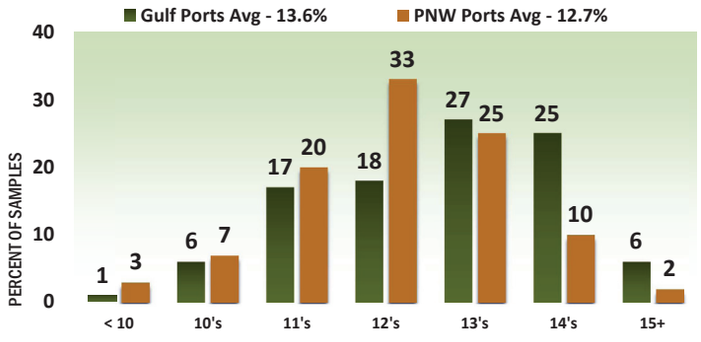
HECTOLITER WEIGHT | Kilograms/Hectoliter



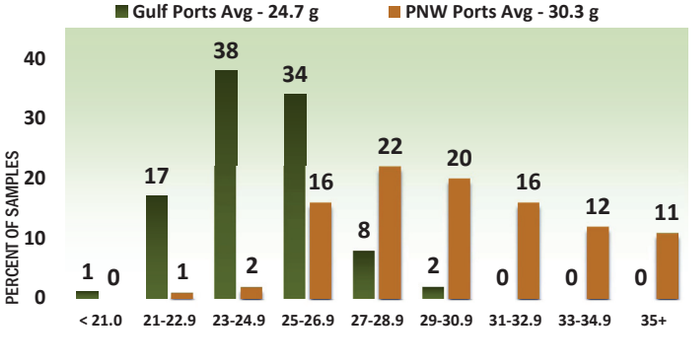
WHEAT MOISTURE | Percent



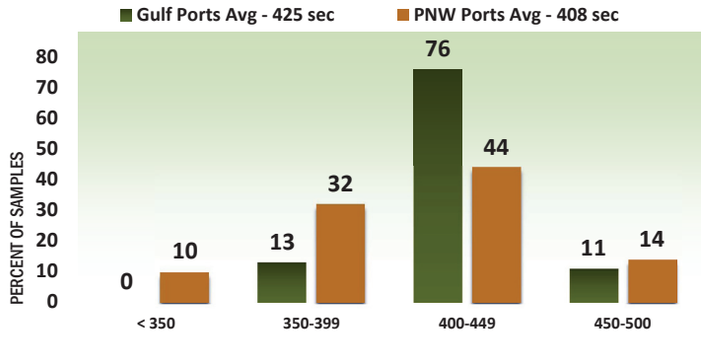
PROTEIN (12% MB) | Percent



1000 KERNEL WEIGHT | Grams

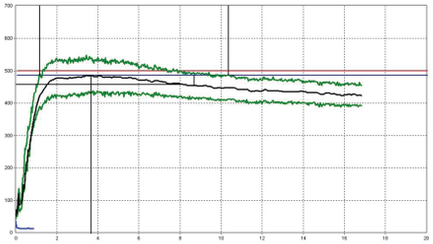
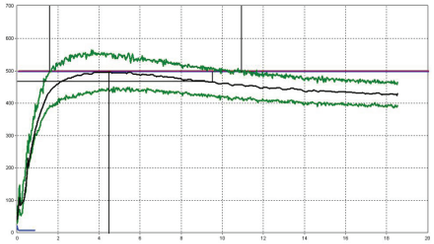
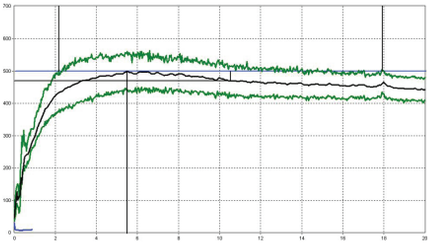


FALLING NUMBER | Seconds

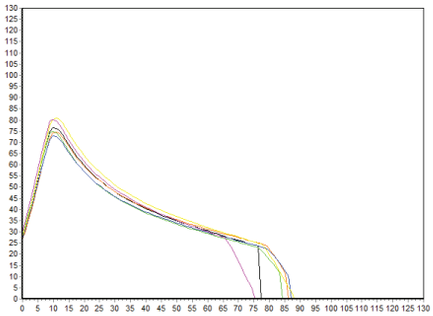
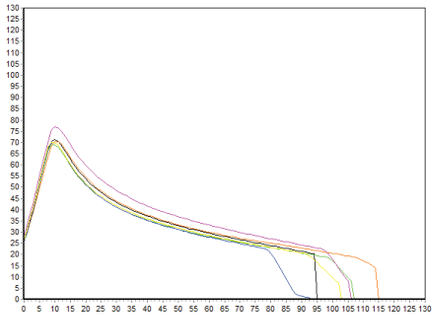
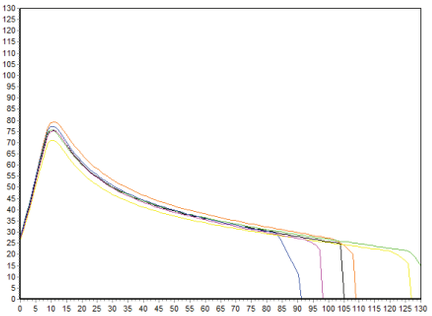


HARD RED WINTER | PHYSICAL DOUGH PROPERTIES

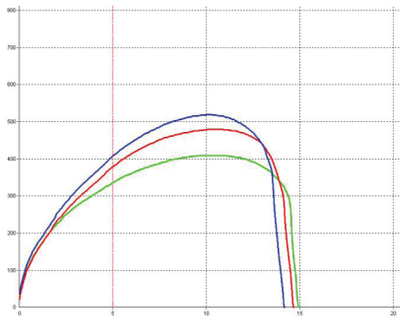
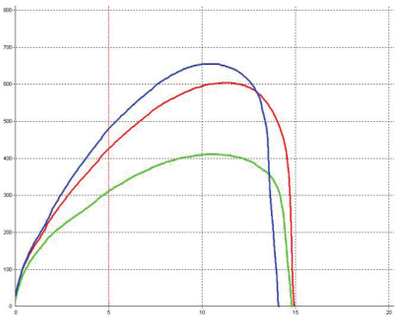
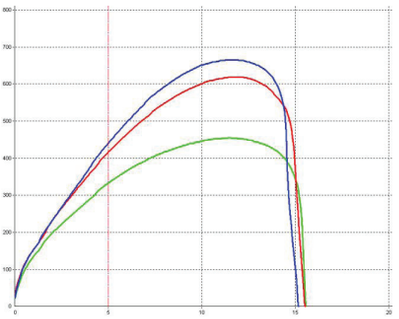
FARINOGRAMS*

ALVEOGRAMS

EXTENSOGRAMS

LOW PROTEIN | MEDIUM PROTEIN | HIGH PROTEIN

*Representing 2013 Composite Average



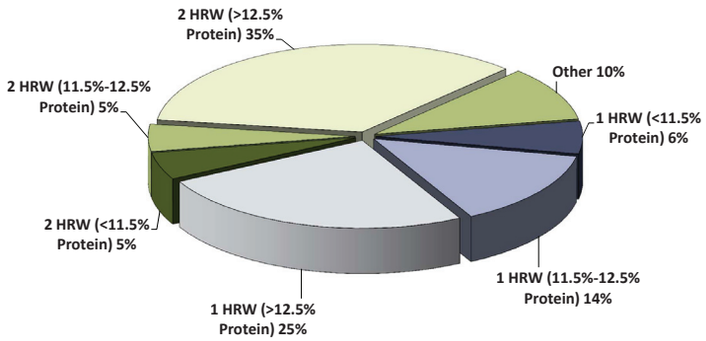
Hard Red Winter Production

for the major growing region (million metric tons)

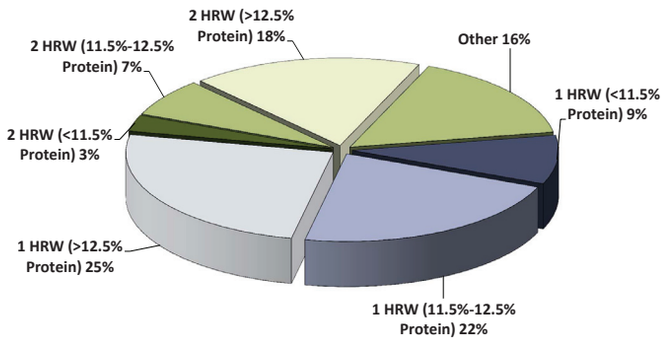
	2013	2012	2011	2010	2009
California	0.7	0.6	0.8	0.7	0.6
Colorado	1.1	2.0	2.1	2.8	2.5
Idaho	0.4	0.4	0.4	0.4	0.4
Kansas	8.5	10.2	7.4	9.6	9.9
Montana	2.2	2.3	2.4	2.5	2.4
Nebraska	1.1	1.5	1.8	1.7	2.1
Oklahoma	2.8	4.2	1.9	3.3	2.1
Oregon	0.1	0.1	0.1	0.1	0.0
South Dakota	0.7	1.6	1.8	1.7	1.7
Texas	1.7	2.4	1.3	3.4	1.6
Washington	0.4	0.6	0.5	0.5	0.5
Wyoming	0.1	0.1	0.1	0.1	0.1
Twelve-State Total	**19.7**	**25.9**	**20.6**	**26.8**	**23.9**
Total HRW Production	**20.3**	**27.3**	**21.2**	**27.7**	**25.0**

Based on USDA crop estimates of September 30, 2013.

GULF EXPORTABLE



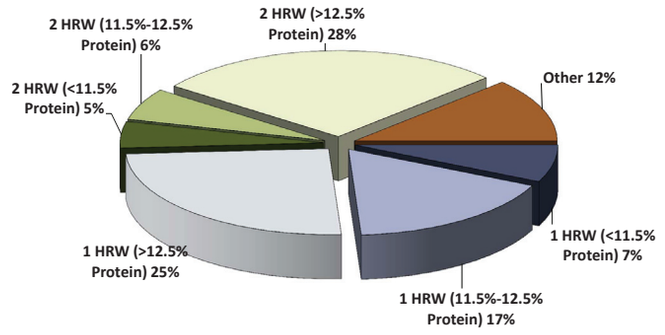
PNW EXPORTABLE



ABOUT HARD RED WINTER WHEAT

U.S. hard red winter wheat has medium to high protein, medium hard endosperm, red bran, medium gluten content and mellow gluten. Used in pan breads, Asian noodles, hearth breads, hard rolls, flatbreads, croissants and general-purpose flour.

OVERALL



HARD RED SPRING | OVERVIEW

HARVEST SURVEY

Weather and Harvest: The 2013 hard red spring wheat (HRS) crop is slightly smaller than 2012; record high yields were offset by reduced acres. Planting in the four-state region was repeatedly delayed by cool, wet conditions from March into June. Not all the intended acres in northern areas were planted because of excessive precipitation. Planting progress was more normal in the three Pacific Northwest states.

Growing conditions were excellent with adequate to surplus moisture. Cool temperatures aided development in the first half of the season. Warm, dry conditions in the second half limited diseases, while subsoil moisture remained adequate.

Harvest began two to three weeks behind average, but warm, dry conditions allowed for rapid progress in the earlier planted crop. However, September rain delayed crop maturity, stalled harvest of the later planted crop, and pushed final harvest into early October. Despite the prolonged harvest, crop quality remained sound, though with reduced vitreous kernel content in some northern areas.

Samples and Methods: Sample collection and analysis were conducted by the Hard Red Spring Wheat Quality Lab, Department of Plant Sciences, North Dakota State University, Fargo, ND. A total of 789 samples were collected from fields, at bin sites on farm or at elevators during harvest in Minnesota (117), Montana (153), North Dakota (376), South Dakota (83), and Washington, Idaho and Oregon (60). The samples represent approximately 95% of the 2013 hard red spring (HRS) crop. Samples were segregated by export region (East and West) and composited by protein range (less than 13.5%, 13.5%-14.5%, and greater than 14.5%). The methods are described in the Analysis Methods section of this booklet.

Wheat and Grade Data: The average grade is No. 1 Northern Spring with 94% grading No. 1. Average protein is 13.6%, more than one percentage point below last year and a half point below the 5-year average. Average test weight is very high at 62.5 lb/bu (82.2 kg/hl), up by more than 1 lb/bu (1.5 kg/hl) over last year and the five-year average. Ninty-four percent of the East crop is above 60 lb/bu (79 kg/hl) compared to 87% in the West. Excellent conditions produced very high thousand kernel weights averaging 32.4 g overall, up from 28.9 in 2012 and 30.9 for the 5-year average. Both East and West are up by more than 3 g from last year. Kernel ash is lower than last year and 5-year average at 1.50% in the East and 1.56% in the West.

Total defects average 1.0% in the West and 0.7% in the East, well below the 2012 crop in the West and slightly lower in the East as the crop has fewer shrunken and broken kernels. Damaged kernels average 0.0% as disease pressures were minimal. Isolated areas experienced some disease during flowering, resulting in average DON of 0.4 ppm, up from 0.1 ppm in 2012. Average DON is higher in the East at 0.6 ppm compared to 0.2 ppm in the West, with the middle protein segment in both having the highest DON.

Protein averaged 13.4% in the East and 13.7% in the West, down about 1.0 and 1.3 percentage points, respectively, from last year. About one-third of the West crop is in each protein segment while 56% of the East crop falls below 13.5% protein. Overall average vitreous kernel content is 71%, lower than the 2012 and 5-year averages; the East average of 72% is slightly higher than 2012 while 70% in the West is sharply lower. Lower protein and some late harvest rains reduced vitreous kernels. Crop moisture of 12.2% is up from the dry 2012 harvest, but similar to the 5-year average. Falling numbers average 401 sec, with 95% of the crop above 350 sec.

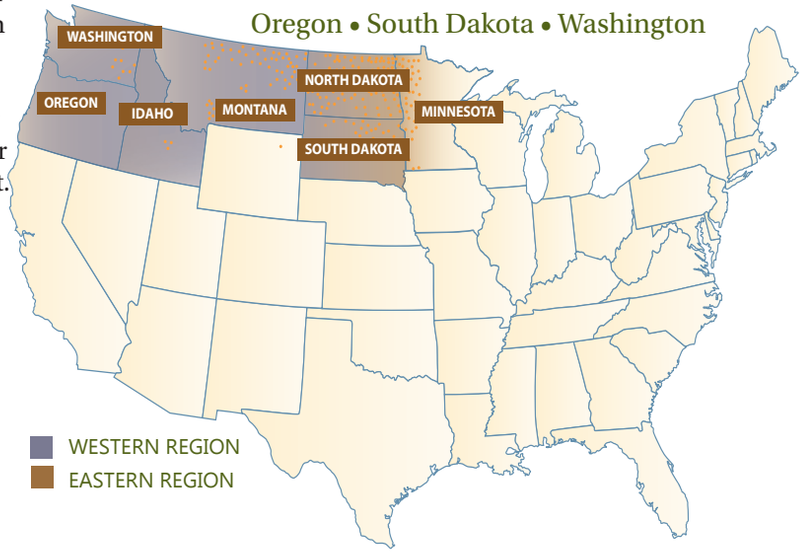
Flour and Baking Data: Average Buhler Lab Mill extraction is 69.5%, higher than 2012 and the 5-year average. Commercial mills would likely achieve much higer rates from the large kernels. Overall flour ash of 0.53% is up slightly from 2012 but similar to the 5-year average. Protein recovery is improved over both the 2012 and 5-year averages. Average wet gluten of 35.3% is similar to the 2012 and 5-year averages; values range from 31.4% in the East low protein segment to 40.2% in the West high protein segment. In contrast to stable falling number values, the amylograph indicates lower 2013 viscosity compared with 2012.

Overall average farinograph stability is 11.0 min, down from 12.9 min in 2012, but similar to the 5-year average. Both regions average 11.0 min, and there is only a slight improvement in dough strength from low to high protein. The mostly weaker values reflect generally lower protein, the generally stress-free growing season and a slight shift in varieties in some areas. Overall average farinograph absorption is 64%, up slightly from 2012 but below the 5-year average. Absorption values increase with protein levels and are slightly higher in the West compared with the East.

The extensograph and alveograph indicate weaker dough properties. Average extensograph resistance on the 45-minute

SEVEN STATES SURVEYED

Idaho • Minnesota • Montana • North Dakota
Oregon • South Dakota • Washington



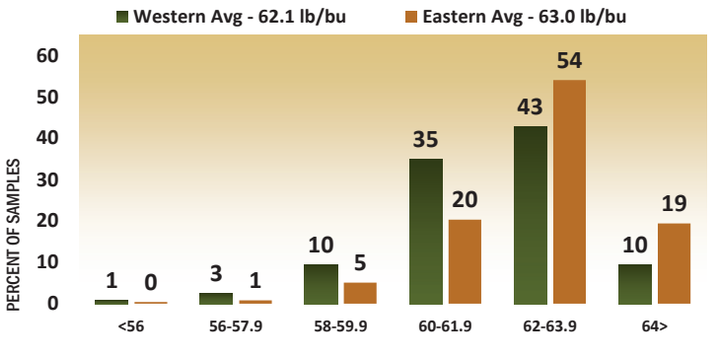
pull is 422 BU compared to 473 in 2012. Extensibility is 16.8 cm, equal to 2012. The East and West have similar resistance values, with West exhibiting slightly more extensibility. The average alveograph W value is 345, down from both 2012 and the 5-year averages of 367 and 379, respectively. The P/L ratio is 0.76, below the recent average of 0.86.

Bake absorption of the 2013 crop is 67%, up from 63% in 2012 and the 5-year average of 64%. Absorption is similar in East and West. Average loaf volume is 962 cm^3 compared to 999 in 2012. Loaf volume correlates fairly consistently with protein. Crumb and texture scores on pan bread are slightly lower compared to 2012 with the West scoring lower than the East.

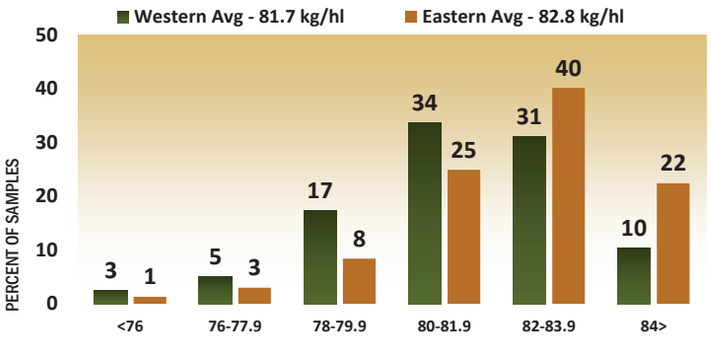
Summary. The 2013 HRS crop has a high grade profile and very uniform kernel quality and functional performance with near zero damaged kernels and large, heavier than average kernels. Protein levels are below normal, and dough strength is generally weaker, especially compared to 2012. However, the crop has improved bake absorption and loaf volumes similar to the 5-year averages. This affords buyers a good value opportunity, although higher proteins will be priced at a premium and higher vitreous kernel specifications may prove challenging. Good contract specifications are the best way to ensure buyers get the quality they need.

Continued on next page

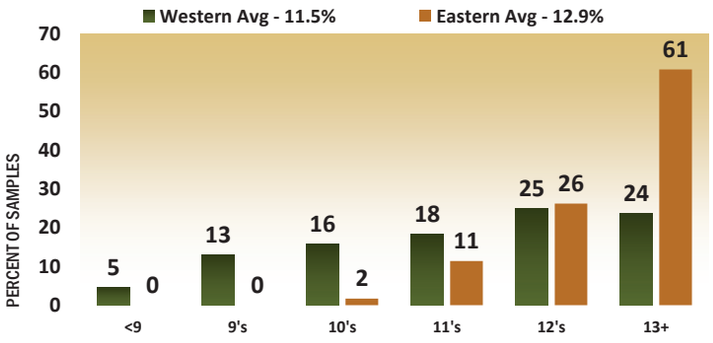
TEST WEIGHT | Pounds/Bushel



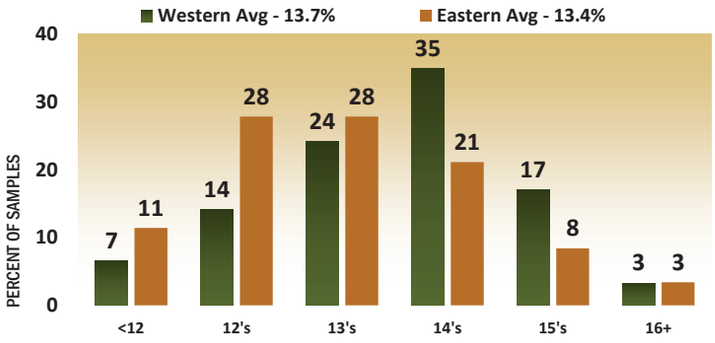
HECTOLITER WEIGHT | Kilograms/Hectoliter



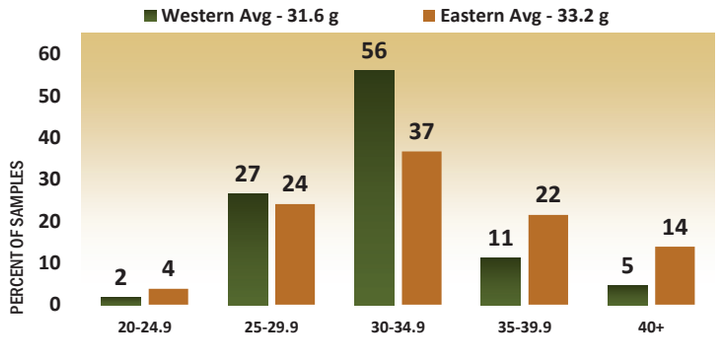
WHEAT MOISTURE | Percent



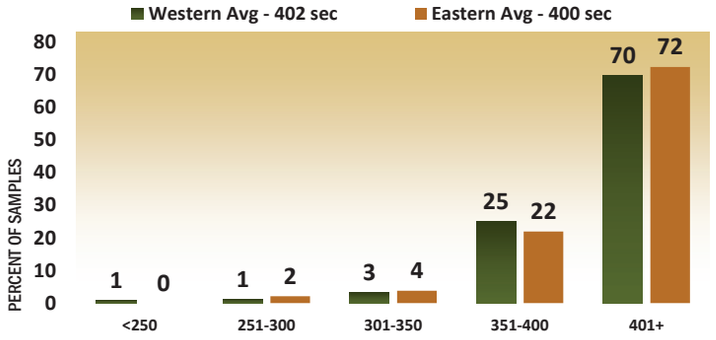
PROTEIN (12% MB) | Percent



1000 KERNEL WEIGHT | Grams



FALLING NUMBER | Seconds



EXPORT CARGO SURVEY

The export cargo data represents 439 individual sublot samples provided by USDA's Federal Grain Inspection Service for crop years 2012 (collected from October 2012 through June 2013) and 2011. Of 188 2012-crop samples, 156 were from PNW, 4 from the Great Lakes and 28 from Gulf ports. Grade data are the official grades on the individual sublots. Milling and baking analyses were conducted by North Dakota State University.



Hard Red Spring	Composite Average					
	2013 By Protein				2012	5-year
	Low	Med	High	Overall	Overall	Average
Wheat Grade Data:						
Test Weight (lb/bu)	62.8	62.7	61.9	62.5	61.3	61.1
(kg/hl)	82.5	82.4	81.4	82.2	80.6	80.4
Damaged Kernels (%)	0.0	0.0	0.0	0.0	0.0	0.1
Foreign Material (%)	0.0	0.0	0.0	0.0	0.0	0.0
Shrunken & Broken (%)	0.7	0.9	1.0	0.9	1.4	1.3
Total Defects (%)	0.7	0.9	1.0	0.9	1.5	1.4
Vitreous Kernels (%)	70	67	77	71	76	72
Grade	1 NS	1 NS	1 DNS	1 NS	1 DNS	1 NS
Wheat Non-Grade Data:						
Dockage (%)	0.5	0.7	0.7	0.6	0.7	0.7
Moisture (%)	12.5	12.1	11.9	12.2	11.7	12.1
Protein (%) 12%/0% moisture basis	12.4/14.1	13.9/15.8	15.1/17.2	13.6/15.5	14.7/16.7	14.1/16.1
Ash (%) 14%/0% moisture basis	1.53/1.78	1.52/1.77	1.55/1.80	1.53/1.78	1.57/1.82	1.59/1.84
1000 Kernel Weight (g)	34.3	31.6	30.2	32.4	28.9	30.9
Kernel Size (%) lg/md/sm	59/39/2	53/45/2	42/55/3	53/45/2	35/60/5	44/52/4
Single Kernel: Hardness	84.7	83.1	83.6	83.9	84.9	80.1
Weight (mg)	36.9	35.5	32.2	35.3	32.1	33.4
Diameter (mm)	2.58	2.48	2.36	2.49	2.34	2.63
Sedimentation (cc)	50.6	61.9	65.4	57.8	61.3	58.6
Falling Number (sec)	386	405	422	401	418	385
DON (ppm)	< 0.5	0.8	< 0.5	< 0.5	< 0.5	
Flour Data:						
Lab Mill Extraction (%)	70.5	69.2	68.0	69.5	68.9	69.1
Color: L*	91.0	90.9	90.8	90.9	90.8	90.6
a*	-1.0	-1.1	-1.1	-1.0	-1.0	-1.0
b*	9.2	9.6	9.7	9.5	9.2	9.4
Protein (%) 14%/0% moisture basis	11.6/13.5	13.0/15.1	14.0/16.3	12.6/14.7	13.6/15.9	13.1/15.2
Ash (%) 14%/0% moisture basis	0.53/0.62	0.53/0.62	0.53/0.62	0.53/0.62	0.50/0.59	0.52/0.61
Wet Gluten (%)	31.9	36.4	40.2	35.3	35.8	35.1
Gluten Index	97.2	94.7	92.8	95.4	86.1	91.0
Falling Number (sec)	406	408	423	411	423	400
Amylograph Viscosity: 65g (BU)	629	511	607	587	735	631
100g (BU)	2249	2036	2199	2170	2820	2366
Starch Damage (%)	7.7	7.0	6.4	7.2	7.3	7.7
Dough Properties:						
Farinograph:						
Peak Time (min)	5.5	7.2	8.0	6.6	7.2	6.8
Stability (min)	10.6	11.3	11.3	11.0	12.9	11.2
Absorption (%)	63.1	64.5	65.0	64.0	63.7	65.4
Classification	5.0	5.0	5.0	5.0	5.4	5.1
Alveograph: P (mm)	94	86	85	89	94	99
L (mm)	106	124	128	117	111	115
P/L Ratio	0.88	0.69	0.66	0.76	0.85	0.86
W (10^{-4} joules)	328	351	366	345	367	379
Extensograph: Resistance (BU)	436/587	406/644	417/701	422/633	473/654	422/558
(45/135 min) Extensibility (cm)	16.0/14.8	16.6/15.3	18.4/16.7	16.8/15.4	16.7/14.2	17.8/17.0
Area (sq cm)	94/114	87/123	99/152	93/126	103/119	99/122
Baking Evaluation:						
Absorption (%)	66.1	67.5	68.1	67.0	62.9	64.4
Crumb Grain and Texture	8.3	7.9	7.3	7.9	8.1	8.4
Loaf Volume (cc)	912	988	1020	962	999	964
% Area Production:	**44**	**31**	**25**	**100**		

2013 Protein Range: Low, less than 13.5%; Med, 13.5 - 14.5%; High, 14.5% or greater

Western Regional Average						Eastern Regional Average					
2013 By Protein				2012	5-year	2013 By Protein				2012	5-year
Low	Med	High	Overall	Overall	Average	Low	Med	High	Overall	Overall	Average
62.2	62.3	61.8	62.1	61.1	61.0	63.1	63.3	62.0	63.0	61.5	61.3
81.8	81.9	81.3	81.7	80.3	80.2	83.0	83.2	81.5	82.8	80.9	80.6
0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2
0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.1	0.9	1.1	1.0	1.9	1.7	0.5	1.0	0.9	0.7	0.9	1.0
1.1	0.9	1.1	1.0	2.0	1.7	0.5	1.0	0.9	0.7	0.9	1.1
70	71	69	70	87	82	70	62	91	72	65	64
1 NS	1 NS	1 NS	1 NS	1 DNS	1 DNS	1 NS	1 NS	1 DNS	1 NS	1 NS	1 NS
0.8	0.7	0.7	0.7	0.9	0.7	0.4	0.6	0.8	0.5	0.5	0.6
11.6	11.6	11.4	11.5	10.6	11.5	13.0	12.8	12.9	12.9	12.6	12.6
12.3/14.0	13.9/15.8	15.0/17.1	13.7/15.6	15.0/17.1	14.4/16.4	12.5/14.2	13.9/15.8	15.2/17.3	13.4/15.2	14.4/16.4	13.9/15.9
1.58/1.84	1.55/1.80	1.56/1.81	1.56/1.81	1.58/1.84	1.54/1.79	1.50/1.74	1.47/1.71	1.53/1.78	1.50/1.74	1.56/1.81	1.62/1.88
31.4	32.2	31.2	31.6	27.9	30.5	36.0	30.7	28.2	33.2	29.9	31.3
46/51/3	53/45/2	43/54/3	47/50/3	26/68/7	36/59/5	66/32/2	53/45/2	41/55/4	58/40/2	43/53/3	50/47/3
84.4	79.8	82.7	82.2	82.8	79.1	84.8	87.9	85.4	85.7	86.8	81.0
33.6	36.4	32.8	34.3	31.6	32.6	38.9	34.1	31.1	36.3	32.6	34.0
2.38	2.51	2.39	2.43	2.29	2.58	2.70	2.45	2.30	2.56	2.39	2.68
52.1	63.4	65.4	60.3	62.1	61.6	49.7	59.9	65.6	55.2	60.6	56.3
386	397	424	402	414	379	387	416	418	400	422	390
< 0.5	0.7	< 0.5	< 0.5	< 0.5		0.5	0.9	0.7	0.6	< 0.5	
70.3	69.1	68.0	69.1	68.2	68.3	70.6	69.3	68.2	69.8	69.6	69.7
91.0	91.0	90.9	91.0	90.9	90.7	91.1	90.8	90.6	90.9	90.7	90.5
-1.2	-1.1	-1.1	-1.1	-1.0	-1.1	-0.9	-1.1	-1.0	-1.0	-0.9	-1.0
9.7	9.5	9.7	9.6	9.4	9.5	9.0	9.7	9.7	9.3	9.1	9.3
11.6/13.5	13.1/15.2	14.0/16.3	12.9/15.0	13.8/16.0	13.3/15.5	11.5/13.4	12.9/15.0	14.1/16.4	12.3/14.3	13.5/15.7	12.9/15.0
0.54/0.63	0.53/0.62	0.53/0.62	0.53/0.62	0.50/0.58	0.49/0.57	0.53/0.61	0.52/0.60	0.53/0.61	0.53/0.61	0.51/0.59	0.54/0.63
32.7	36.0	40.2	36.2	36.3	36.1	31.4	36.9	40.1	34.4	35.3	34.4
95.9	95.2	93.2	94.8	80.6	89.1	98.0	94.0	92.2	95.9	91.4	92.7
423	400	426	416	425	404	396	419	419	406	420	394
568	513	604	560	744	673	665	507	614	615	726	598
1957	2033	2065	2018	2779	2494	2424	2041	2450	2328	2858	2269
7.9	7.1	6.5	7.2	7.2	7.5	7.6	6.8	6.2	7.2	7.3	7.9
5.5	8.0	8.5	7.3	7.5	7.5	5.5	6.0	7.0	5.9	6.8	6.3
10.0	11.5	11.5	11.0	13.0	11.8	11.0	11.0	11.0	11.0	12.8	10.7
63.4	64.7	65.7	64.6	64.0	65.5	63.0	64.2	63.8	63.5	63.5	65.3
5.0	5.0	5.0	5.0	5.4	5.3	5.0	5.0	5.0	5.0	5.4	4.9
95	87	87	90	96	101	93	84	81	89	92	97
112	123	135	123	114	118	103	126	116	111	109	112
0.85	0.71	0.64	0.73	0.84	0.86	0.90	0.67	0.70	0.80	0.85	0.87
340	353	385	359	376	400	321	348	331	330	359	363
450/658	407/650	419/701	425/669	485/655	444/587	428/545	404/635	413/702	419/596	462/652	405/534
15.6/13.9	17.4/16.3	18.1/16.6	17.0/15.6	16.6/14.2	18.0/17.2	16.3/15.4	15.4/13.9	18.9/16.9	16.5/15.3	16.7/14.2	17.6/16.8
95/122	92/133	98/149	95/134	105/120	105/131	93/109	79/109	102/157	91/117	101/119	95/115
66.1	67.7	68.7	67.5	63.4	64.5	66.0	67.2	67.0	66.5	62.4	64.2
8.3	7.5	7.0	7.6	7.9	8.5	8.3	8.5	7.8	8.2	8.2	8.5
885	1003	993	961	1009	965	928	968	1070	963	989	962
33	**36**	**32**	**100**			**56**	**26**	**18**	**100**		

2013 Protein Range: Low, less than 13.5%; Med, 13.5 - 14.5%; High, 14.5% or greater

HARD RED SPRING | EXPORT CARGO DATA

Hard Red Spring	PNW Average		Great Lakes Average		Gulf Average	
	2012	2011	2012	2011	2012	2011
Wheat Grade Data:						
Test Weight (lb/bu)	61.9	61.7	61.5	61.6	61.5	61.7
(kg/hl)	81.4	81.1	80.8	81.1	80.8	81.2
Damaged Kernels (%)	0.2	0.6	0.7	1.9	1.0	1.0
Foreign Material (%)	0.1	0.1	0.0	0.1	0.1	0.1
Shrunken & Broken (%)	1.6	1.5	1.3	1.7	1.2	1.3
Total Defects (%)	1.9	2.2	2.1	3.8	2.3	2.4
Vitreous Kernels (%)	84	79	47	40	54	69
Grade	1 DNS	1 DNS	1 NS	2 NS	1 NS	1 NS
Wheat Non-Grade Data:						
Dockage (%)	0.3	0.4	0.6	0.7	0.6	0.4
Moisture (%)	10.8	11.7	12.5	12.6	12.6	12.7
Protein (%) 12%/0% moisture basis	14.3/16.2	14.0/15.9	14.3/16.3	13.9/15.8	14.2/16.1	13.6/15.4
Ash (%) 14%/0% moisture basis	1.56/1.82	1.56/1.82	1.53/1.78	1.68/1.96	1.58/1.84	1.63/1.89
1000 Kernel Weight (g)	30.0	30.5	30.3	29.3	30.6	30.5
Kernel Size (%) lg/md/sm	34/60/5	37/58/5	43/53/4	43/52/5	44/52/4	45/51/4
Single Kernel: Hardness	81.3	81.8	81.4		81.5	82.7
Weight (mg)	29.2	29.9	29.7		29.8	30.0
Diameter (mm)	2.60	2.64	2.69		2.66	2.67
Sedimentation (cc)						
Falling Number (sec)	469	419	440	417	465	418
DON (ppm)	0.2	0.6	0.9		0.4	0.9
Flour Data:						
Lab Mill Extraction (%)	70.9	69.0	71.3	69.6	71.2	68.7
Color: L*	90.3	90.4	89.9	90.2	90.1	90.5
a*	-0.9	-1.0	-0.9	-0.9	-0.9	-0.9
b*	9.4	9.1	9.1	9.1	9.4	9.0
Protein (%) 14%/0% moisture basis	13.5/15.6	13.0/15.1	13.6/15.8	12.8/14.9	13.4/15.6	12.4/14.5
Ash (%) 14%/0% moisture basis	0.56/0.65	0.53/0.62	0.53/0.61	0.54/0.63	0.56/0.65	0.55/0.64
Wet Gluten (%)	34.9	35.5	33.4	33.8	34.7	34.0
Gluten Index	91.7	89.7	97.0	94.7	92.4	92.2
Falling Number (sec)	529	465	489	436	502	459
Amylograph Viscosity: 65g (BU)	693	615	683	507	640	638
100g (BU)						
Starch Damage (%)						
Dough Properties:						
Farinograph:						
Peak Time (min)	7.3	7.1	7.3	7.2	7.5	6.7
Stability (min)	8.8	10.0	10.1	12.4	10.7	10.5
Absorption (%)	62.7	63.8	62.0	62.7	61.5	62.9
Classification	4.4	4.7	4.8	5.3	4.8	4.7
Alveograph: P (mm)	86	90	90	94	83	88
L (mm)	123	117	125	108	121	114
P/L Ratio	0.70	0.77	0.72	0.87	0.69	0.77
W (10^{-4} joules)	338	344	381	354	337	333
Extensograph: Resistance (BU)						
(45/135 min) Extensibility (cm)						
Area (sq cm)						
Baking Evaluation:						
Absorption (%)	64.2	64.4	63.3	61.6	63.0	64.1
Crumb Grain and Texture	8.3	8.3	8.3	8.3	8.2	8.4
Loaf Volume (cc)	939	962	934	987	925	950
Sample Count:	**156**	**204**	**4**	**3**	**28**	**44**

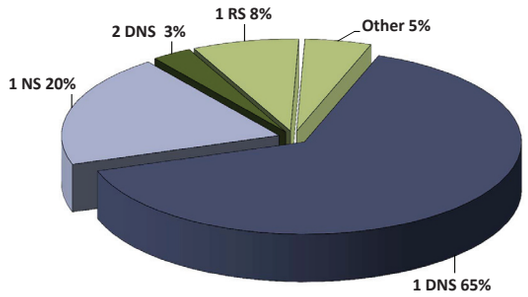
Hard Red Spring Production

for the major producing states (million metric tons)

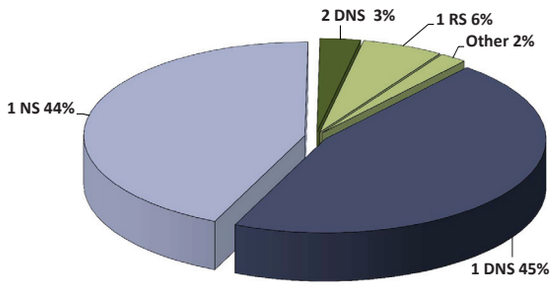
	2013	2012	2011	2010	2009
Idaho	0.5	0.5	0.6	0.7	0.6
Minnesota	1.8	2.0	1.9	2.3	2.2
Montana	2.9	2.6	2.1	2.8	1.9
North Dakota	6.3	7.0	4.7	7.8	7.9
Oregon	0.1	0.1	0.1	0.1	0.1
South Dakota	1.4	1.1	1.0	1.6	1.8
Washington	0.3	0.4	0.5	0.4	0.4
Seven-State Total	**13.3**	**13.7**	**11.0**	**15.8**	**14.9**
Total HRS Production	**13.3**	**13.7**	**11.0**	**15.8**	**14.9**

Based on USDA crop estimates of September 30, 2013.

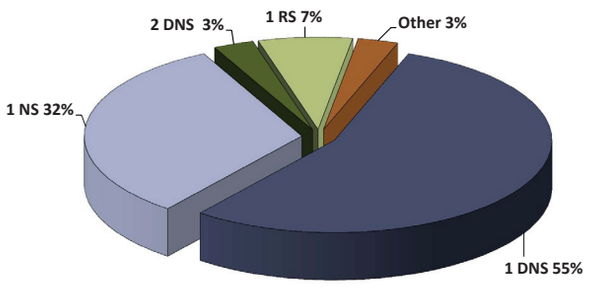
WESTERN REGION



EASTERN REGION



OVERALL

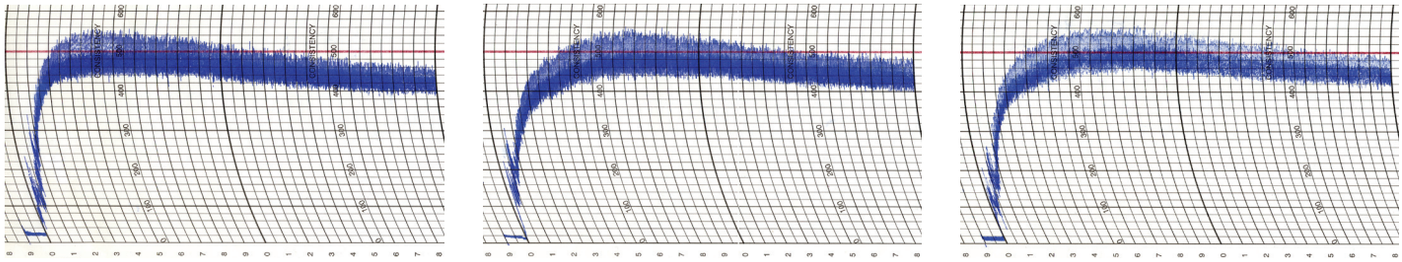


ABOUT HARD RED SPRING WHEAT

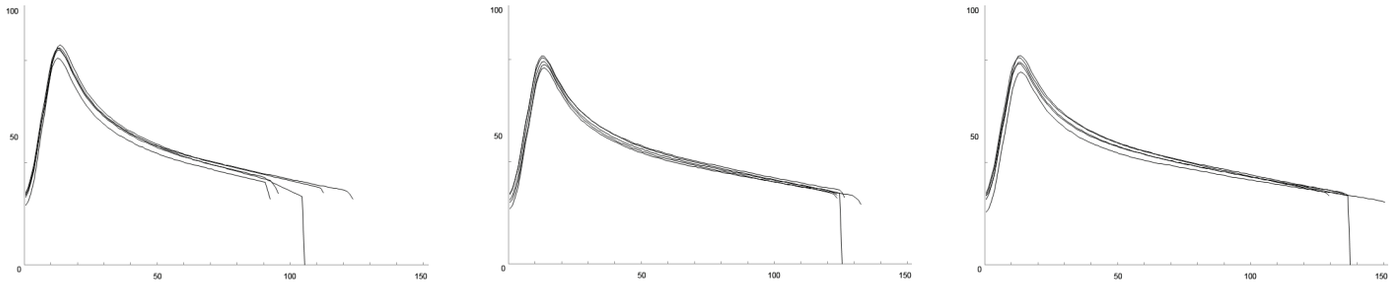
Highest protein content, hard endosperm, red bran, strong gluten, high water absorption. Used in pan breads, hearth breads, rolls, croissants, bagels, hamburger buns, pizza crust and for blending.



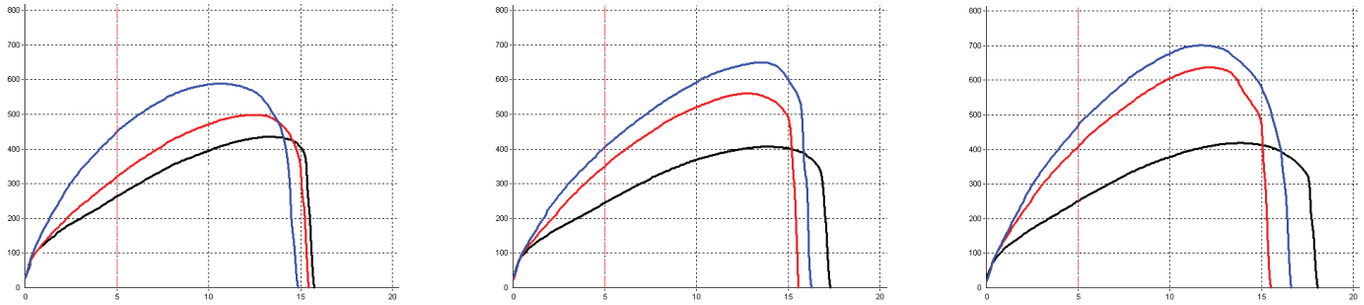
FARINOGRAMS*



ALVEOGRAMS



EXTENSOGRAMS



LOW PROTEIN | MEDIUM PROTEIN | HIGH PROTEIN

*Representing 2013 Composite Average



HARVEST SURVEY

Hard white wheat (HW) is primarily grown in Idaho, California, Kansas, Colorado, and Washington. Montana, Nebraska, North Dakota, South Dakota, Oregon and others have limited production. Currently U.S. Wheat Associates (USW) estimates 2013 HW production at 690,000* MT, down from 2012's USW estimate of 765,000 MT. Planted acres were down this year primarily because acres were abandoned in Colorado and Kansas due to the severe drought.

Survey Methods: Samples were collected by state and private grain inspection agencies; commercial wheat handlers; Plains Grains, Inc. (Stillwater, OK); South Dakota State University and a number of state wheat commissions. These samples represented diverse growing conditions across the country. Wheat grading was conducted by the Federal Grain Inspection Service (FGIS), Portland, Oregon. All other tests were conducted by the Wheat Marketing Center (WMC), Portland, Oregon.

HW samples were made into seven composites based on the four growing regions sampled (PNW, California, Southern Plains, and Northern Plains) and four protein levels (less than 11.5%, 11.5 – 12.5%, 12.6 – 13.5%, and greater than 13.5%). Wheat and flour tests were done according to the AACC International Approved Methods (11th Edition). Chinese raw and wet noodle testing and steamed bread evaluation were conducted according to protocols established by Asian noodle and steamed bread makers and flour millers at WMC during USW's Asian Products Collaborative Program.

Wheat and Grade Data: All samples graded US No. 1 with test weights from 60.1 to 65.5 lb/bu (79.1 to 86.0 kg/hl). Wheat moisture contents were in the range of 8.8 to 12.0%, and wheat ash contents ranged from 1.49% to 1.68% (14% mb). The PNW high-protein composite and California medium- and very high-protein composites had higher thousand kernel weights and kernel diameters than other composites. Falling number values were 346 sec or higher for all composites, indicating sound grain during harvest.

Flour, Dough and Baking Data: Buhler laboratory mill straight-grade flour extractions ranged from 68.5 to 73.6%, whiteness (L*) values were from 91.4 to 92.5, flour protein contents were 11.0 to 14.8% (14% mb), and flour ash contents varied from 0.39 to 0.50% (14% mb). These values were typical of HW flours.

Flour wet gluten contents ranged from 29.3 to 35.6% depending on flour protein content. Amylograph peak viscosities were between 713 and 979 BU, which showed good starch pasting properties. Starch damage values were in the range of 4.0 to 5.2%. Lactic acid SRC values were 137% or higher, indicating strong gluten strength for bread baking.

Farinograph absorption ranged from 57.0 to 64.4%, and stability times were 11.5 to 34.3 min, exhibiting typically medium to strong dough characteristics of HW wheat. HW usually has a similar farinograph water absorption to HRW, but the stability time is much longer indicating more tolerance to overmixing. The ranges of alveograph values were: 66-144 mm for P values, 91-168 mm for L values, and 339-549 erg/g for W values. Extensograph data at 135-minute resting showed that maximum resistance was in the range of 806-1305 BU, and extensibility was from 8.2-12.9 cm.

All samples showed very good baking performance relative to their protein content, with the bake absorptions in the range of 61.8-69.2%, loaf volumes from 813 to 1007 cc, and crumb grain and texture scores of 6.5-8.0 points.

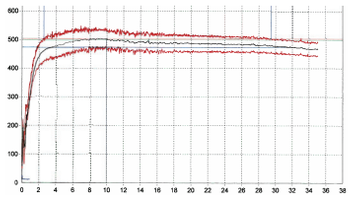
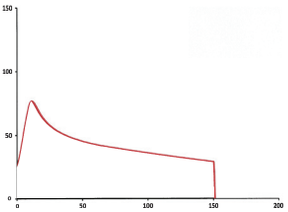
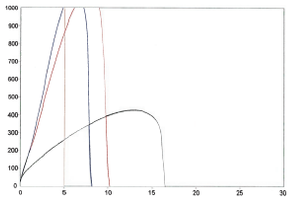
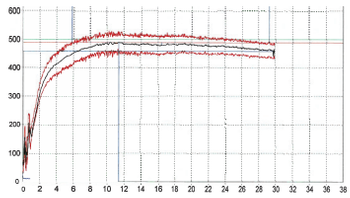
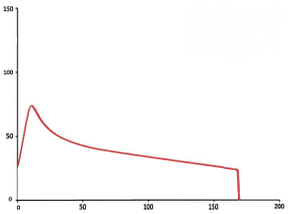
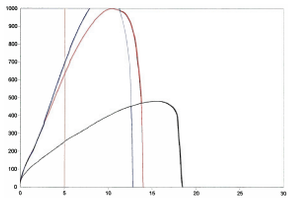
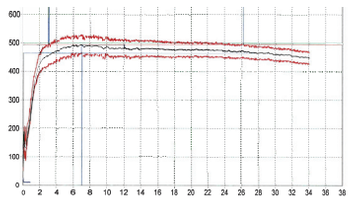
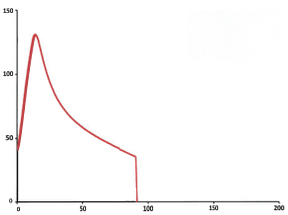
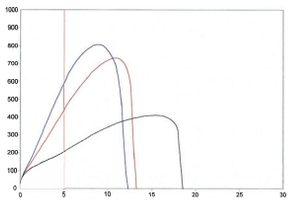
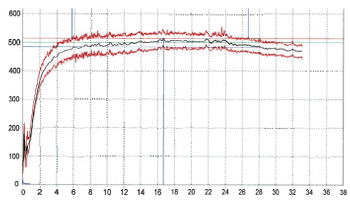
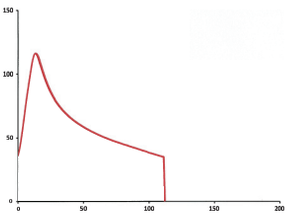
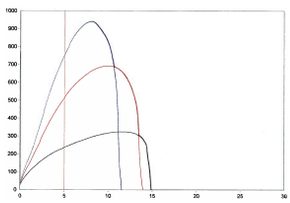
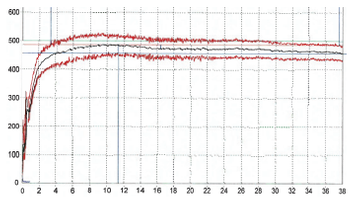
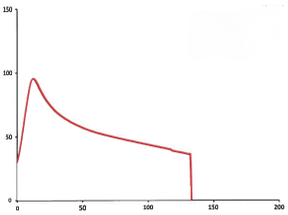
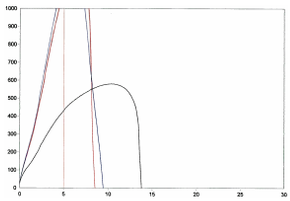
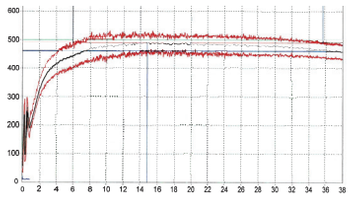
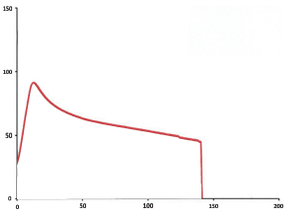
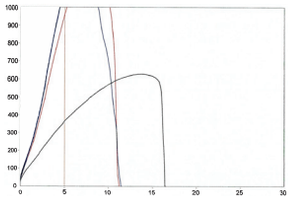
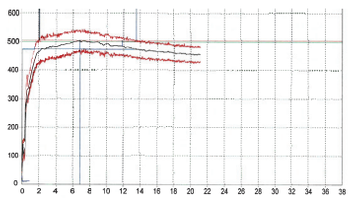
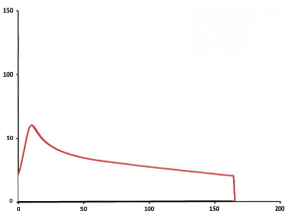
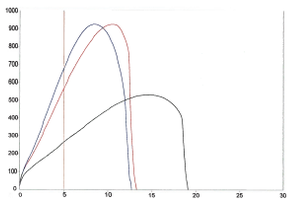
Noodle Evaluation: HW flours and a control flour were evaluated for both Chinese raw noodles (white salted) and Chinese wet noodles (yellow alkaline). For Chinese raw noodles, all samples had acceptable L* values (lightness) at 0 hour of production; however, after 24 hours of storage at room temperature, all except the PNW very high protein composite and Northern Plains medium protein composite showed greater discoloration than desired (maximum 10 units). Sensory color stability scores were acceptable for PNW very high protein, California medium protein, and Southern Plains high protein composites. Cooked noodle texture was acceptable for all samples except the California medium protein composite, which was slightly softer. For Chinese wet noodles, most samples showed acceptable sensory color stability scores and cooked noodle texture. Overall, this year's HW samples had better noodle quality than last year because slightly lower extraction flours were used for noodle evaluation. It is recommended to use 60-65% extraction flour to further improve noodle color with this year's HW crop.

Steamed Bread Evaluation: HW flours were evaluated for Asian steamed breads in comparison with a control flour. Results showed that most samples were acceptable except the very high-protein composites from both PNW and Southern Plains, which had low scores because the flour protein was too strong. Blending 20-30% SW flour with HW flour would improve overall steamed bread quality.

Summary: US 2013 HW production was estimated at 690,000 MT, slightly lower than last year. Quality analyses indicated that this year's samples showed good quality performance in milling, dough rheological properties, and end-products including pan breads, Asian noodles, and steamed breads. For Asian noodle applications, it is recommended to use 60-65% extraction patent flour to improve noodle color while maintaining good noodle texture. In the manufacture of steamed breads, very high protein HW samples should be blended with low protein SW flour to eliminate shrinkage problems and improve product quality.

* USDA estimates 2013 HW production at 589,000 tons.

HARD WHITE | PHYSICAL DOUGH PROPERTIES

	FARINOGRAMS	ALVEOGRAMS	EXTENSOGRAMS
PNW HIGH			
PNW VERY HIGH			
CALIFORNIA MEDIUM			
CALIFORNIA VERY HIGH			
SOUTHERN PLAINS HIGH			
SOUTHERN PLAINS VERY HIGH			
NORTHERN PLAINS MEDIUM			

Hard White	Pacific Northwest		California		Southern Plains		Northern Plains
	High	Very High	Medium	Very High	High	Very High	Medium
Wheat Grade Data:							
Test Weight (lb/bu)	61.5	61.4	65.5	64.8	60.5	60.1	64.5
(kg/hl)	80.9	80.7	86.0	85.1	79.6	79.1	84.8
Damaged Kernels (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Foreign Material (%)	0.1	0.0	0.0	0.1	0.1	0.1	0.0
Shrunken & Broken (%)	0.9	0.6	0.3	0.3	2.2	2.3	0.0
Total Defects (%)	1.0	0.6	0.3	0.4	2.3	2.4	0.0
Grade	1 HW	1 HW	1 HW	1 HW	1 HW	1 HW	1 HW
Wheat Non-Grade Data:							
Dockage (%)	0.6	0.8	0.1	0.1	0.3	0.8	0.0
Moisture (%)	9.6	9.4	8.8	8.8	10.6	10.6	12.0
Protein (%) 12%/0% moisture basis	12.6/14.3	14.3/16.2	12.4/14.1	13.7/15.6	13.5/15.3	15.7/17.8	12.2/13.9
Ash (%) 14%/0% moisture basis	1.58/1.84	1.54/1.79	1.52/1.77	1.54/1.79	1.68/1.95	1.64/1.91	1.49/1.73
1000 Kernel Weight (g)	37.7	36.1	38.0	38.7	24.7	30.1	36.8
Kernel Size (%) lg/md/sm	86/13/1	85/14/1	90/10/0	89/11/0	29/63/8	71/26/3	88/12/0
Single Kernel: Hardness	66.0	64.1	71.8	64.9	81.7	65.4	75.0
Weight (mg)	39.0	38.4	39.1	40.7	23.6	29.5	35.7
Diameter (mm)	2.85	2.85	2.89	2.94	2.38	2.65	2.76
Sedimentation (cc)	51.5	59.9	44.0	51.7	40.4	47.5	33.3
Falling Number (sec)	366	387	362	346	401	432	564
Flour Data:							
Lab Mill Extraction (%)	72.2	70.0	68.5	69.1	69.5	70.6	73.6
Color: L*	92.4	92.0	92.4	92.5	91.5	91.5	91.4
a*	-1.9	-1.9	-1.7	-1.6	-2.3	-2.2	-1.7
b*	7.4	7.2	5.9	5.8	9.0	8.3	7.3
Protein (%) 14%/0% moisture basis	11.8/13.7	13.4/15.6	11.3/13.1	12.7/14.8	12.6/14.7	14.8/17.2	11.0/12.8
Ash (%) 14%/0% moisture basis	0.44/0.51	0.43/0.50	0.41/0.48	0.39/0.45	0.47/0.55	0.50/0.58	0.43/0.50
Wet Gluten (%)	29.6	33.2	31.1	34.7	32.6	35.6	29.3
Gluten Index	98.3	95.5	94.9	84.0	97.4	99.7	96.9
Falling Number (sec)	386	401	403	409	403	442	622
Amylograph Viscosity 65 g (BU)	830	931	715	769	713	804	979
Starch Damage (%)	5.1	4.0	5.2	5.2	4.7	4.1	5.1
Solvent Retention Capacity (%)							
Water/50% Sucrose	69/138	65/135	68/125	69/126	65/118	65/119	64/98
5% Lactic Acid/5% Na_2CO_3	154/92	174/86	162/91	178/90	163/87	187/80	137/75
Dough Properties:							
Farinograph:							
Peak Time (min)	10.0	11.4	7.0	16.7	11.4	14.8	6.8
Stability (min)	26.9	23.4	23.1	20.9	34.3	29.6	11.5
Absorption (%)	58.2	59.4	62.7	64.4	58.9	62.0	57.0
Alveograph: P (mm)	84	81	144	128	105	100	66
L (mm)	150	168	91	111	133	140	164
P/L Ratio	0.56	0.48	1.58	1.15	0.79	0.71	0.40
W (10-4 joules)	418	425	402	441	475	549	339
Extensograph: Resistance (BU)	428/1093	480/1081	411/806	324/940	581/1222	627/1305	529/920
(45/135 min) Extensibility (cm)	16.6/8.2	18.4/12.9	18.7/12.3	15.0/11.7	13.8/9.5	16.6/11.5	19.1/12.7
Area (sq cm)	89/98	108/160	94/115	64/129	102/120	128/158	123/136
Baking Evaluation:							
Bake Absorption (%)	63.2	64.5	67.6	69.2	64.1	66.8	61.8
Crumb Grain and Texture	8.0	8.0	6.5	7.5	8.0	6.5	7.5
Loaf Volume (cc)	979	1007	847	935	1000	1000	813

2013 Protein Range: Low, less than 11.5%; Medium, 11.5 to 12.5%; High, 12.6 to 13.5%; Very High, greater than 13.5%.

HARD WHITE | HARVEST DATA

Hard White	Pacific Northwest		California		Southern Plains		Northern Plains
	High	Very High	Medium	Very High	High	Very High	Medium
Chinese Raw Noodle-Making Quality:							
Color at 0/24 hour: L*	82.2/70.5	81.1/71.9	83.5/72.1	82.6/70.1	82.0/71.3	81.4/69.9	82.0/71.9
a*	0.6/1.1	0.7/1.5	0.4/0.6	0.6/0.9	0.1/0.6	0.0/0.8	0.8/1.2
b*	19.4/22.7	20.9/24.8	16.4/19.2	16.4/19.1	21.2/25.2	18.7/24.8	17.5/21.3
Change in L* (0-24 hr)	11.7	9.2	11.5	12.5	10.8	11.4	10.1
Cooking Yield (5 min, %)	118	115	121	103	108	108	122
Sensory Color Stability Score	6.0	6.8	6.8	6.0	6.5	6.0	6.3
Instrumental Texture:							
Firmness (g)	1257	1311	1095	1151	1479	1425	1306
Springiness (%)	95.2	95.3	95.3	95.1	95.9	95.4	94.8
Cohesiveness	0.65	0.64	0.67	0.66	0.64	0.64	0.64
Chewiness (g)	781	805	697	719	906	870	797
Chinese Wet Noodle-Making Quality:							
Uncooked Color at 0/24 hour: L*	79.3/67.5	80.4/70.8	80.3/68.9	78.3/66.8	80.3/68.0	78.2/67.8	80.9/69.9
a*	-1.5/-0.4	-1.0/-0.5	-1.5/-0.8	-1.3/-0.7	-1.5/-0.5	-1.5/-0.6	-0.8/0.2
b*	21.7/22.4	21.6/25.0	18.6/20.6	19.7/20.1	21.7/24.4	21.6/23.4	17.8/21.5
Change in L* (0-24 hr)	11.7	9.6	11.4	11.5	12.4	10.4	11.0
Parboiled Color at 0/24 hour: L*	76.4/76.6	77.4/77.9	77.4/78.5	76.8/78.0	76.5/77.3	76.1/75.9	77.8/78.6
a*	-2.3/-2.7	-2.3/-2.6	-2.6/-2.7	-2.1/-2.4	-2.0/-2.7	-2.2/-2.5	-2.0/-2.0
b*	28.1/26.7	28.3/27.1	24.7/23.6	24.2/23.0	29.5/28.2	27.9/26.4	25.4/24.7
Cooking Yield (1.5 min, %)	65	67	71	70	64	67	64
Uncooked Color Stability Score	6.3	7.0	6.3	6.3	6.5	6.5	6.5
Parboiled Color Stability Score	6.8	6.8	6.5	6.5	7.0	6.3	6.3
Instrumental Texture:							
Firmness (g)	779	792	697	597	970	932	803
Springiness (%)	94.4	95.9	95.8	95.1	96.9	96.6	95.6
Cohesiveness	0.63	0.61	0.65	0.65	0.62	0.63	0.63
Chewiness (g)	466	464	434	368	580	566	483
Asian-Type Steamed Bread Evaluation:							
Specific Volume (ml/g)	2.7	2.0	3.1	3.1	2.9	2.0	2.7
Total Score	66.9	51.0	78.2	77.9	67.3	50.4	75.5

2013 Protein Range: Low, less than 11.5%; Medium, 11.5 to 12.5%; High, 12.6 to 13.5%; Very High, greater than 13.5%.

ABOUT HARD WHITE WHEAT

Medium to high protein content, hard endosperm, white bran. Used in Asian noodles, whole wheat or high extraction flour applications, pan breads and flat breads.



NORTHERN GREAT PLAINS

Weather and Harvest: The 2013 durum crop in Montana and North Dakota is 20% smaller than 2012. Persistent cool, wet spring weather reduced planted acres by one-third, but an excellent growing season supported well above average yields. Planting began two to three weeks behind average, and excessive, frequent rains in late May and early June stalled planting and reduced acreage. Cool temperatures and above-normal rainfall slowed early crop development but enhanced yield potential. Some disease occurred in areas with frequent precipitation, but drier, somewhat hotter weather later in the season limited significant disease effects to isolated areas.

Harvest began the last week of August and progressed steadily through mid-September. The remaining harvest was slowed by frequent precipitation and delayed maturity from the late planting. These delays reduced quality in portions of the crop. Harvest was completed in mid-October.

Survey Methods: Fewer samples than targeted were collected because of the harvest delays, and the survey does not represent the final 15% harvested. A total of 170 samples were collected from North Dakota (120) and Montana (50). State offices of the National Agricultural Statistics Service collected samples from producers in the field, from farm bins or at local elevators. The samples represent grain before any conditioning or blending, including unsold grain in farm bins. Analysis was conducted by the Durum Quality Lab, North Dakota State University, Fargo, North Dakota.

Wheat and Grade Data: Eighty percent of the crop grades No. 1 Hard Amber Durum (HAD). Because of adverse harvest rains, much of the remaining crop is Amber Durum or grade No. 3 or lower. Excellent kernel fill conditions supported heavy test weights, averaging 60.7 lbs/bu (79 kg/hl), similar to 2012 and the 5-year average. More than 80% of the crop has test weight greater than 60 lb/bu (78.1 kg/hl). Crop average thousand kernel weight is 44.4 g, well above the 5-year average of 38.2 g. Nearly 85% of the crop boasts a 40-gram TKW or higher, compared to roughly 20% in 2012.

Total defects average 1.0%, lower than the 2012 and 5-year averages, with fewer damaged and shrunken and broken kernels. Fusarium affected portions of the crop, resulting in areas having higher kernel damage and DON. Average DON is 1.0 ppm, similar to 2012.

Average protein of 12.8% (12% mb) is nearly 2 points below 2012 and about 1 point below the 5-year average. Growing conditions which promoted high yields also reduced protein. Still more than half of the crop exceeds 13% protein. Vitreous kernels average 85% compared to 89% in 2012. Harvest rains led to lower falling numbers which average 375 sec. One-fourth of the crop falls below 350 sec, compared to only 3% last year. Still, more than half of the crop exceeds 400 sec.

Semolina and Processing Data: Semolina extraction rates on the Buhler Laboratory Mill are above last year and the 5-year average. Total extraction averages 70.3% and semolina extraction 65.2% compared with 68.6% and 63.4%, respectively, in 2012. Average semolina ash of 0.66% is slightly higher and b* is lower than the 2012 average.

Semolina mixing properties are similar to last year with a slightly lower gluten index, 55 down from 61. Semolina speck counts are slightly higher than 2012, but lower than the 5-year average. Cooking qualities are lower than the 2012 and 5-year averages with a lower color score and less cooked firmness. Low protein levels and effects of harvest rains likely contributed to lower cooking qualities.

Summary: Buyers will need to be diligent in contract specifications because of the wide range of quality in the 2013 crop. While average values of key end-use quality factors are below 5-year levels, growers and handlers are likely to store different qualities separately. In addition to generally high kernel weight, significant portions of the crop are above average for factors such as protein, falling number and vitreous kernels. Capturing these higher qualities may require price premiums and more direct communication with sellers, but will help ensure buyers receive the quality they need.

DESERT DURUM®

Desert Durum®, a trademark of the Arizona Grain Research and Promotion Council and the California Wheat Commission, applies only to durum wheat produced under irrigation in the states of Arizona and California.

Desert Durum® is often delivered "identity preserved" to U.S. domestic and export markets. The identity preservation system allows buyers to purchase grain varieties having intrinsic quality parameters specific to their needs. Annual production requirements can be contracted ahead with grain merchandisers who provide certified seed of contracted varieties to experienced growers for planting. Handlers can store grain by varietal identity for season-long shipment on the buyers' preferred delivery schedules.

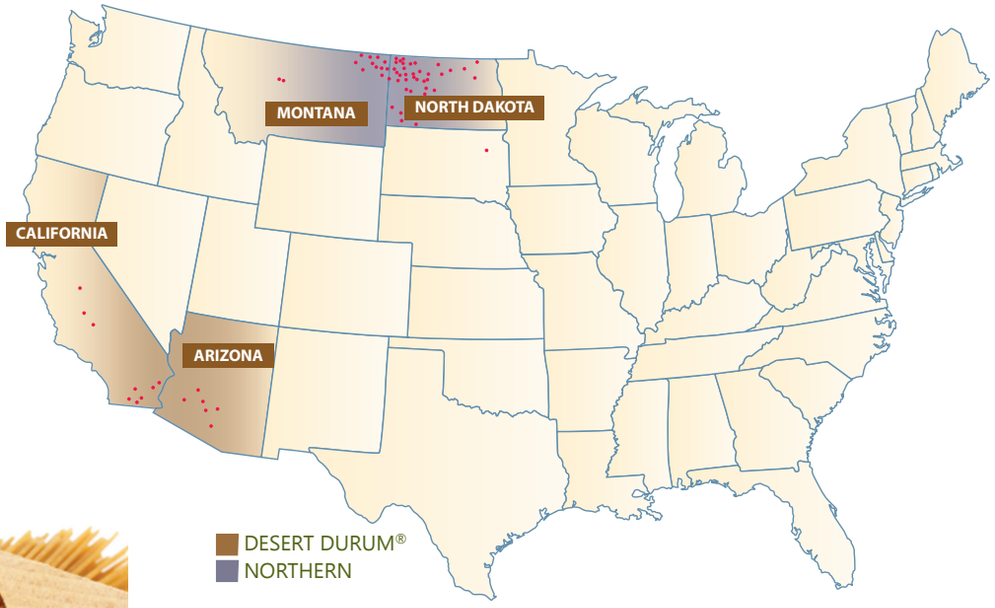
Total 2013 Desert Durum® acreage harvested was considerably lower than in 2012. Grain yields were generally average. The new crop grain again exhibited consistently large kernel size and low moisture, traits that contribute to achieving high extraction rates. Overall, grain quality characteristics met expectations. The 2013 Desert Durum® crop will deliver the valuable milling, semolina, and pasta quality traits that customers have learned to expect and appreciate.

ABOUT DURUM WHEAT

Durum is the hardest of all wheats, high protein content, yellow endosperm, white bran. Used to make pasta, couscous, and some Mediterranean breads.

EXPORT CARGO SURVEY

The durum export cargo data represents 13 individual sublot samples provided by USDA's Federal Grain Inspection Service for crop year 2012 (collected from October 2012 through June 2013) and 29 samples for 2011. Grade data are the actual official grades on the individual sublots. Processing analysis was conducted by North Dakota State University.

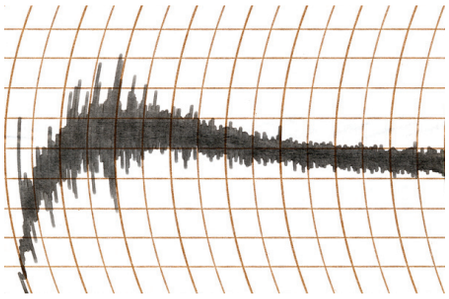




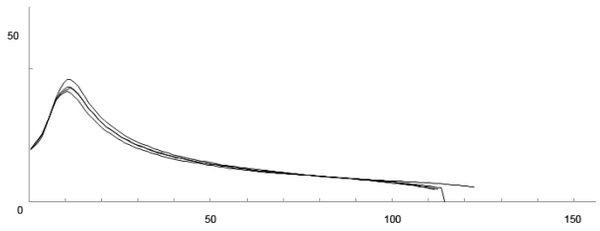
FOUR STATES SURVEYED

Arizona • California • Montana • North Dakota

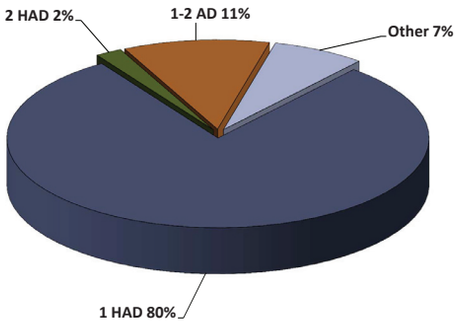
NORTHERN DURUM REGIONAL AVERAGE



MIXOGRAM
(SCORE = 5.5)



ALVEOGRAM



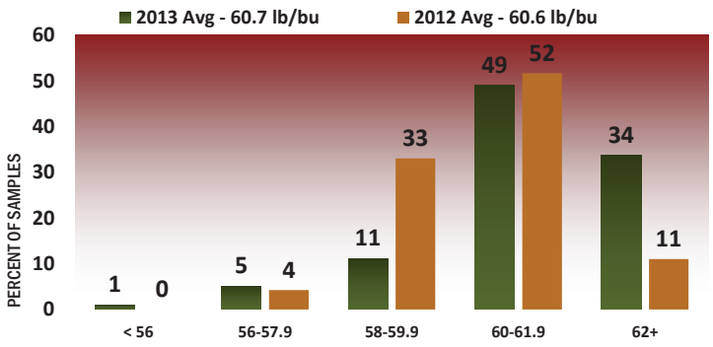
NORTHERN DURUM GRADE DISTRIBUTION

Durum	Harvest Data						Export Cargo Data			
	Northern Durum			Desert Durum®			Northern Durum		Desert Durum®	
	2013	2012	5-Year Avg	2013	2012	5-Year Avg	2012	2011	2012	2011
Wheat Grade Data:										
Test Weight (lb/bu)	60.7	60.6	60.4	62.8	62.3	62.7	60.5	60.2	61.9	62.0
(kg/hl)	79.0	78.9	78.7	81.7	81.2	81.6	78.9	78.5	80.7	80.7
Damaged Kernels (%)	0.2	0.5	0.6	0.2	0.2	0.3	1.2	2.3	0.4	0.7
Foreign Material (%)	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.1	0.1
Shrunken and Broken (%)	0.8	1.3	1.1	0.6	0.6	0.5	1.8	1.5	1.0	1.0
Total Defects (%)	1.0	1.8	1.7	0.8	0.9	0.8	3.1	4.0	1.6	1.8
Contrasting Classes (%)	0.2	0.0	0.2	0.0	0.0	0.0	0.8	1.1	0.0	0.2
Vitreous Kernels (%)	85	89	85	97	97	96	81	72	96	94
Grade	1 HAD	1 HAD	1 HAD	I HAD	1 HAD	1 HAD	2 HAD	2 AD	1 HAD	1 HAD
Wheat Non-Grade Data:										
Dockage (%)	0.9	0.9	1.1	0.5	0.4	0.3	0.5	0.7	0.6	0.6
Moisture (%)	12.1	10.5	11.4	6.3	6.3	6.5	10.9	12.4	6.9	6.7
Protein (%) 12%/0% moisture basis	12.8/14.6	14.6/16.6	14.0/15.9	13.2/15.0	13.7/15.5	13.4/15.3	14.3/16.3	13.7/15.6	13.5/15.4	13.3/15.1
Ash (%) 14%/0% moisture basis	1.57/1.83	1.57/1.83	1.55/1.81	1.79/2.09	1.74/2.02	1.72/2.00	1.62/1.88	1.65/1.92	1.66/1.93	1.63/1.90
1000 Kernel Weight (g)	44.4	36.9	38.2	46.4	45.2	50.4	36.4	40.4	43.4	47.1
Kernel Size (%) lg/md/sm	59/37/4	64/29/7	46/48/6	88/12/0	86/14/0	91/9/0	37/57/6	46/49/5	64/33/3	69/28/3
Falling Number (sec)	375	412	368	488			451	318	1387	914
Sedimentation (cc)	46	49	47							
DON (ppm)	1.0	1.0	0.5				0.7	0.6	0.0	0.1
Semolina Data:										
Lab Mill Extraction (%)	70.3	68.6	70.4	77.6	75.5	74.9	68.8	69.5	70.7	71.0
Semolina Extraction (%)	65.2	63.4	64.2	62.1	62.0	62.3	62.8	64.2	65.0	65.8
Ash (%) 14%/0% moisture basis	0.66/0.77	0.63/0.73	0.64/0.75	0.93/1.08	0.91/1.06	0.86/1.01	0.68/0.79	0.67/0.78	0.68/0.79	0.67/0.78
Specks (no/10 sq in)	26	23	29	22	4	5	25	23	25	21
Protein (%) 14%/0% moisture basis	11.7/13.6	13.7/15.9	12.9/15.0	12.3/14.3	12.5/14.5	12.3/14.3	13.1/15.2	12.4/14.4	12.2/14.2	12.2/14.2
Wet Gluten (%)	34.8	37.0	36.4	34.6	32.5	33.0				
Gluten Index	55.1	60.6	54.3	88.0			56.4	61.6	93.6	84.2
Mixograph Classification	5.5	5.6	5.4				5.7	6.4	7.9	7.4
Alveograph: P (mm)	52	45	47	112	102	87				
L (mm)	106	127	99	60	60	60				
P/L Ratio	0.50	0.36	0.48	1.90	1.80	1.44				
W (10-4 joules)	134	141	121	233	205	180				
Color: L*	84.6	85.0	84.7	87.3		88.1	84.9	84.8	85.1	84.8
a*	-3.2	-2.8	-2.8	-1.7		2.0	-2.8	-2.5	-2.7	-2.7
b*	27.7	29.8	27.9	25.6	25.9	25.9	27.6	26.7	25.7	27.8
Spaghetti Processing Data:										
Color Score	8.6	9.5	9.1	8.4	8.2	8.6	8.8	8.4	9.0	9.0
Cooked Weight (gm)	31.3	31.3	31.6	29.7	29.8	30.0	32.6	32.0	32.2	31.1
Cooking Loss (%)	6.7	5.3	5.9	7.0	7.4	7.5	5.8	5.8	5.8	5.8
Cooked Firmness (g cm)	4.0	5.1	5.1	7.7	7.6	7.5	4.6	4.7	5.2	5.4
Sample Count:							6	15	7	14

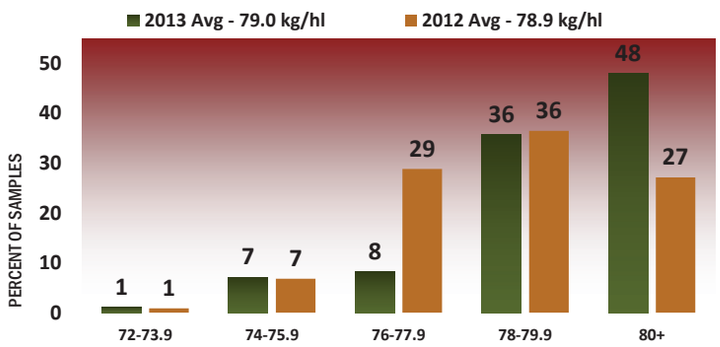
NOTE: Fewer northern durum samples than targeted were collected because of harvest delays. The northern durum survey does not represent the final 15% harvested.

NORTHERN DURUM DISTRIBUTIONS

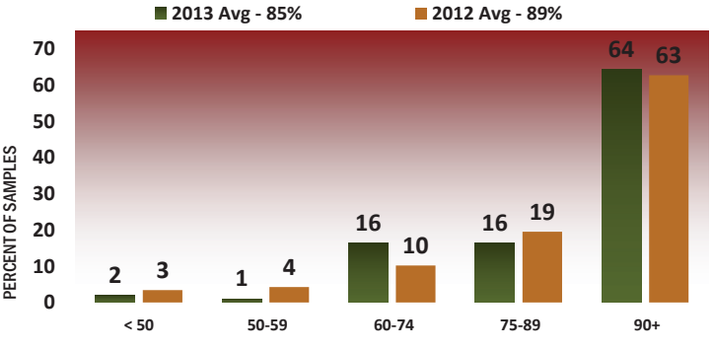
TEST WEIGHT | Pounds/Bushel



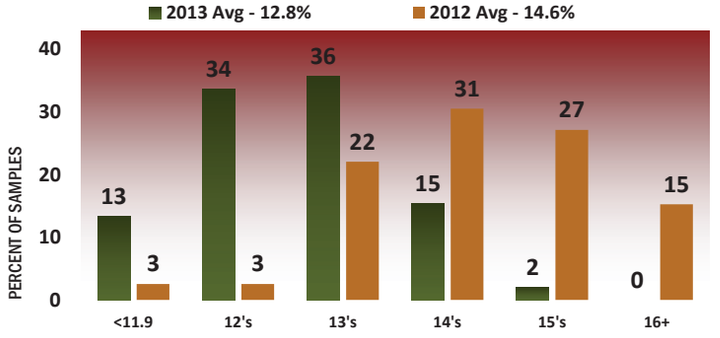
HECTOLITER WEIGHT | Kilograms/Hectoliter



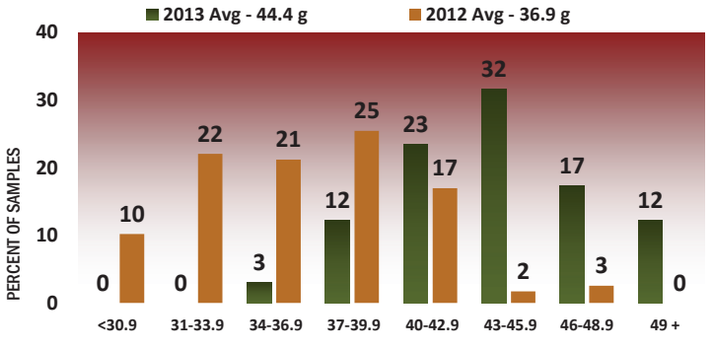
VITREOUS KERNELS | Percent



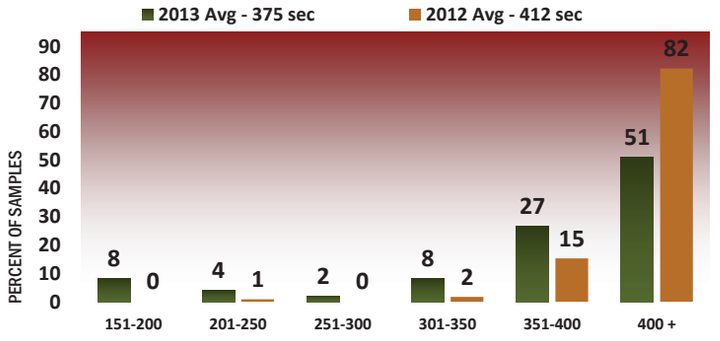
PROTEIN (12% MB) | Percent



1000 KERNEL WEIGHT | Grams



FALLING NUMBER | Seconds



Durum Production

for the major producing states (million metric tons)

	2013	2012	2011	2010	2009
Arizona	0.2	0.3	0.2	0.3	0.3
California	0.2	0.4	0.3	0.3	0.5
Montana	0.5	0.4	0.3	0.5	0.5
North Dakota	0.8	1.2	0.5	1.8	1.7
Total Durum Production	**1.7**	**2.2**	**1.4**	**2.9**	**3.0**

Based on USDA crop estimates of September 30, 2013.



THREE STATES SURVEYED

Idaho • Oregon • Washington

HARVEST SURVEY

Weather and Harvest: The Pacific Northwest had limited to adequate soil moisture at planting. Most areas received adequate rainfall during the winter and spring. Hot, dry conditions occurred during the end of wheat kernel development and continued during wheat harvest. A few areas received rainfall at harvest.

Survey and Analysis Methods: A total of 464 soft white (SW) and 72 white club (WC) wheat samples were collected from state and private grain inspection agencies and commercial wheat handling operations. USDA's Federal Grain Inspection Service (FGIS) graded and tested protein content on the wheat samples. For further testing, four composites were made, three from SW according to protein content (less than 9.0%, 9.0-10.5%, and greater than 10.5%) and one from all WC samples. Wheat and flour quality testing and data analyses were conducted by the Wheat Marketing Center (WMC), Portland, Oregon. Laboratory testing was conducted according to either American Association of Cereal Chemists Approved Methods (11th Edition) or WMC standard methods.

Wheat and Grade Data: The 2013 average SW test weight of 61.1 lb/bu (80.4 kg/hl) was similar to last year's 61.0 lb/bu (80.2 kg/hl), and WC test weight of 61.1 lb/bu (80.4 kg/hl) was above last year's 60.3 lb/bu (79.3 kg/hl). Other FGIS grading factors and dockage for SW and WC were similar to the 2012 and 5-year averages. Average SW moisture content decreased to 9.1% from 9.5% last year, while WC average moisture increased to 9.2% from 8.9% last year.

Soft white wheat protein content (12% mb) at 10.3% was higher than last year's 9.8% and the 5-year average. WC protein at 10.5% was higher than the 2012 and 5-year averages. SW wheat ash (14% mb) at 1.36% was similar to the 2012 and 5-year averages, and WC ash was lower at 1.25% than the 2012 and 5-year averages. Thousand kernel weight for SW was similar to last year, but heavier than the 5-year average. WC thousand kernel weight was heavier than last year and the 5-year average. Both SW and WC kernel diameters were similar to the 2012 and 5-year averages. Falling numbers were 349 sec for SW and 344 sec for WC, both of which were higher than the 2012 and 5-year averages.

Flour, Dough and Baking Data: Buhler Laboratory Mill flour extraction for SW at 75.9% and WC at 76.7% was slightly higher than last year. Flour proteins (14% mb) were 9.1% and 9.4% for SW and WC, respectively. Flour ash (14% mb) for SW was the same as last year and similar to the 5-year average. WC ash was lower than the 2012 and 5-year averages. Falling number values were 365 seconds for SW and 356 seconds for WC. Amylograph peak viscosity values were 529 BU for SW and 450 BU for WC. Starch damage values were lower for SW and higher for WC than last year. Farinograph peak and stability times showed that SW had weaker gluten properties with similar water absorptions, and WC had slightly higher water absorption and slightly shorter stability time than last year and the 5-year averages. SW showed a shorter alveograph L value and WC showed a similar value compared with last year; both were similar to the 5-year averages. Extensograph extensibility for SW and WC were longer than the 2012 and 5-year averages. Sponge cake volume for SW of 1232 cc was higher with a slightly lower score than the 2012 and 5-year averages. The volume for WC of 1217 cc was less than last year and the 5-year average. SW cookie diameter was slightly larger than the 2012 and 5-year averages. WC cookie diameter was slightly smaller than last year, but slightly larger than the 5-year average. SW cookie spread factor was higher than last year and the 5-year average. Cookie spread factor for WC was lower than last year, but similar to the 5-year average.

Chinese Southern-Type Steamed Bread: Each composite flour was made into southern-type steamed bread and compared with steamed bread from control flour. The specific volume was slightly higher than last year for SW, but similar for WC. Total scores were higher than the 2012 and 5-year averages for SW, but both were lower for WC.

Summary: The 2013 crop has the typical high quality expected of SW for soft wheat products with high test weight, slightly higher than average protein, and excellent milling and processing characteristics. The high protein segment of SW has the potential to perform well in blends for bread products.

EXPORT CARGO SURVEY

The PNW SW export cargo data show the results of analyses of individual sublot samples including 89 drawn from the 2011 crop and 62 from the 2012 crop (August 2012 through May 2013). Representative samples were selected from official FGIS samples. Grade data were the actual grades on the individual sublots. Milling and processing analyses were conducted by WMC.

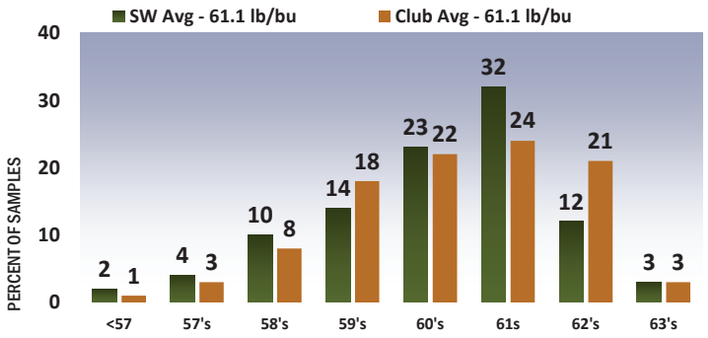
Pacific Northwest Soft White Wheat Production

in major producing states (million metric tons)

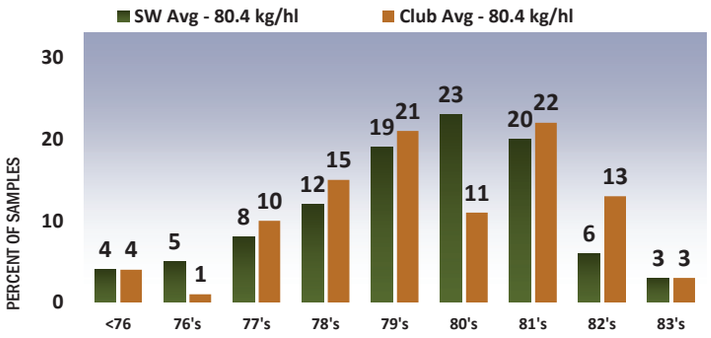
	2013		2012		2011		2010		2009	
	SW	CLUB	SW	CLUB	SW	CLUB	SW	CLUB	SW	CLUB
Washington	2.9	0.3	2.5	0.4	3.1	0.4	2.8	0.3	2.3	0.2
Oregon	1.3	0.0	1.4	0.0	1.8	0.0	1.5	0.0	1.2	0.0
Idaho	1.7	0.0	1.5	0.0	1.8	0.1	1.6	0.1	1.3	0.0
Three-State Total	**5.9**	**0.3**	**5.4**	**0.5**	**6.7**	**0.5**	**5.9**	**0.4**	**4.9**	**0.2**
Three-State Total Soft White Wheat	**6.2**		**5.9**		**7.2**		**6.3**		**5.1**	
Total US Soft White Wheat	**6.7**		**6.5**		**7.9**		**6.9**		**5.7**	

Based on USDA crop estimates of September 30, 2013.

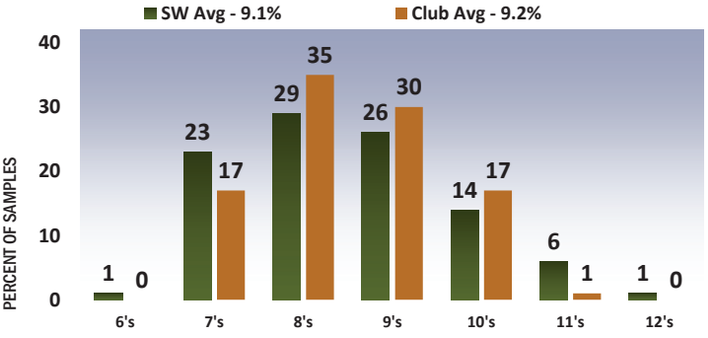
TEST WEIGHT | Pounds/Bushel



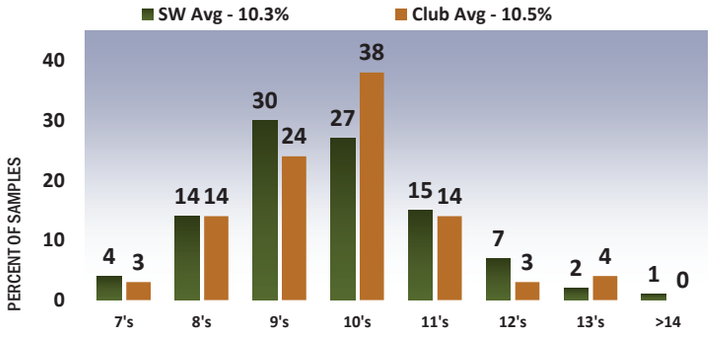
HECTOLITER WEIGHT | Kilograms/Hectoliter



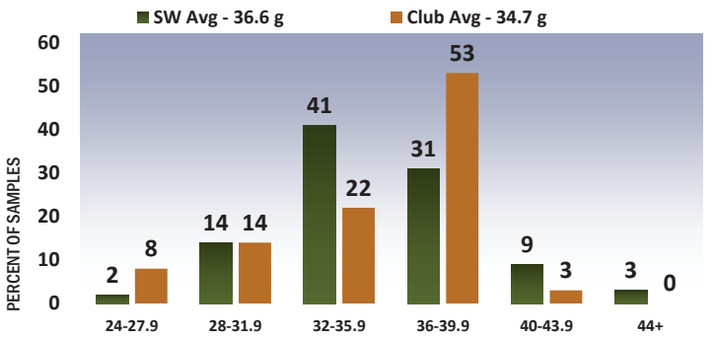
WHEAT MOISTURE | Percent



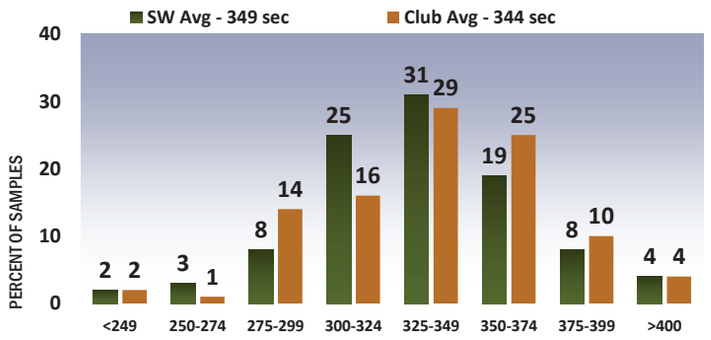
PROTEIN (12% MB) | Percent



1000 KERNEL WEIGHT | Grams



FALLING NUMBER | Seconds

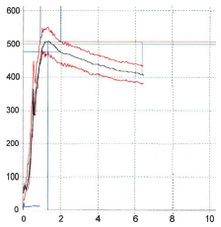


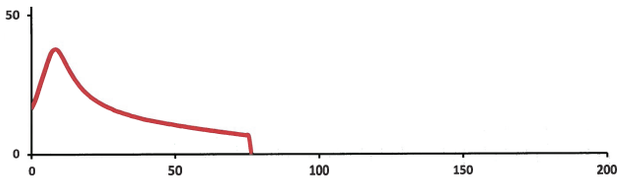
FARINOGRAMS

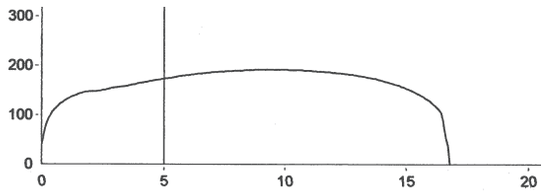
ALVEOGRAMS

EXTENSOGRAMS

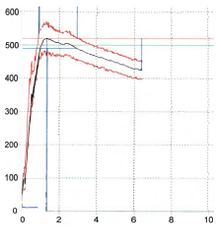
LOW PROTEIN

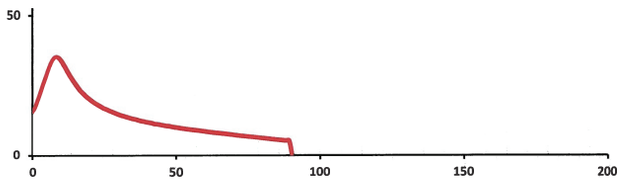


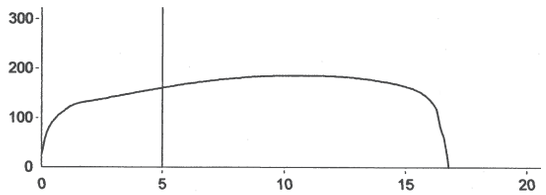




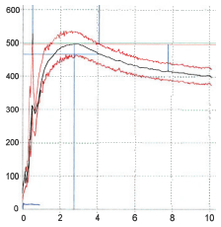
MEDIUM PROTEIN

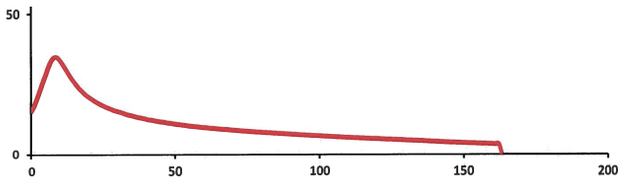


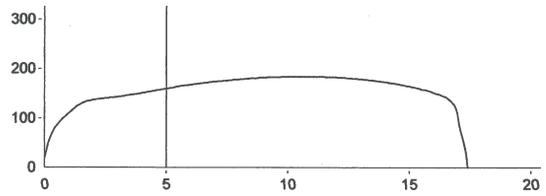




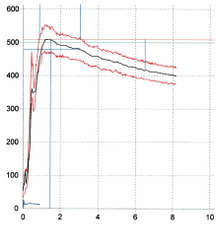
HIGH PROTEIN

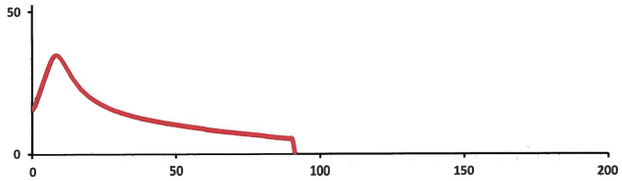


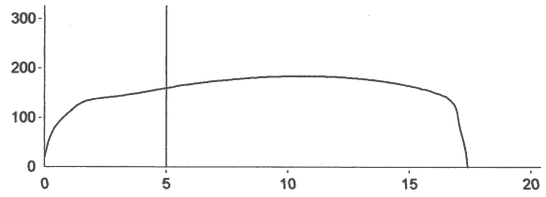




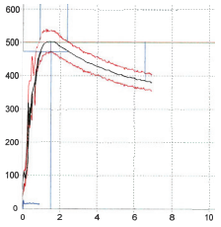
AVERAGE PROTEIN

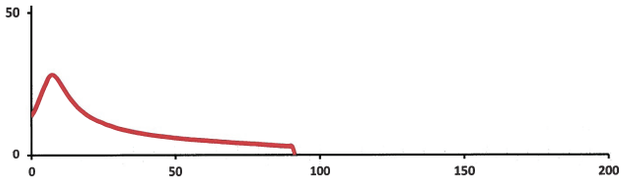


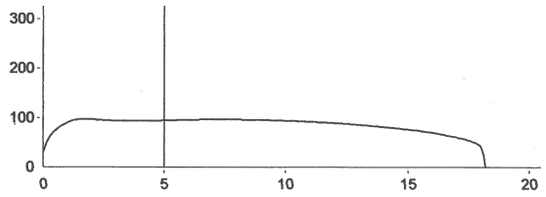




CLUB







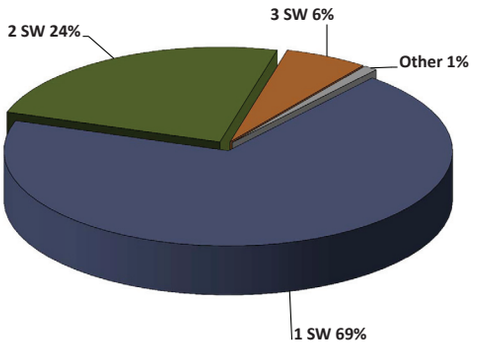
Soft White	2013					2012		5-Year Average	
	Soft White By Protein				Club				
	Low	Med	High	Overall	Average	SW	Club	SW	Club
Wheat Grade Data:									
Test Weight (lb/bu)	61.6	60.9	61.1	61.1	61.1	61.0	60.3	60.0	59.8
(kg/hl)	81.0	80.1	80.4	80.4	80.4	80.2	79.3	79.0	78.7
Damaged Kernels (%)	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Foreign Material (%)	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1
Shrunken & Broken (%)	0.5	0.6	0.7	0.6	0.8	0.5	0.8	0.7	1.1
Total Defects (%)	0.6	0.6	0.7	0.6	0.9	0.7	0.9	0.8	1.2
Grade	1 SW	1 SW	1 SW	1 SW	1 WC	1 SW	1 WC	1 SW	1 WC
Wheat Non-Grade Data:									
Dockage (%)	0.2	0.5	0.7	0.5	0.6	0.4	0.7	0.6	0.9
Moisture (%)	9.0	9.3	9.0	9.1	9.2	9.5	8.9	9.5	9.1
Protein (%) 12%/0% moisture basis	8.6/9.8	9.9/11.2	11.8/13.4	10.3/11.7	10.5/11.9	9.8/11.1	10.2/11.6	10.0/11.4	10.2/11.6
Ash (%) 14%/0% moisture basis	1.33/1.55	1.35/1.57	1.39/1.62	1.36/1.58	1.25/1.45	1.35/1.57	1.31/1.52	1.37/1.59	1.28/1.49
1000 Kernel Weight (g)	37.5	37.9	34.3	36.6	34.7	36.7	33.3	34.6	32.0
Kernel Size (%) lg/md/sm	90/10/0	88/12/0	82/18/0	87/13/0	86/14/0	88/11/1	82/17/1	82/17/1	76/23/1
Single Kernel: Hardness	32.7	31.7	33.2	32.5	32.1	35.7	32.3	34.0	33.2
Weight (mg)	40.7	39.9	36.9	39.0	37.2	39.6	36.0	38.1	35.2
Diameter (mm)	2.84	2.83	2.74	2.80	2.66	2.83	2.65	2.77	2.64
Sedimentation (cc)	11.8	12.8	19.3	14.9	11.2	18.1	12.7	17.2	14.5
Falling Number (sec)	355	334	365	349	344	320	308	322	309
Flour Data:									
Lab Mill Extraction (%)	75.6	76.5	75.2	75.9	76.7	75.6	75.3	72.7	73.9
Color: L*	92.6	92.2	92.2	92.3	91.3	91.9	91.9	92.1	92.1
a*	-2.6	-2.5	-2.3	-2.4	-2.3	-2.5	-2.4	-2.5	-2.4
b*	8.5	7.7	7.6	7.8	7.3	8.3	7.7	8.1	7.7
Protein (%) 14%/0% moisture basis	7.7/9.0	8.7/10.1	10.5/12.2	9.1/10.6	9.4/10.9	8.7/10.1	9.1/10.6	8.6/10.0	8.9/10.4
Ash (%) 14%/0% moisture basis	0.49/0.57	0.49/0.57	0.50/0.58	0.49/0.57	0.45/0.52	0.49/0.57	0.49/0.57	0.47/0.55	0.47/0.55
Wet Gluten (%)	17.2	21.8	31.5	24.4	24.3	18.1	23.5	21.5	18.5
Gluten Index	81.4	64.6	60.2	66.3	44.6	55.4	42.5	67.0	43.7
Falling Number (sec)	362	363	369	365	356	378	353	339	323
Amylograph Viscosity 65 g (BU)	452	509	598	529	450	470	464	485	495
Starch Damage (%) (14% mb)	4.8	4.3	4.0	4.3	3.7	4.6	3.3	4.5	3.9
Solvent Retention Capacity (%)									
Water/50% Sucrose	57/106	58/106	57/110	57/107	54/107	56/94	54/84	55/100	51/92
5% Lactic Acid/5% Na_2CO_3	93/81	96/78	104/79	98/79	84/78	91/81	76/72	99/81	81/74
Dough Properties:									
Farinograph: Peak Time (min)	1.3	1.4	2.8	1.5	1.5	1.7	1.3	1.7	1.5
Stability (min)	1.1	2.0	3.6	2.2	1.5	3.4	1.9	3.6	1.9
Absorption (%)	52.8	53.0	53.5	53.3	52.6	53.5	51.9	53.4	52.3
Alveograph: P (mm)	41	39	38	38	31	39	28	42	32
L (mm)	76	89	162	91	91	131	98	118	86
P/L Ratio	0.54	0.44	0.23	0.42	0.34	0.30	0.29	0.36	0.37
W (10^{-4} joules)	80	82	112	83	56	101	53	105	54
Extensograph: Resistance (BU)	192	186	205	184	97	163	89	188	103
(45 min) Extensibility (cm)	16.8	16.8	18.6	17.4	18.2	16.3	17.8	16.3	16.6
Area (sq cm)	49	47	57	49	28	42	23	47	25
Baking Evaluation:									
Sponge Cake: Volume (cc)	1277	1240	1198	1232	1217	1219	1239	1204	1221
Score	55	48	43	48	50	50	53	51	51
Cookie: Diameter (cm)	9.0	8.8	8.7	8.8	8.9	8.6	9.1	8.5	8.8
Spread Factor (width/height)	11.2	10.8	10.1	10.6	11.1	9.9	12.0	9.4	11.2
Pan Bread Bake Absorbtion (%)[1]			58.8						
Crumb Grain and Texture (1-10)[1]			4.3						
Loaf Volume (cc)[1]			688						
Chinese Southern-Type Steamed Bread Evaluation:									
Specific Volume (ml/g)	1.8	1.9	2.1	2.0	2.2	1.8	2.3	2.1	2.3
Total Score	64.7	69.9	71.0	69.3	65.6	67.6	66.3	67.4	66.4
% of Area Production:	**19**	**45**	**36**	**100**	**100**				

2013 Protein Range: Low, less than 9.0%; Medium, 9.0 - 10.5%; High, Greater than 10.5%

[1]Bread Bake for High Protein SW only

Soft White	2012	2011
Wheat Grade Data:		
Test Weight (lb/bu)	62.0	61.3
(kg/hl)	81.5	80.6
Damaged Kernels (%)	0.1	0.1
Foreign Material (%)	0.1	0.1
Shrunken & Broken (%)	0.7	1.0
Total Defects (%)	0.9	1.2
Grade	1 SW	1 SW
Wheat Non-Grade Data:		
Dockage (%)	0.3	0.4
Moisture (%)	9.4	9.3
Protein (%) 12%/0% moisture basis	9.2/10.5	9.9/11.2
Ash (%) 14%/0% moisture basis	1.32/1.53	1.35/1.57
1000 Kernel Weight (g)	39.2	36.8
Kernel Size (%) lg/md/sm	87/12/1	81/19/1
Single Kernel: Hardness	35.3	38.8
Weight (mg)	39.4	35.9
Diameter (mm)	2.81	2.70
Sedimentation (cc)	12.4	14.5
Falling Number (sec)	333	361
Flour Data:		
Lab Mill Extraction (%)	74.8	69.3
Color: L*	92.3	92.3
a*	-2.4	-2.4
b*	8.1	8.1
Protein (%) 14%/0% moisture basis	7.0/8.2	8.1/9.4
Ash (%) 14%/0% moisture basis	0.44/0.52	0.44/0.51
Wet Gluten (%)	19.0	20.7
Gluten Index	76.6	76.6
Falling Number (sec)	360	378
Amylograph Viscosity 65 g (BU)	477	506
Starch Damage (%) (14% mb)		
Solvent Retention Capacity (%)		
Water/50% Sucrose		
5% Lactic Acid/5% Na_2CO_3		
Dough Properties:		
Farinograph: Peak Time (min)	1.4	1.4
Stability (min)	2.4	3.2
Absorption (%)	52.9	52.4
Alveograph: P (mm)	40	41
L (mm)	92	123
P/L Ratio	0.44	0.33
W (10^{-4} joules)	87	108
Extensograph: Resistance (BU)		
(45 min) Extensibility (cm)		
Area (sq cm)		
Baking Evaluation:		
Sponge Cake: Volume (cc)	1195	1212
Score	49	48
Cookie: Diameter (cm)	8.6	8.9
Spread Factor (width/height)		
Pan Bread Bake Absorbtion (%)[1]		
Crumb Grain and Texture (1-10)[1]		
Loaf Volume (cc)[1]		
Chinese Southern-Type Steamed Bread Evaluation:		
Specific Volume (ml/g)		
Total Score		
Sample Count:	**62**	**89**

SW GRADE DISTRIBUTION





ABOUT SOFT WHITE WHEAT

Low protein, low moisture wheat. Soft endosperm, white bran, weak gluten. Used in pastries, cakes, biscuits, crackers, flat breads, Asian-style noodles and snack foods. Can also be used for blending.

SOFT RED WINTER | OVERVIEW

HARVEST SURVEY

Weather and Harvest: Soft red winter wheat (SRW) is widely grown in eastern United States. The 2013 production, estimated at 14.8 MMT, is the largest since 2008/09 and much larger than the 11.4 MMT produced in 2012. The area seeded in the fall of 2012 was up sharply from 2011, and average yield per acre is record high, up about 3% from the previous year. Crop development was slower than normal because of cool spring weather, and harvest was repeatedly delayed by rain. As a result, quality parameters this year vary across the states and do not match the sound values found in the 2012 crop.

Survey Methods: Great Plains Analytical Laboratory, Kansas City, Missouri, conducted sample collection and analysis. For 2013, 546 samples were collected from elevators in 18 reporting areas across nine states. Samples were collected at two different times reflecting early and late harvest. Test weight, moisture, protein, thousand kernel weight, wheat ash and falling number were determined on individual samples, while the remaining tests were on 36 composite samples. The results were weighted by 5-year average production for the 18 reporting areas and combined into "Composite Average," "East Coast" and "Gulf Port" values. Gulf Port states include Arkansas, Illinois, Indiana, Kentucky, Missouri, and Ohio and account for about 80% of production in the states surveyed. East Coast states include Maryland, North Carolina and Virginia and represent the remaining 20% of production in the states surveyed. The states surveyed typically account for 60%-70% of total SRW production.

Wheat and Grade Data: The overall average grade of U.S. No. 2 and average protein of 9.9% are similar to the 5-year averages, and average dockage of 0.5% is well below the 5-year average of 0.8%. However, test weight and falling number values are lower than, and damaged kernels higher than, 5-year averages. The Gulf Port average test weight of 58.7 lb/bu (77.3 kg/hl) is similar to the 5-year average, while the East Coast average of 57.2 lb/bu (75.3 lb/bu) is below last year and the 5-year average. Average damaged kernel content is 2.8%, up from a low 0.5% last year and the 5-year average of 1.3%. Both the East Coast (3.7%) and Gulf Ports (1.7%) damaged kernel values are higher than 5-year averages. Most of the increase in damage is reported to be sprout damage, which is consistent with the lower average falling number of 294 sec compared to the 5-year average of 328. While wheat protein content is similar to the 5-year average, sedimentation and wet gluten values are lower overall for both East Coast and Gulf Port states. The DON average for the three East Coast states is 2.2 ppm, well above the 5-year average, while DON for the six Gulf Port states is about average at 1.2 ppm.

Flour and Baking Data: Despite adverse harvest conditions, Buhler laboratory mill flour extraction and flour ash are similar to the 5-year averages overall for both East Coast and Gulf Port states. Overall farinograph absorption, stability and alveograph W values are also similar to the 5-year averages, though farinograph mix time averages 1.3 min compared with the 5-year average of 1.6 min. Farinograph peak and stability values and alveograph W values are similar to the 5-year averages for Gulf Port states, but are lower than average for East Coast. The East Coast cookie spread ratio exceeds the 5-year average while the Gulf Port average is equal to it. The average loaf volume for East Coast samples is similar to the 5-year average, but the Gulf Port average of 688 cc is below the 5-year average of 716 cc.

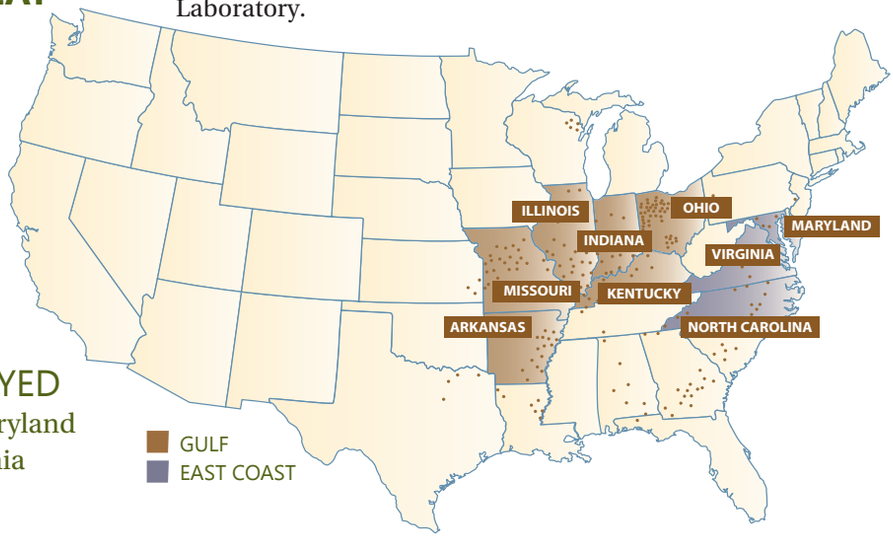
Summary: The 2013 crop has variable quality which reflects the cool, wet spring weather and repeated rain delays during harvest that affected most areas. The East Coast states were more severely affected than the Gulf Port states. Buyers are encouraged to review their quality specifications to ensure that purchases meet their expectations.

EXPORT CARGO SURVEY

The export cargo data represents 157 individual sublot samples for crop years 2013 and 2012 from Gulf of Mexico and East Coast ports. Samples were selected from official Federal Grain Inspection Service samples, and grade data are the official grades on the individual sublots. Milling and baking analyses were conducted by Great Plains Analytical Laboratory.

ABOUT SOFT RED WINTER WHEAT

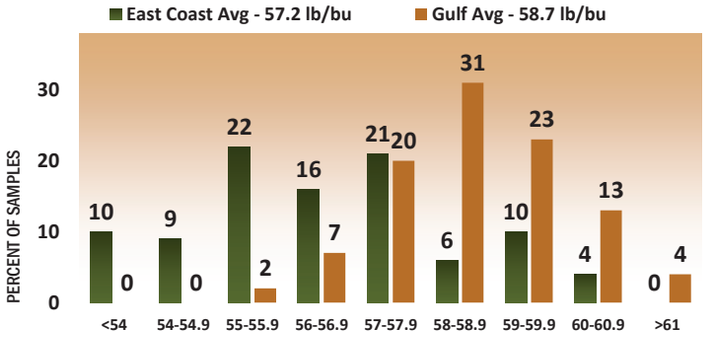
Low protein content, soft endosperm, red bran, weak gluten. Used in pastries, cakes, cookies, crackers, pretzels, and flat breads. Can also be used for blending.



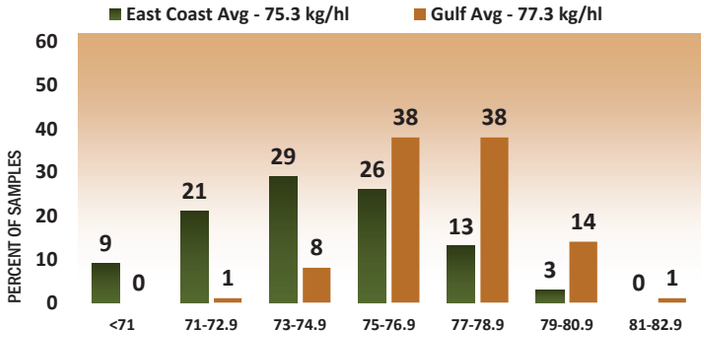
NINE OF SIXTEEN STATES SURVEYED

Arkansas • Illinois • Indiana • Kentucky • Maryland
Missouri • North Carolina • Ohio • Virginia

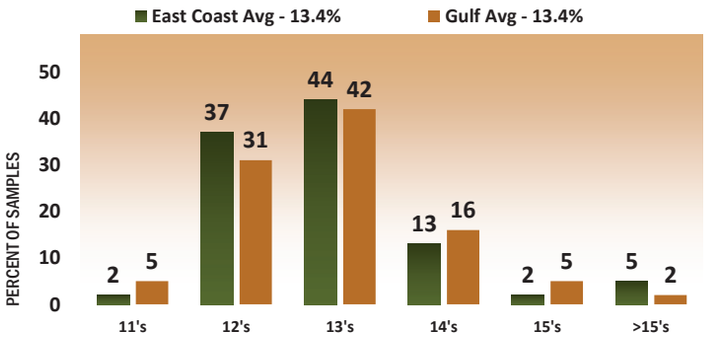
TEST WEIGHT | Pounds/Bushel



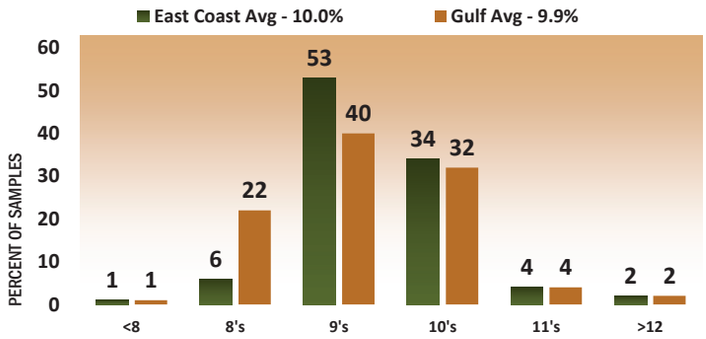
HECTOLITER WEIGHT | Kilograms/Hectoliter



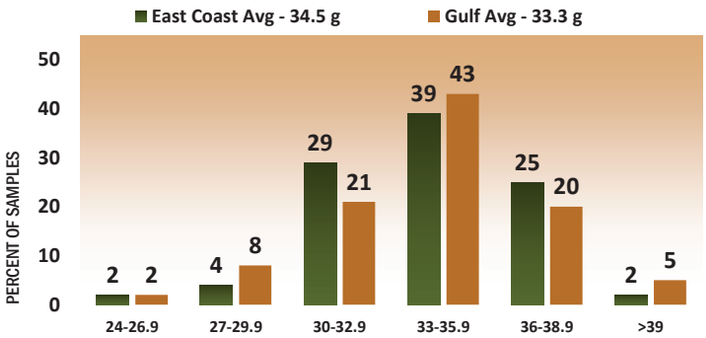
WHEAT MOISTURE | Percent



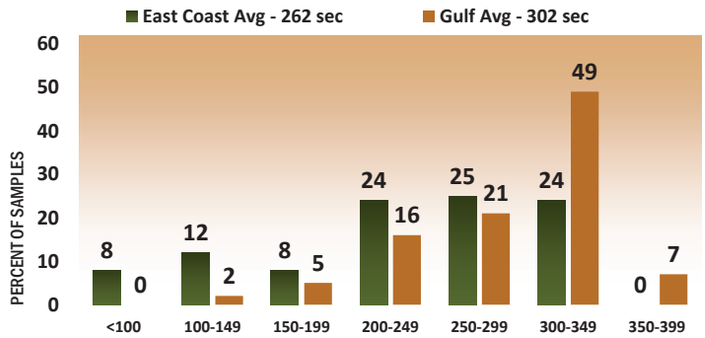
PROTEIN (12% MB) | Percent



1000 KERNEL WEIGHT | Grams

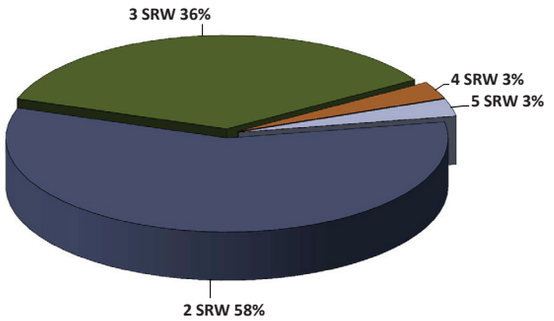


FALLING NUMBER | Seconds





GRADE DISTRIBUTION*



*Based on 36 composite samples.

SOFT RED WINTER | HARVEST DATA

Soft Red Winter	Composite Average			East Coast			Gulf Ports		
	2013	2012	5-Year Avg	2013	2012	5-Year Avg	2013	2012	5-Year Avg
Wheat Grade Data:									
Test Weight (lb/bu)	58.4	60.2	58.7	57.2	59.2	59.6	58.7	60.5	58.6
(kg/hl)	76.8	79.2	77.3	75.3	77.9	78.4	77.3	79.5	77.1
Damaged Kernels (%)	2.1	0.8	1.3	3.7	1.1	1.2	1.7	0.8	1.3
Foreign Material (%)	0.1	0.2	0.1	0.2	0.2	0.1	0.1	0.2	0.2
Shrunken & Broken (%)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Total Defects (%)	2.8	1.5	2.0	4.3	1.7	1.8	2.3	1.4	2.0
Grade	2 SRW	1 SRW	2 SRW	3 SRW	2 SRW	2 SRW	2 SRW	1 SRW	2 SRW
Wheat Non-Grade Data:									
Dockage (%)	0.5	0.7	0.8	0.5	0.8	1.0	0.5	0.7	0.8
Moisture (%)	13.4	12.7	12.9	13.4	13.1	12.9	13.4	12.6	12.9
Protein (%) 12%/0% moisture basis	9.9/11.3	9.9/11.3	10.0/11.4	10.0/11.4	10.2/11.6	10.5/11.9	9.9/11.3	9.8/11.1	9.9/11.3
Ash (%) 14%/0% moisture basis	1.49/1.73	1.50/1.74	1.54/1.79	1.48/1.72	1.46/1.70	1.50/1.74	1.50/1.74	1.51/1.76	1.55/1.80
1000 Kernel Weight (g)	33.6	34.2	32.8	34.5	35.9	34.2	33.3	33.8	32.5
Kernel Size (%) lg/md/sm	85/14/01	85/14/01	82/17/01	87/12/01	86/13/01	84/15/01	85/14/01	85/14/01	83/16/01
Single Kernel: Hardness	16.4	29.2	22.6	13.4	23.3	24.1	17.1	30.5	22.3
Weight (mg)	34.2	33.9	32.0	35.3	34.8	33.3	34.0	33.7	31.7
Diameter (mm)	2.65	2.66	2.41	2.65	2.68	2.46	2.65	2.65	2.41
Sedimentation (cc)	11.4	13.4	12.2	11.5	14.6	14.7	11.4	13.2	11.7
Falling Number (sec)	294	329	328	262	306	332	302	334	327
DON (ppm)	1.4	< 0.5	1.2	2.2	0.5	0.7	1.2	< 0.5	1.3
Flour Data:									
Lab Mill Extraction (%)	70.2	73.4	70.1	69.8	73.3	69.9	70.4	73.5	70.2
Color: L*	93.4	93.2	93.4	93.3	93.0	93.4	93.4	93.2	93.4
a*	-2.8	-2.8	-3.0	-2.8	-2.8	-3.0	-2.8	-2.8	-3.0
b*	7.8	8.3	8.2	8.0	8.3	8.2	7.8	8.3	8.2
Protein (%) 14%/0% moisture basis	8.3/9.6	8.4/9.8	8.4/9.8	8.4/9.8	8.8/10.2	8.8/10.2	8.2/9.6	8.3/9.7	8.3/9.7
Ash (%) 14%/0% moisture basis	0.42/0.49	0.46/0.53	0.44/0.51	0.43/0.50	0.46/0.53	0.44/0.51	0.42/0.48	0.46/0.53	0.44/0.52
Wet Gluten (%)	20.7	22.2	22.4	21.6	23.6	23.3	20.4	21.9	22.2
Gluten Index	88.3	73.5	75.9	83.9	74.8	79.5	89.5	73.1	75.1
Falling Number (sec)	278	329	332	263	306	331	282	334	332
Amylograph Viscosity 65 g (BU)	302	603	627	235	425	567	319	644	640
Starch Damage (%)	4.4	4.9	4.4	4.4	5.0	4.5	4.4	4.8	4.4
Solvent Retention Capacity (%)									
Water/50% Sucrose	55/105	58/111	56/108	54/105	60/109	57/110	54/102	58/109	55/106
5% Lactic Acid/5% Na_2CO_3	114/79	112/84	113/82	115/81	115/85	115/83	113/79	111/84	111/81
Dough Properties:									
Farinograph:									
Peak Time (min)	1.3	1.6	1.6	1.2	1.8	1.9	1.3	1.5	1.5
Stability (min)	2.8	2.7	2.7	2.5	2.7	2.9	2.8	2.7	2.7
Absorption (%)	53.2	53.2	52.2	53.2	53.3	53.0	53.2	53.1	52.0
Alveograph: P (mm)	35	41	38	34	39	42	35	41	38
L (mm)	94	87	84	96	99	90	93	84	82
P/L Ratio	0.37	0.47	0.46	0.35	0.40	0.46	0.38	0.49	0.46
W (10-4 joules)	85	86	85	83	89	96	85	85	83
Baking Evaluation:									
Crumb Grain	5.1	5.2	5.3	4.9	5.3	5.5	5.2	5.2	5.2
Crumb Texture	4.5	5.5	5.3	4.6	5.6	5.6	4.4	5.5	5.2
Loaf Volume (cc)	695	676	717	722	700	721	688	671	716
Cookie Spread Ratio	9.2	7.9	9.1	9.0	7.7	8.5	9.2	8.0	9.2
% of Area Sampled:	**100%**			**21%**			**79%**		

East Coast - Maryland, Virginia and North Carolina; Gulf Ports - Arkansas, Illinois, Indiana, Kentucky, Missouri and Ohio

Soft Red Winter	2013	2012
Wheat Grade Data:		
Test Weight (lb/bu)	59.4	60.3
(kg/hl)	78.2	79.3
Damaged Kernels (%)	1.1	1.6
Foreign Material (%)	0.1	0.1
Shrunken & Broken (%)	0.8	0.8
Total Defects (%)	2.0	2.5
Grade	2 SRW	1 SRW
Wheat Non-Grade Data:		
Dockage (%)	0.7	0.8
Moisture (%)	12.5	12.3
Protein (%) 12%/0% moisture basis	10.0/11.4	10.5/11.9
Ash (%) 14%/0% moisture basis	1.49/1.73	1.49/1.73
1000 Kernel Weight (g)	30.4	31.5
Kernel Size (%) lg/md/sm	81/17/1	83/16/1
Single Kernel: Hardness		28.3
Weight (mg)		32.0
Diameter (mm)		2.60
Sedimentation (cc)	11.4	12.6
Falling Number (sec)	340	350
DON (ppm)		0.0
Flour Data:		
Lab Mill Extraction (%)	71.0	72.5
Color: L*	92.9	93.0
a*	-3.2	-2.7
b*	8.9	7.6
Protein (%) 14%/0% moisture basis	8.3/9.7	8.9/10.3
Ash (%) 14%/0% moisture basis	0.43/0.50	0.45/0.52
Wet Gluten (%)	20.7	23.9
Gluten Index	76.4	87.2
Falling Number (sec)	348	390
Amylograph Viscosity 65 g (BU)	603	713
Starch Damage (%)		
Solvent Retention Capacity (%)		
Water/50% Sucrose		
5% Lactic Acid/5% Na_2CO_3		
Dough Properties:		
Farinograph:		
Peak Time (min)	1.4	1.5
Stability (min)	2.9	3.8
Absorption (%)	52.2	53.1
Alveograph: P (mm)	38	43
L (mm)	79	99
P/L Ratio	0.48	0.43
W (10^{-4} joules)	89	110
Baking Evaluation:		
Crumb Grain	5.1	5.4
Crumb Texture	5.5	5.4
Loaf Volume (cc)	717	717
Cookie Spread Ratio	8.0	8.0
Sample Count:	**43**	**114**

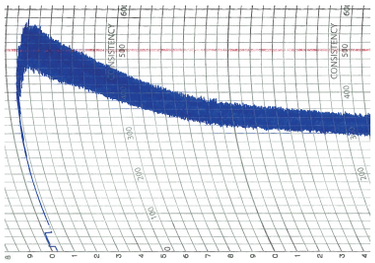
Soft Red Winter Production

in major producing states (million metric tons)

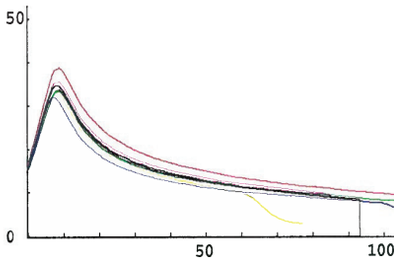
	2013	2012	2011	2010	2009
Alabama	0.5	0.3	0.4	0.2	0.3
Arkansas	1.0	0.7	0.8	0.2	0.5
Georgia	0.6	0.3	0.3	0.1	0.3
Illinois	1.5	1.1	1.3	0.4	1.2
Indiana	0.9	0.5	0.7	0.4	0.8
Kentucky	1.2	0.8	0.8	0.4	0.6
Louisiana	0.4	0.4	0.4	0.1	0.3
Maryland	0.5	0.4	0.3	0.2	0.3
Michigan	0.8	0.7	0.9	0.6	0.7
Mississippi	0.6	0.5	0.6	0.1	0.2
Missouri	1.5	1.0	0.9	0.3	0.9
North Carolina	1.4	1.2	1.1	0.4	0.8
Ohio	1.3	0.8	1.3	1.2	1.9
South Carolina	0.4	0.3	0.3	0.1	0.2
Tennessee	1.0	0.6	0.6	0.3	0.5
Virginia	0.5	0.4	0.5	0.2	0.3
16-State Total	**14.1**	**10.1**	**11.2**	**5.5**	**9.7**
Total SRW Production	**15.4**	**11.4**	**12.5**	**6.5**	**11.0**

Based on USDA crop estimates of September 30, 2013.

FARINOGRAM



ALVEOGRAM





ANALYSIS METHODS

The harvest and cargo samples for each class were evaluated using the same methods as described below. All flour, semolina and end-use tests use flour or semolina produced as described in the "Extraction" section.

WHEAT AND GRADE DATA

Grade: Official U.S. Standards for Grain.
Dockage: Official USDA procedure using the Carter Dockage Tester.
Moisture: HRS, Durum - Motomco Moisture Meter and AACC 44-15A (Air Oven Method); SRW - AACC 44-15A; HRW - NIR Method; SW, HW - Official US Standards for grain method using Dickey-John Grain Analysis Computer 2100.
Test Weight: AACC 55-10; test weight is mathematically converted to hectoliter weight: for durum - kg/hl = lb/bu x 1.292 + 0.630, for other wheats - kg/hl = lb/bu x 1.292 + 1.419.
Protein: HRW – AACC 39-11 (NIR Method). SW, HW - Official USDA method using Foss Infratec Analyzer. All other classes - AACC 46-30 (Dumas Combustion Nitrogen Analysis method).
Single Kernel Characterization: Perten method using Perten SKCS 4100.
Sedimentation: HRS, HRW (Midwestern), SRW, SW, HW - AACC 56-61A; Durum - AACC 56-70.
1000 Kernel Weight: HRS, Durum, SRW - based on a 10-gram sample of clean wheat counted by an electronic counter. SW, HW - based on three 100-kernel sample weight expressed on a 14% moisture basis. HRW – calculated from SKCS data by taking average kernel weight times 1000.
Ash: AACC 08-01 expressed on a 14% moisture basis.
Falling Number: AACC 56-81B. An average value is a simple mean of sample results.
Vitreous Kernels: HRS and durum only - Percentage by weight of vitreous kernels hand-picked from a 50-gram sample of clean wheat.
Kernel Size Distribution: Cereal Foods World (Cereal Science Today) 5:(3), 71 (1960). Wheat is sifted with a RoTap sifter using a Tyler No. 7 screen (2.82 mm) and a Tyler No. 9 screen (2.00 mm). Kernels which do not pass through the No. 7 screen are classified as "Large." Kernels passing through the No. 7 screen but not the No. 9 screen are "Medium." Kernels passing through the No. 9 screen are "Small."

FLOUR DATA

Laboratory Milling Extraction: Samples were cleaned and tempered according to AACC 26-10A. All samples within each class other than California HRW were milled with standardized mill settings on a Buhler laboratory mill as described in the following procedures: SW – AACC 26-31 and HW – AACC 26-21A both with bran dusting flour by Buhler MLU-303 and shorts sifting flour using 119 micron sieve; HRW (Midwestern), SRW, and HRS - AACC 26-21A. California HRW was milled on a Brabender® Quadrumat Senior mill using the Brabender® procedure. All extraction rates were calculated against total products on an "as is" moisture basis.
Ash: AACC 08-01, reported on a 14% moisture basis.
Color: Minolta Method using Minolta Chroma Meter CR-110 for HRW and SRW, CR-310 for HRS, or CR-410 for SW and HW with Granular-Materials Attachment CR-A50. CIE 1976 L*a*b* color system: L* indicates white-black, a* - red-green, and b* - yellow-blue.
Protein: HRW - AACC 39-11 (NIR Method). All other classes - AACC 46-30 (Dumas Combustion Nitrogen Analysis method),
Wet Gluten and Gluten Index: HRS, SRW, HW, HRW (Midwestern) - AACC 38-12A; SW - AACC 38-12A (water reduced from 4.8 to 4.2 ml); HRW (CA) - Glutomatic Method (ICC 137).
Falling Number: AACC 56-81B. An average value is a simple mean of sample results.
Farinograph: AACC 54-21 with 50-gram bowl. Absorption except HRW (California) is reported on 14% moisture basis. HRW (California) reports "as is" absorption. Classification (HRS only) incorporates peak time, mixing tolerance, and general curve characteristics to assign rating based on a scale of 1-8. Higher numbers indicate stronger protein flours. (See farinogram reference at www.uswheat.org/fg)
Alveograph: Durum - AACC 54-30A modified. Other classes - AACC 54-30A.
Amylograph: HRS (100g) - AACC 22-10. HRW, HRS (65g), SRW, SW, HW - AACC 22-10 modified to use 65g flour (14% moisture basis) and 450ml distilled water with paddle (HRS) or pins (other classes).
Extensograph: AACC 54-10, modified 45 min. and 135 min. rest for HRS, HRW, HW; 45 min. rest for SW.
Starch Damage: HRW - (SDmatic, similar to AACC 76-33.), HRS, SRW - AACC 76-30A. SW, HW - iodine absorption by Chopin SDMatic instrument.
Solvent Retention Capacity (SRC): AACC 56-11.

SEMOLINA DATA

Laboratory Milling Extraction: Midwestern samples were milled using a modified Buhler laboratory mill with identical settings and equipped with Miag laboratory purifiers, as described by Vasiljevic and Banasik 1980: Quality Testing Methods for Durum Wheat and its Products, pp. 64-72, Dept. of Cereal Chemistry and Technology, NDSU, Fargo, ND. Roll gaps have been modified to (in mm): B1-0.762; B2-0.305; B3-0.254; R1-0.102; B4-0.076; B5-0.038. Extraction rates were calculated against total products on an "as is" moisture basis. Procedure is derived from AACC 26-41 based on research showing improved correlation between laboratory and commercially milled semolina quality. Pacific Southwest samples were milled on a Modified Chopin CD2 mill.
Ash: AACC 08-01 on 14.0% moisture basis.
Color: Minolta Method using Minolta Chroma Meter CR-310.
Protein: AACC 46-30 (Dumas Combustion Nitrogen Analysis method).
Wet Gluten and Gluten Index: AACC 38-12 Glutomatic procedure.

Specks: Sample is pressed under 3 inch x 4 inch glass plate, and the specks within one-inch square marked on the plate are counted. Average of three determinations is expressed as specks per 10 square inches.
Mixograph: Ten grams of semolina are mixed in a 10-gram mixograph bowl with 5.8 ml of distilled water to give maximum dough consistency. An overall empirical classification incorporating peak height and general curve characteristics is assigned based on comparison with eight reference mixograms. The higher the classification number, the stronger the curve type.

END-USE PRODUCT DATA

HRW: AACC 10-10B (Pup Loaf Method). 100-g pin mixer with head speed of 100-125 rpm was used to mix 100 g flour at 14% mb with optimized water absorption and other ingredients (6% sugar, 3% shortening, 1.5% salt, 1.0% Instant dry yeast, 50 ppm ascorbic acid, and 0.25% mated barley flour) to optimum development. The dough was fermented for 60 min with two punches, then molded and panned, and proofed for 60 min before baking at 425 F for 18 min. Loaf volume is measured immediately after baking by rapeseed displacement. Crumb grain and texture were evaluated using a scale of 0 to 6 points, which in this booklet has been mathematically converted to a scale of 1-10. **California HRW only** - AACC 10-10B producing two loaves per batch using wet compressed yeast, malt flour, 45 ppm ascorbic acid and 120-minute fermentation. Loaf volume is measured immediately after baking. Scoring of grain and texture for all is on a scale of 1-10 with higher numbers indicating preferred quality attributes.
SRW: AACC 10-10B (Pup Loaf Method) producing two loaves per batch using dry yeast and ascorbic acid. After mixing, the dough is divided into two equal portions, fermented for 160 min., molded and panned in "pup loaf" pans before proofing and baking. Loaf volume is measured immediately after baking by rapeseed displacement. SRW Cookie Spread Ratio - AACC 10-50D.
HRS: AACC 10-09 (Long Fermentation), modified: fungal amylase (I5 SKB units/100 g flour) replacing malt dry powder; instant dry yeast (1%); 10 ppm bromate, where additional oxidants are required; 2% added shortening. Doughs are mechanically punched, moulded, and baked in "Shogren-type" pans. Scoring is based on a scale of 1-10 with higher numbers indicating preferred quality attributes.
SW: Cookie diameter – AACC 10-52. Sponge cake volume* and score - Japanese standard method described by Nagao in Cereal Chemistry 53:977-988, 1976. SW High Protein – AACC 10-10B with 180 min fermentation for bread.*
Durum: Pasta is made using the laboratory procedure described by Walsh, Ebeling, and Dick, Cereal Foods World: 16: (11) 385 (1971). Water (32.0% based on semolina weight) is added to semolina and mixed in a Hobart mixing bowl 3.5 min. Semolina-water mixture is extruded using a DeMaco laboratory pasta extruder. Spaghetti is dried using modified Buhler high-temperature drying cycle as described by Debbouz, Pitz, Moore, and D'Appolonia, Cereal Chemistry: 72 (1):128-131. Color scores are determined by the procedure described by Walsh, Macaroni Journal 52: (4) 20 (1970), using a Minolta Color Difference Meter (Model: CR 310). Higher values (scale 1-12) are preferred. Cooked weight, cooking loss and firmness are determined by AACC 16-50.
HW Baking: AACC 10-10B with 180 min fermentation.*
HW Noodle: Two types of Chinese noodles were prepared from each HW flour: Chinese raw noodles and Chinese wet noodles. The raw noodle formula was: flour 100%, salt 1.2%, and distilled water 28%. The wet noodle formula was: flour 100%, salt 2%, K_2CO_3 0.45%, Na_2CO_3 0.45%, and distilled water 32%. Noodle sheet color is measured by stacking three dough sheets and taking two readings from each side of two dough sheets (a total of eight readings) using a Minolta CR-310 Chroma Meter; the mean value is reported. For wet noodles, noodle sheet color was measured on both uncooked and parboiled (boiling for 1.5 minutes) sheets. Cooking yield is percent of weight gain after cooking for 5 minutes for raw noodles and 1.5 minutes for wet noodles, rinsing in 26°-27° C water and draining. Sensory Noodle Color Stability Score is a total score of noodle color rated at 2 and 24 hours against a control sample (an assigned score of 7) and is reported based on a scale of 1-10; higher scores indicate better color stability. Noodle texture is determined on five strands of cooked noodles (2.5 x 1.2 mm for raw noodles, W x T; 1.7 x 1.6 mm for wet noodles, W x T) using a Stable Micro Systems TA.XT2 Texture Analyzer. Firmness indicates noodle bite; springiness indicates the degree of recovery after first bite; cohesiveness is a measure of the extent to which noodle structure is disrupted during first bite; and chewiness is a product of firmness, cohesiveness and springiness (firmness x cohesiveness x springiness) and thus is a single parameter that incorporates the three textural parameters. Higher textural parameter values are generally more desirable for Chinese-style noodles.
Chinese Steamed Bread: Two types of steamed breads were prepared: Chinese southern-type from each of the SW and club wheat flours and Asian steamed breads from each of the HW flours. The Chinese southern-type formula was: flour 100%, sugar 15%, shortening 4%, baking powder 1.2%, instant yeast 0.8%, nonfat dry milk powder 3% and water 39-43%. The Asian-type formula was: flour 100%, instant yeast 1.5%, sugar 12%, shortening 2%, and water 42.5-45%. Yeast was dissolved in water before use. All steamed breads were prepared using no-time dough methods (WMC protocols). The Total Product Score comprises volume*, external characteristics, internal characteristics, eating quality and flavor. Each property was rated compared with a control sample. The control flour was scored 70.

*Finished Product Volume for SW sponge cake, steamed bread, and bread and HW bread and steamed bread: Laser light using a Tex Vol Instrument (BVM-L370).

Wheat Grades and Grade Requirements Table

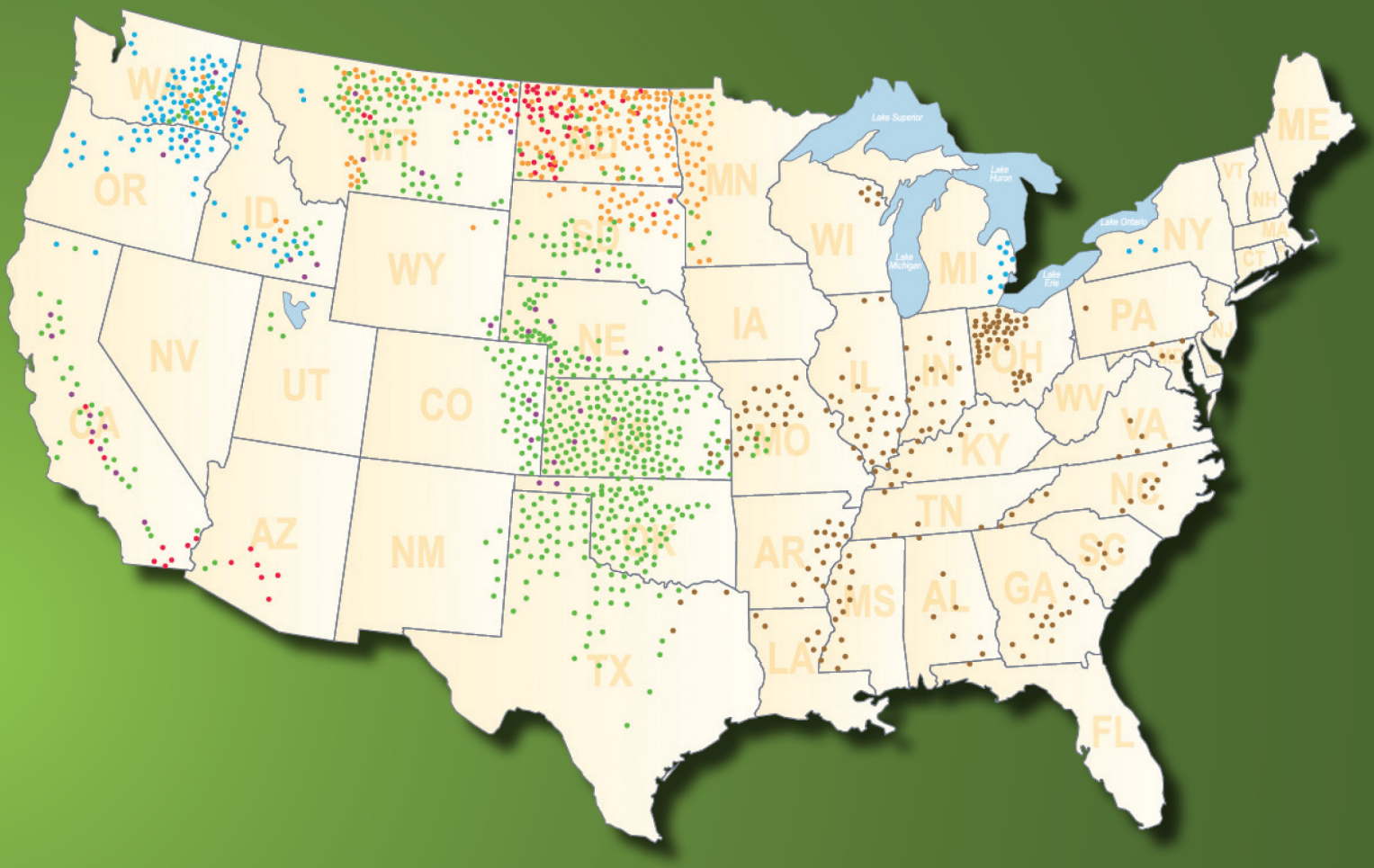
Grading Factors	Grades U.S. Nos.				
	1	2	3	4	5
	Minimum limits:				
Test Weight (lbs/bu)					
Hard Red Spring or White Club	58.0	57.0	55.0	53.0	50.0
All other classes and subclasses	60.0	58.0	56.0	54.0	51.0
Test Weight (kg/hl)					
Hard Red Spring or White Club	76.4	75.1	72.5	69.9	66.0
Durum	78.2	75.6	73.0	70.4	66.5
All other classes and subclasses	78.9	76.4	73.8	71.2	67.3
	Maximum percent limits:				
Defects					
Damaged kernels:					
- Heat (part of total)	0.2	0.2	0.5	1.0	3.0
- Total	2.0	4.0	7.0	10.0	15.0
Foreign material	0.4	0.7	1.3	3.0	5.0
Shrunken and broken kernels	3.0	5.0	8.0	12.0	20.0
Total[1]	3.0	5.0	8.0	12.0	20.0
Wheat of Other Classes[2]					
Contrasting classes	1.0	2.0	3.0	10.0	10.0
Total[3]	3.0	5.0	10.0	10.0	10.0
Stones	0.1	0.1	0.1	0.1	0.1
	Maximum count limits (all grades):				
Other material (1000 gram sample)					
Animal filth	1				
Castor beans	1				
Crotalaria seeds	2				
Glass	0				
Stones	3				
Unknown foreign substance	3				
Total[4]	4				
Insect-damaged kernels in 100 grams	31				

U.S. Sample grade:
Wheat that:
(a) Does not meet the requirements for U.S. Nos. 1, 2, 3, 4, 5; or
(b) Has a musty, sour or commercially objectionable foreign odor (except smut or garlic odor); or
(c) Is heating or of distinctly low quality.

Notes:
1. Includes damaged kernels (total), foreign material, and shrunken and broken kernels.
2. Unclassed wheat of any grade may contain not more than 10.0% of wheat of other classes.
3. Includes contrasting classes.
4. Includes any combination of animal filth, castor beans, crotalaria seeds, glass, stones, or unknown foreign substance.

Wheat Equivalents:		**Metric Equivalents:**	
1 bushel =	60 pounds (27.2 kg)	1 pound =	0.4536 kg
36.74 bushels =	1 metric ton	1 metric ton (MT) =	2204.6 lbs
37.33 bushels =	1 long ton	1 short ton (2000 lbs) =	0.9072 MT, or 907.2 kg
33.33 bushels =	1 short ton	1 long ton (2240 lbs) =	1.0160 MT, or 1016.0 kg
3.67 bushels =	1 quintal	1 metric ton =	10 quintals
tons/ha =	0.06725 bu/acre	1 hectare =	2.47 acres
durum kg/hl =	lbs/bu x 1.292 + 0.630	1 acre =	0.40 hectare
other wheat kg/hl =	lbs/bu x 1.292 + 1.419	1 hundredweight =	100 pounds or 45.36 kg

U.S. wheat...the world's most reliable choice



HARD RED WINTER



Medium to high protein, medium hard endosperm, red bran, medium gluten content and mellow gluten. Used in pan breads, Asian noodles, hard rolls, flatbreads and general-purpose flour.

HARD RED SPRING



Highest protein content, hard endosperm, red bran, strong gluten, high water absorption. Used in pan breads, hearth breads, rolls, croissants, bagels, hamburger buns, pizza crust and for blending.

SOFT RED WINTER



Low protein content, soft endosperm, red bran, weak gluten. Used in pastries, cakes, cookies, crackers, pretzels, and flat breads. Can also be used for blending.

SOFT WHITE



Low protein, low moisture wheat. Soft endosperm, white bran, weak gluten. Used in pastries, cakes, biscuits, crackers, flat breads, Asian-style noodles and snack foods.

HARD WHITE



Medium to high protein content, hard endosperm, white bran. Used in Asian noodles, whole wheat or high extraction flour applications, pan breads and flat breads.

DURUM



Hardest of all wheats, high protein content, yellow endosperm, white bran. Used to make pasta, couscous, and some Mediterranean breads.

U.S. WHEAT ASSOCIATES

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PROVIDING SERVICES TO: Nigeria			
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MOSCOW	(7 495) 956-9081	(7 495) 608-8124	InfoMoscow@uswheat.org
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ROTTERDAM (Regional Office)	(31 10) 413-9155	(31 10) 433-0438	InfoRotterdam@uswheat.org
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PROVIDING SERVICES TO: Japan			