U.S. WHEAT ASSOCIATES

The world's most reliable choice.



2012 CROP QUALITY REPORT

U.S. WHEAT ASSOCIATES

Greetings!

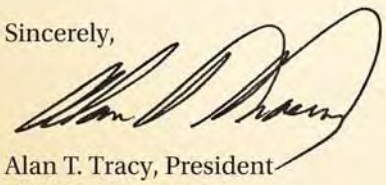
On behalf of U.S. Wheat Associates and the entire U.S. wheat industry, I'm happy to share some good news with you. America's farmers produced an ample supply of high quality wheat once again this year despite drought that persisted from last year in the Southern Plains and warmer winter temperatures that caused the crop to mature two to three weeks ahead of schedule in much of the country.

This Crop Quality Report features data for all six classes of U.S. wheat harvested in 2012. Overall, each class compares favorably last year's high quality crop, demonstrating the advantage of the geographically diverse wheat-growing area in the United States.

All the world's major wheat suppliers competed in the marketplace this year and, in some cases, may offer export supplies at less expensive prices. High market uncertainty and price volatility is also causing concerns for many of the world's wheat buyers, millers, bakers and food processors. We encourage you to carefully read this report and meet with your local USW representative to discuss how this information, the undisputed reliability and dedication to service prove U.S. wheat often provides the greatest value for our customers.

On behalf of our producers, our 19 state wheat commission members 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

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- 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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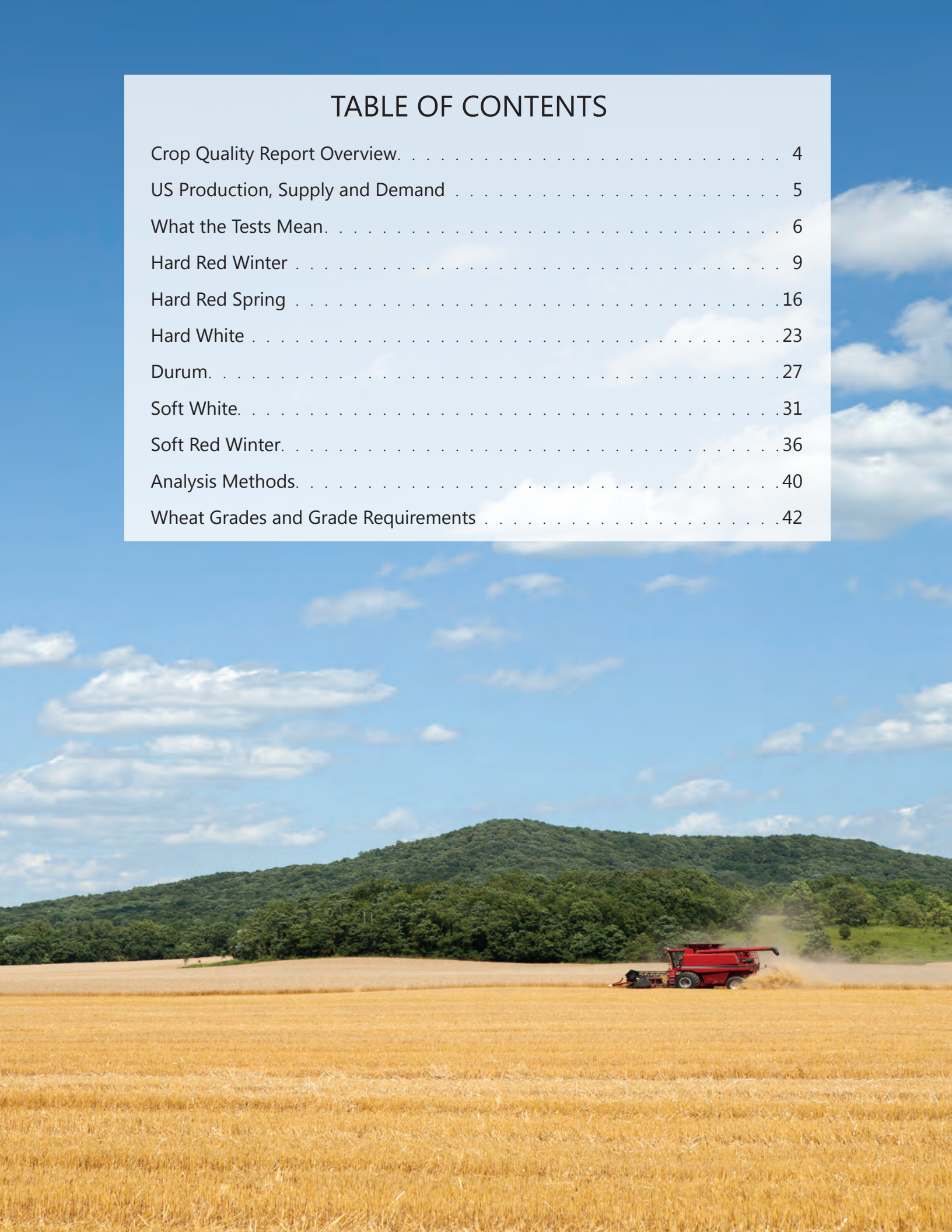

2012 CROP QUALITY REPORT OVERVIEW

SUMMARY OF CLASSES

	Hard Red Winter[1]		Hard Red Spring		Northern Durum[2]		Desert Durum®		Soft White		Soft Red Winter	
	2012	5-Year Avg	2012	5-Year Avg	2012	5-Year Avg	2012	5-Year Avg	2012	5-Year Avg	2012	5-Year Avg
Test Weight (lb/bu)	61.1	60.5	61.3	61.1	60.6	60.3	62.3	62.8	61.0	59.8	60.2	58.7
(kg/hl)	80.4	79.5	80.6	80.4	78.9	78.5	81.2	81.7	80.2	78.7	79.2	77.2
Grade	1 HRW	1 HRW	1 DNS	1 NS	1 HAD	1 HAD	I HAD	1 HAD	1 SW	2 SW	1 SRW	2 SRW
Dockage (%)	0.5	0.6	0.7	0.6	0.9	1.3	0.4	0.3	0.4	0.7	0.7	0.9
Wheat Moisture (%)	10.7	11.1	11.7	12.2	10.5	11.7	6.3	6.6	9.5	9.5	12.7	12.9
Wheat Protein (%)[3]	12.6	12.0	14.7	14.1	14.6	14.1	13.7	13.4	9.8	10.1	9.9	10.1
Wheat Ash (%)[3]	1.51	1.55	1.57	1.60	1.57	1.57	1.74	1.71	1.35	1.37	1.50	1.55
1000 Kernel Weight (g)	29.0	29.9	28.9	31.2	36.9	37.6	45.2	51.5	36.7	34.4	34.2	32.6
Wheat Falling Number (sec)	409	415	418	388	412	359	n/a	n/a	320	324	329	331
Flour/Semolina Extraction (%)	75.2	70.8	68.9	68.8	63.4	64.2	62.0	63.1	75.7	71.4	73.4	69.6
Flour/Semolina Ash (%)[3]	0.51	0.48	0.50	0.51	0.63	0.67	0.91	0.86	0.49	0.46	0.46	0.44
Wet Gluten (%)	28.5	28.4	35.8	35.3	37.0	36.9	32.5	33.2	18.1	22.0	22.2	22.6
Farinograph:												
Peak Time (min)	5.3	5.0	7.2	7.8	n/a	n/a	n/a	n/a	1.7	1.6	1.6	1.7
Stability (min)	11.1	11.4	12.9	13.9	n/a	n/a	n/a	n/a	3.4	3.7	2.7	2.9
Absorption (%)	58.9	57.6	63.7	65.7	n/a	n/a	n/a	n/a	53.5	53.4	53.2	52.0
Alveograph W (10^{-4} joules)	254	231	367	391	141	116	205	170	101	106	86	89
Loaf Volume (cc)	789	817	999	956	n/a	n/a	n/a	n/a	n/a	n/a	676	732
Production (mmt)	27.3	20.9	13.7	12.2	1.6	1.6	0.7	0.6	6.5	6.4	11.4	10.9
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[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.



Photo by Peter Roise, Moscow, Idaho

US Production by Class

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

	2012	2011	2010	2009	2008
Hard Red Winter	27.3	21.2	27.7	25.0	28.2
Hard Red Spring	13.7	11.0	15.8	14.9	13.9
Hard White	0.6	0.7	0.8	0.7	0.5
Durum	2.2	1.4	2.9	3.0	2.3
Soft White	6.5	7.9	6.9	5.7	6.1
Soft Red Winter	11.4	12.5	6.5	11.0	16.7
Total	**61.8**	**54.4**	**60.1**	**60.4**	**68.0**

Based on USDA crop estimates of September 28, 2012.

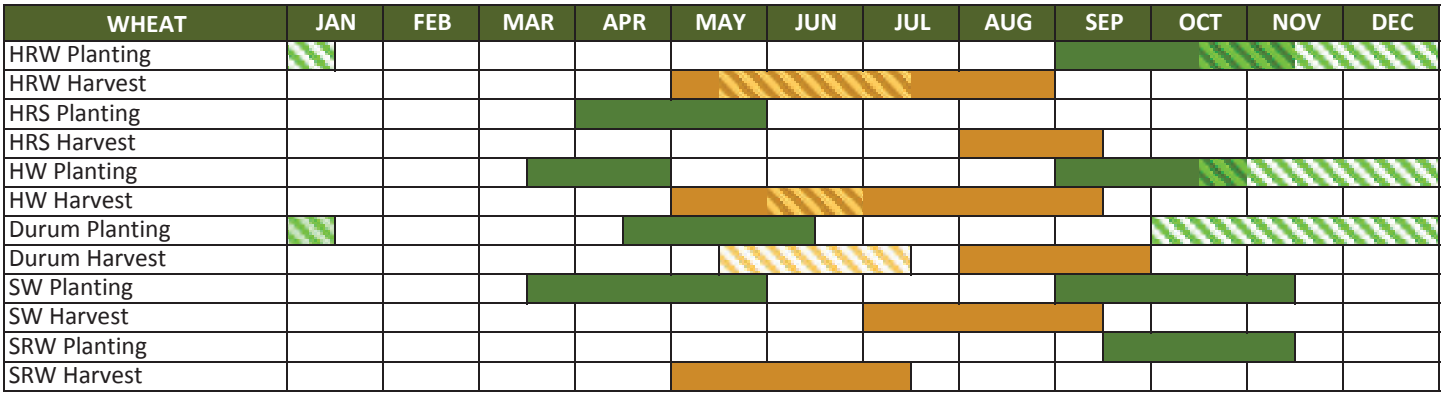
US Supply and Demand

Estimated for 2012/2013 (year beginning June 1)
(million metric tons)

	HRW	HRS	Durum	White	SRW	TOTAL
Beginning Stocks	8.6	4.1	0.7	1.7	5.0	20.2
Production	27.3	13.7	2.2	7.0	11.4	61.8
Imports	0.0	1.2	1.2	0.2	0.8	3.5
Total Supply	**36.0**	**19.1**	**4.1**	**9.0**	**17.3**	**85.5**
Domestic Use	15.8	7.9	2.4	2.7	7.5	36.4
Exports	14.8	6.5	0.7	4.6	4.6	31.3
Total Demand	**30.7**	**14.5**	**3.1**	**7.4**	**12.1**	**67.7**
Ending Stocks	**5.3**	**4.6**	**1.1**	**1.7**	**5.1**	**17.8**
Stocks Five-year Average	**7.2**	**4.1**	**0.7**	**1.7**	**4.1**	**17.7**

Based on USDA Supply/Demand estimates of October 11, 2012.

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.

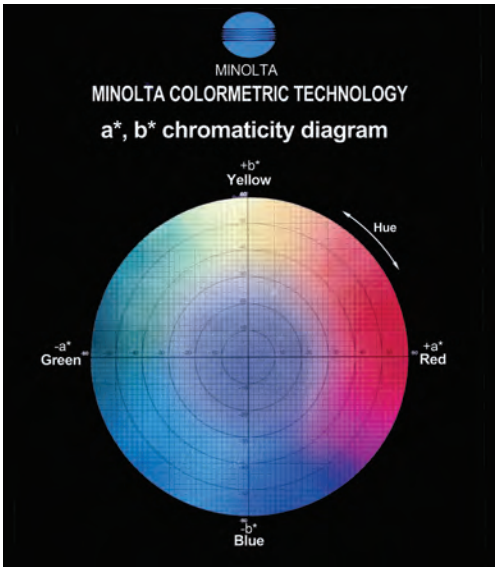
Sedimentation value is a measure of the sediment that results when lactic acid is added to a sifted ground wheat sample and can be used as an indicator of gluten quality and thus the baking quality of wheat flour.

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 for the 2012 HRW crop was somewhat later than normal in Texas and Oklahoma and near normal elsewhere. Winter conditions were abnormally warm with timely moisture throughout the central and southern plains which allowed growth in many areas when the crop would normally be dormant. Hot, dry conditions, however, spread from the southern plains into Montana in the spring and stressed the crop during kernel development and pushed the crop rapidly to maturity. Harvest began 10 to 14 days earlier than normal, and many areas completed harvest before normal start dates. The unusual hot, dry spring conditions caused variable yields and a wide range of protein content, but had the positive effects of limited disease or insect pressure and good falling numbers.

Survey Methods: Sample collection and analysis were conducted by the USDA ARS Hard Winter Wheat Quality Lab and Plains Grains, Inc. A total of 538 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 102 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 74% of production), PNW-tributary (26%), and Overall averages. The analytical methods are described in the Analysis Methods section of this booklet.

Wheat and Grade Data: Seventy-eight percent of individual samples graded US No. 1, up from 72% in 2011. The overall average dockage level of 0.5% was equal to last year's average and below the 5-year average of 0.6%. Total defects of 1.4% were also below the 5-year average of 1.6% and last year's average of 1.5%. Foreign material, shrunken and broken kernels, and wheat ash were consistent with 5-year averages. Test weight was 61.1 lbs/bu (80.4 kg/hl), significantly above the 5-year average of 60.5 lbs/bu (79.5 kg/hl) and above the 2011 crop of 60.8 lbs/bu (80.0 kg/hl). The overall average thousand kernel weight of 29.0 g was slightly lower than the 2011 crop (30.3 g) and the 5-year average (29.9 g).

Protein averaged more than a half percentage point above the 5-year average and was higher than the 2011 average. Approximately 20% of samples were in the < 11.5% protein content range, 35% in 11.5% – 12.5% range and 45% in the >12.5% ranges, percentages that were consistent across most areas. The average falling number was 409 sec, comparable to the 5-year average and indicative of sound wheat.

Flour and Baking Data: The lab mill flour extraction averaged (75.2%) and ash averaged 0.51%, relatively high values mostly attributable to a new tandem Buhler Experimental Mill being used. Protein loss during flour conversion averaged 1.1 percentage points, below the 2011 crop and the 5-year average of 1.3 points. Farinograph peak time of 5.3 min was comparable to 2011 and the 5-year average, but stability of 11.1 min was significantly lower than the 2011 value of 14.7. The alveograph W value of 254 was above the 2011 crop and the 5-year average. Overall average water absorption was 58.9%, compared to 57.1% in 2011 and a 5-year average of 57.6%. Overall loaf volume averaged 789 cc, lower than the 2011 crop and significantly lower than the 5-year average of 817 cc. Wheat protein had to exceed 12.5% before many samples exceeded 800 cc. The farinograph, alveograph and loaf volume values suggest that while protein quantity is present, protein quality performance may be below long term averages.

Summary: This year's crop has good physical characteristics with a high percentage of grade #1, high test weights, and low dockage and other impurities. While overall protein quantity was above 2011 and the 5-year average, protein quality was diverse, as reflected in the dough functionality and bake tests.

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 two wet years, the growing season was drier than normal this year, mostly affecting emergence and viability of rain-fed wheat at planting. While yields of harvested fields were somewhat reduced, proteins and overall quality were excellent. Disease pressure was present 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 489 individual sublot samples provided by USDA's Federal Grain Inspection Service for marketing years 2012 and 2011. Of 117 2012-crop samples collected in July and August, 70 are from Gulf and 47 from PNW ports. Of the 372 2011-crop samples, 255 are from Gulf and 117 from PNW ports. Grade data are the official grades on the individual sublots. Milling and baking analyses were conducted by Great Plains Analytical Laboratory, Kansas City, MO.



HARD RED WINTER | MIDWESTERN HARVEST DATA



Hard Red Winter	Composite Average					
	2012 By Protein				2011	5-Year
	Low	Med	High	Overall	Overall	Average
Wheat Grade Data:						
Test Weight (lb/bu)	61.8	61.3	60.6	61.1	60.8	60.5
(kg/hl)	81.3	80.6	79.8	80.4	80.0	79.5
Damaged Kernels (%)	0.1	0.1	0.1	0.1	0.2	0.3
Foreign Material (%)	0.1	0.1	0.1	0.1	0.1	0.1
Shrunken & Broken (%)	1.2	1.2	1.2	1.2	1.1	1.2
Total Defects (%)	1.3	1.5	1.5	1.4	1.5	1.6
Grade	1 HRW	1 HRW	1 HRW	1 HRW	1 HRW	1 HRW
Wheat Non-Grade Data:						
Dockage (%)	0.4	0.4	0.5	0.5	0.5	0.6
Moisture (%)	10.7	10.6	10.9	10.7	10.8	11.1
Protein (%) 12%/0% moisture basis	11.0/12.5	12.0/13.7	13.8/15.7	12.6/14.3	12.3/14.0	12.0/13.7
Ash (%) 14%/0% moisture basis	1.49/1.69	1.50/1.70	1.53/1.74	1.51/1.72	1.54/1.79	1.55/1.80
1000 Kernel Weight (g)	30.0	29.1	28.4	29.0	30.3	29.9
Kernel Size (%) lg/md/sm	61/38/1	55/44/1	51/48/1	53/46/1	57/41/2	58/40/1
Single Kernel: Hardness	70.4	72.7	74.4	73.0	66.8	68.4
Weight (mg)	30.0	29.1	28.4	29.0	30.3	29.5
Diameter (mm)	2.64	2.61	2.59	2.60	2.60	2.45
Sedimentation (cc)	41.6	44.7	55.4	49.3	56.9	52.0
Falling Number (sec)	399	406	417	409	403	415
DON (ppm)	<0.5	<0.5	<0.5	<0.5	<0.5	
Flour Data:						
Lab Mill Extraction (%)	74.8	75.6	75.1	75.2	70.4	70.8
Color: L*	92.0	91.7	91.5	91.6	92.5	92.0
a*	-1.2	-1.1	-1.0	-1.1	-2.6	-1.9
b*	10.6	10.8	10.8	10.7	10.4	10.3
Protein (%) 14%/0% moisture basis	9.6/11.2	10.8/12.5	12.4/14.4	11.5/13.4	11.0/12.8	10.7/12.4
Ash (%) 14%/0% moisture basis	0.48/0.56	0.51/0.59	0.52/0.60	0.51/0.59	0.43/0.50	0.48/0.56
Wet Gluten (%)	23.6	26.3	31.6	28.5	28.3	28.4
Gluten Index	96.2	95.6	92.2	93.9	95.4	95.2
Falling Number (sec)	439	448	446	442	400	415
Amylograph Viscosity 65 g (BU)	570	568	540	553	665	877
Starch Damage (%)	6.3	6.0	6.0	6.1	5.7	6.0
Dough Properties:						
Farinograph:						
Peak Time (min)	4.5	5.0	5.9	5.3	5.0	5.0
Stability (min)	9.2	10.2	12.6	11.1	14.7	11.4
Absorption (%)	56.6	57.6	59.8	58.9	57.1	57.6
Alveograph: P (mm)	73	69	79	78	75	74
L (mm)	91	104	111	102	93	94
P/L Ratio	0.81	0.69	0.73	0.77	0.83	0.79
W (10^{-4} joules)	219	226	277	254	246	231
Extensograph: Resistance (BU)	300/480	292/456	300/438	303/467	365/587	338/515
(45/135 min) Extensibility (cm)	14.2/13.8	14.8/14.3	15.5/15.4	14.8/14.3	14.6/13.4	14.9/14.0
Area (sq cm)	76/110	77/111	85/123	80/116	95/131	90/123
Baking Evaluation:						
Crumb Grain (scale 1-10)	5.3	5.1	5.1	5.2	5.0	5.6
Crumb Texture (scale 1-10)	5.4	5.5	6.1	5.8	6.3	6.7
Loaf Volume (cc)	727	763	829	789	804	817
% of Area Production:	**20**	**35**	**45**	**100**		

2012 Protein Range: Low, less than 11.5%; Med, 11.5 - 12.5%; High, 12.5% or greater

Gulf Exportable Average						PNW Exportable Average					
2012 By Protein				2011	5-Year	2012 By Protein				2011	5-Year
Low	Med	High	Overall	Overall	Average	Low	Med	High	Overall	Overall	Average
61.7	61.1	60.4	60.9	60.7	60.3	62.1	61.9	61.3	61.7	61.0	61.1
81.1	80.4	79.5	80.1	79.8	79.3	81.6	81.4	80.6	81.1	80.2	80.4
0.1	0.1	0.2	0.1	0.2	0.3	0.1	0.1	0.1	0.1	0.2	0.2
0.1	0.2	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.2	0.1
1.3	1.3	1.3	1.3	1.0	1.2	0.8	1.1	1.0	1.0	1.4	1.3
1.5	1.6	1.6	1.6	1.3	1.6	0.9	1.2	1.1	1.1	1.9	1.5
1 HRW	1 HRW	1 HRW	1 HRW	1 HRW	1 HRW	1 HRW	1 HRW	1 HRW	1 HRW	1 HRW	1 HRW
0.4	0.4	0.6	0.5	0.4	0.6	0.4	0.5	0.5	0.5	0.5	0.6
10.7	10.7	11.2	10.9	10.8	11.1	10.6	10.3	10.1	10.3	10.9	11.0
11.0/12.5	12.0/13.7	13.9/15.7	12.6/14.3	12.5/14.2	12.1/13.8	10.8/12.3	12.1/13.7	13.6/15.4	12.5/14.2	11.7/13.3	11.8/13.4
1.52/1.72	1.52/1.73	1.56/1.77	1.54/1.75	1.54/1.79	1.57/1.82	1.40/1.59	1.43/1.62	1.45/1.64	1.43/1.63	1.54/1.79	1.49/1.73
29.0	28.3	27.5	28.1	30.2	29.8	33.1	31.2	31.1	31.5	30.4	30.5
57/42/1	51/47/2	45/54/1	50/49/1	57/41/2	58/40/2	73/26/1	65/34/1	66/33/1	60/39/1	57/41/2	58/40/1
71.9	73.5	76.1	74.3	67.0	68.4	66.1	70.3	69.9	69.2	66.3	67.7
29.0	28.3	27.5	28.1	30.2	29.5	33.1	31.2	31.1	31.5	30.4	30.0
2.60	2.58	2.55	2.57	2.60	2.46	2.73	2.68	2.69	2.69	2.59	2.44
40.3	43.2	55.0	48.4	57.6	51.4	45.3	48.9	55.4	51.6	55.1	52.4
402	404	416	409	399	425	392	412	419	411	412	418
<0.5	<0.5	<0.5	<0.5	<0.5		<0.5	<0.5	<0.5	<0.5	<0.5	
74.9	75.9	75.1	75.3	70.0	70.8	74.3	75.1	75.5	74.8	71.1	71.3
92.0	91.7	91.5	91.6	92.4	92.0	91.9	91.6	91.4	91.6	92.8	92.3
-1.2	-1.1	-1.0	-1.1	-2.5	-1.8	-1.3	-1.1	-1.0	-1.1	-2.8	-1.9
10.7	10.8	10.9	10.8	10.3	10.3	10.5	10.5	10.4	10.4	10.7	10.2
9.7/11.2	10.8/12.5	12.5/14.5	11.6/13.5	11.3/13.1	10.7/12.5	9.6/11.1	11.0/12.8	12.1/14.0	11.3/13.1	10.3/12.0	10.5/12.2
0.49/0.57	0.52/0.61	0.53/0.62	0.53/0.61	0.44/0.51	0.49/0.57	0.45/0.53	0.47/0.55	0.48/0.56	0.46/0.54	0.41/0.48	0.46/0.54
23.9	26.2	31.7	28.4	29.2	28.6	23.0	27.3	31.2	28.6	26.4	27.9
95.8	95.1	91.4	93.3	95.0	95.1	97.4	96.8	94.4	95.5	96.6	95.9
445	448	443	437	429	425	423	442	453	457	410	418
566	557	516	530	675	886	581	598	606	616	642	847
6.4	6.1	6.1	6.2	5.6	5.8	6.2	5.9	5.8	5.8	5.9	5.9
4.5	5.0	6.0	5.3	5.4	5.1	4.5	5.1	5.9	5.3	4.1	4.5
8.6	9.6	12.1	10.7	15.4	11.5	10.7	11.3	13.5	12.0	13.2	11.1
56.9	57.8	60.3	59.2	57.5	57.5	55.9	57.7	58.5	58.1	56.4	57.7
73	69	81	77	76	72	74	78	75	80	71	78
91	100	106	100	92	94	91	110	127	108	97	92
0.81	0.70	0.78	0.78	0.86	0.77	0.81	0.73	0.59	0.76	0.76	0.84
212	214	270	240	245	227	237	278	301	292	248	242
286/461	283/428	298/432	291/434	359/572	331/505	338/532	314/548	300/456	338/560	380/621	353/533
13.9/13.8	14.6/14.2	15.4/15.2	14.7/14.6	14.5/13.5	14.9/14.1	15.0/13.9	15.0/14.8	15.6/15.9	15.0/13.5	14.7/13.2	14.9/13.9
70/104	72/103	83/116	75/110	92/129	89/122	95/125	86/134	87/141	92/135	101/134	95/125
5.1	5.0	5.1	4.9	5.2	5.8	5.7	5.7	5.2	6.0	4.7	5.2
5.1	5.4	6.0	5.6	6.2	6.7	6.3	6.0	6.6	6.4	6.3	6.6
725	766	838	786	816	822	731	765	799	798	777	801
15	**27**	**33**	**74**			**5**	**9**	**12**	**26**		

2012 Protein Range: Low, less than 11.5%; Med, 11.5 - 12.5%; High, 12.5% or greater

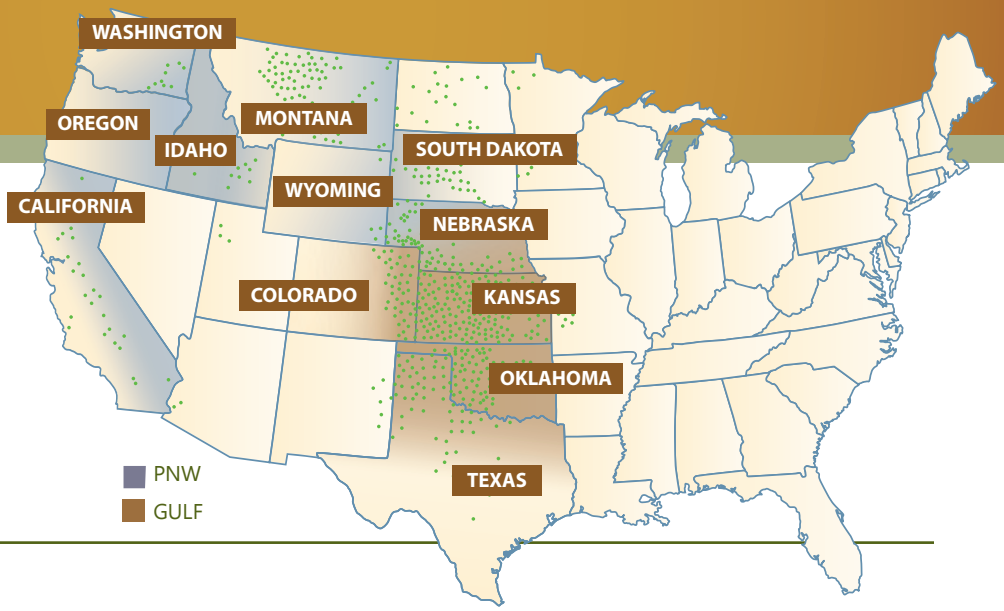
HARD RED WINTER | CALIFORNIA AND EXPORT DATA

Hard Red Winter	California Harvest Data				Export Cargo Data			
	Medium Protein		High Protein		Gulf		PNW	
	2012	2011	2012	2011	2012	2011	2012	2011
Wheat Grade Data:								
Test Weight (lb/bu)	63.0	62.3	62.6	62.3	61.2	61.1	62.1	62.0
(kg/hl)	82.8	81.9	82.2	81.9	80.5	80.4	81.6	81.5
Damaged Kernels (%)	0.0	0.1	0.0	0.1	0.9	1.2	0.1	0.2
Foreign Material (%)	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1
Shrunken & Broken (%)	0.5	0.4	0.8	0.7	1.5	1.6	1.5	1.7
Total Defects (%)	0.6	0.6	0.9	0.9	2.6	3.0	1.7	2.0
Grade	1 HRW	1 HRW	1 HRW	1 HRW	1 HRW	1 HRW	1 HRW	1 HRW
Wheat Non-Grade Data:								
Dockage (%)	0.7	0.7	1.0	0.9	0.6	0.7	0.3	0.4
Moisture (%)	8.1	8.9	8.1	8.9	11.2	11.1	10.9	10.7
Protein (%) 12%/0% moisture basis	11.9/13.5	11.8/13.4	13.1/14.9	13.2/15.0	12.2/13.8	12.1/13.8	11.8/13.4	11.7/13.3
Ash (%) 14%/0% moisture basis	1.53/1.78	1.43/1.67	1.54/1.79	1.50/1.74	1.54/1.79	1.56/1.81	1.42/1.65	1.47/1.71
1000 Kernel Weight (g)	41.2	44.1	41.1	44.7	26.8	27.1	27.5	27.7
Kernel Size (%) lg/md/sm	88/12/0	92/8/0	87/13/0	90/10/0	57/41/2	60/38/2	57/41/2	59/39/2
Single Kernel: Hardness	65.6	60.5	66.3	59.0		74.0		76.8
Weight (mg)	41.2	44.1	41.1	44.7		29.1		29.1
Diameter (mm)	2.54	2.72	2.51	2.70		2.60		2.56
Sedimentation (cc)					28.0	27.8	36.9	32.1
Falling Number (sec)	419		436		387	419	376	378
DON (ppm)						<0.5		<0.5
Flour Data:								
Lab Mill Extraction (%)	73.3	73.5	73.3	73.7	71.3	71.5	72.2	72.5
Color: L*					92.3	91.9	92.4	92.1
a*					-2.7	-3.0	-2.6	-2.9
b*					8.8	8.6	8.7	8.9
Protein (%) 14%/0% moisture basis	10.6/12.3	10.5/12.3	11.8/13.7	11.9/13.8	11.0/12.7	10.8/12.5	10.7/12.5	10.6/12.4
Ash (%) 14%/0% moisture basis	0.45/0.52	0.45/0.52	0.44/0.52	0.46/0.54	0.51/0.59	0.52/0.61	0.47/0.55	0.49/0.57
Wet Gluten (%)	27.1	27.3	31.1	30.9	28.7	27.8	28.0	27.0
Gluten Index	99.0	N/A	92.8	N/A	96.5	96.7	97.3	98.0
Falling Number (sec)	419	407	416	397	468	477	430	429
Amylograph Viscosity 65 g (BU)					733	752	769	722
Starch Damage (%)								
Dough Properties:								
Farinograph:								
Peak Time (min)	8.1	6.3	9.1	7.5	5.0	5.8	5.2	5.8
Stability (min)	17.2	14.3	17.0	15.4	9.0	10.5	10.5	10.8
Absorption (%)	62.4	63.5	63.4	64.2	56.7	58.4	56.7	57.2
Alveograph: P (mm)	101		102		74	92	76	85
L (mm)	87		91		112	85	114	92
P/L Ratio	1.16		1.12		0.66	1.08	0.67	0.93
W (10^{-4} joules)	319		333		248	258	275	259
Extensograph: Resistance (BU)								
(45/135 min) Extensibility (cm)								
Area (sq cm)								
Baking Evaluation:								
Crumb Grain (scale 1-10)	8	7	8	8	6.7	6.4	6.6	6.4
Crumb Texture (scale 1-10)	9	8	9	8	6.8	6.7	6.7	6.5
Loaf Volume (cc)	928	891	963	926	930	838	920	828
Number of Samples					**70**	**255**	**47**	**117**

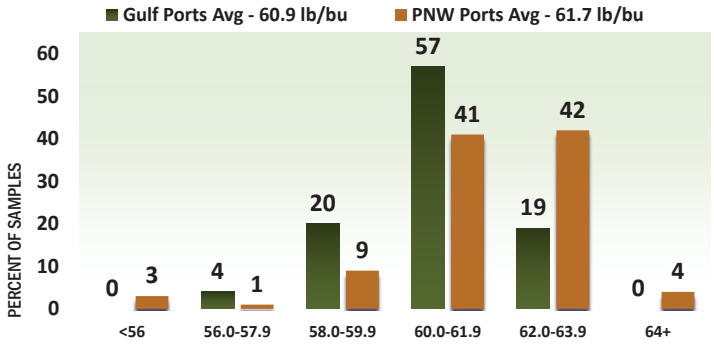
California HRW 2012 Protein Range: Med, 11.0 - 12.4%; High, 12.5% or greater

TWELVE STATES SURVEYED

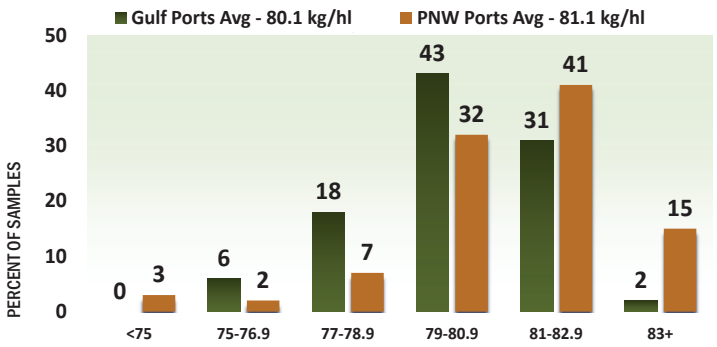
California • Colorado • Idaho • Kansas
Montana • Nebraska • Oklahoma
Oregon • South Dakota • Texas
Washington • Wyoming



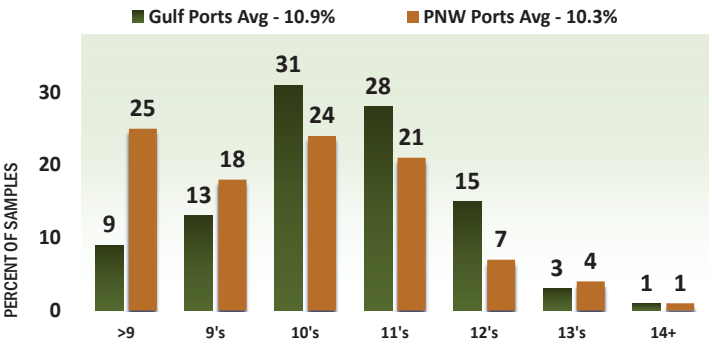
TEST WEIGHT | Pounds/Bushel



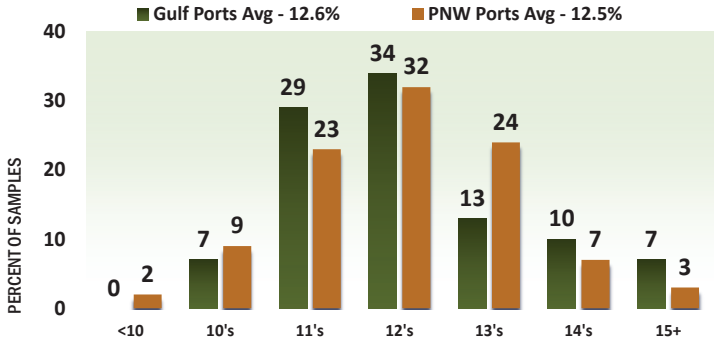
HECTOLITER WEIGHT | Kilograms/Hectoliter



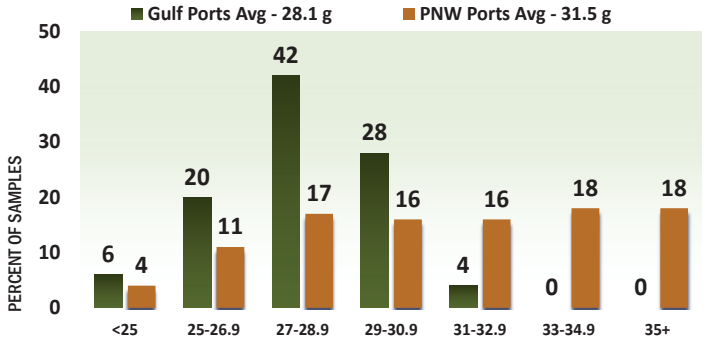
WHEAT MOISTURE | Percent



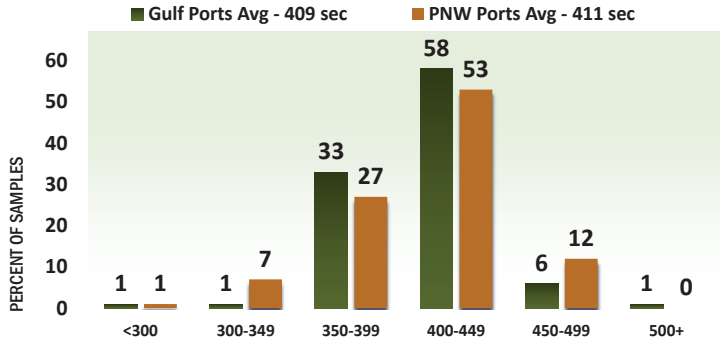
PROTEIN (12% MB) | Percent



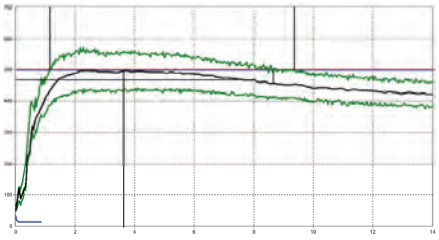
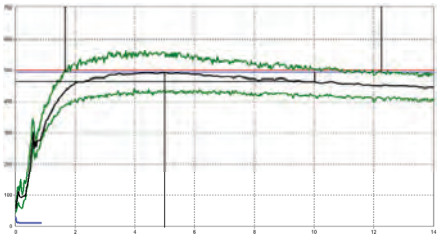
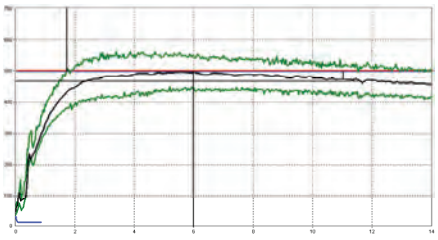
1000 KERNEL WEIGHT | Grams



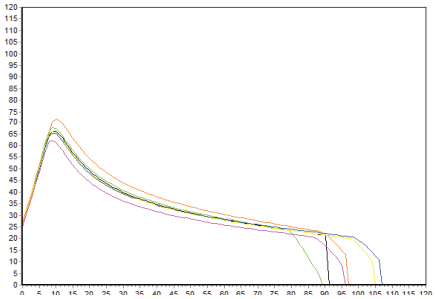
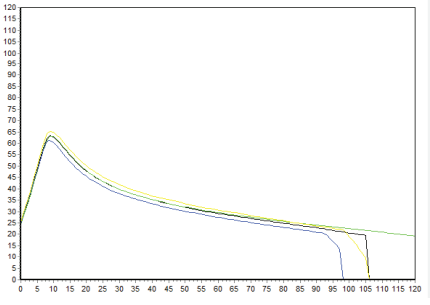
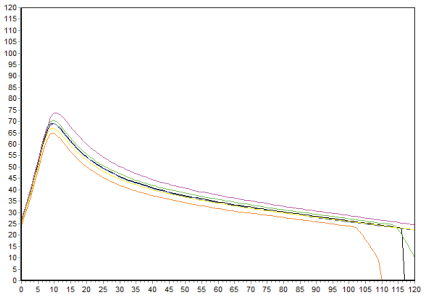
FALLING NUMBER | Seconds



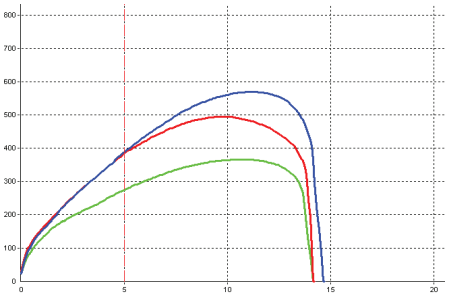
FARINOGRAMS*

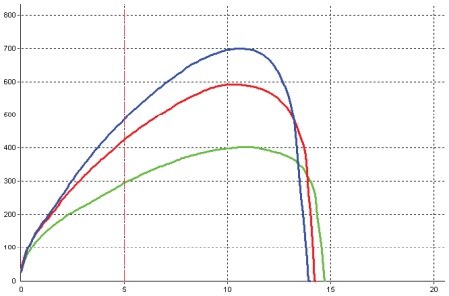




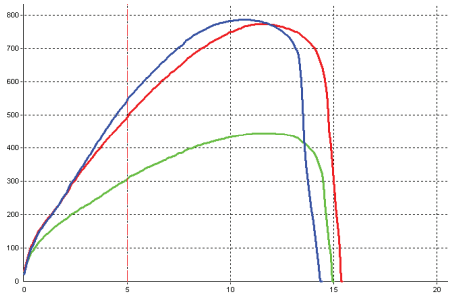
ALVEOGRAMS

EXTENSOGRAMS


LOW PROTEIN


MEDIUM PROTEIN


HIGH PROTEIN

*Representing 2012 Composite Average



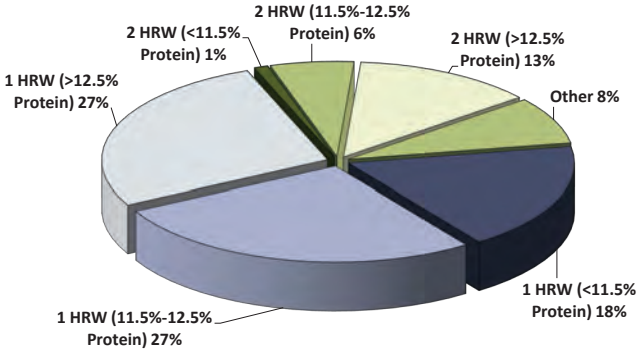
Hard Red Winter Production

for the major growing region (million metric tons)

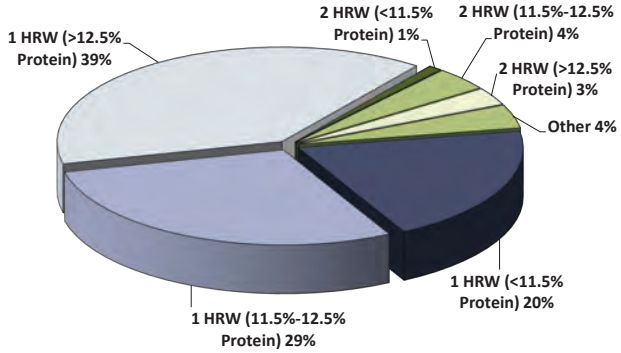
	2012	2011	2010	2009	2008
California	0.6	0.8	0.7	0.6	0.8
Colorado	2.0	2.1	2.8	2.5	1.4
Idaho	0.4	0.4	0.4	0.4	0.5
Kansas	10.2	7.4	9.6	9.9	9.4
Montana	2.3	2.4	2.5	2.4	2.5
Nebraska	1.5	1.8	1.7	2.1	2.0
Oklahoma	4.2	1.9	3.3	2.1	4.4
Oregon	0.1	0.1	0.1	0.0	0.0
South Dakota	1.6	1.8	1.7	1.7	2.8
Texas	2.4	1.3	3.4	1.6	2.6
Washington	0.6	0.5	0.5	0.5	0.4
Wyoming	0.1	0.1	0.1	0.1	0.1
Twelve-State Total	**25.9**	**20.6**	**26.8**	**23.9**	**27.0**
Total HRW Production	**27.3**	**21.2**	**27.7**	**25.0**	**28.2**

Based on USDA crop estimates of September 28, 2012.

GULF EXPORTABLE



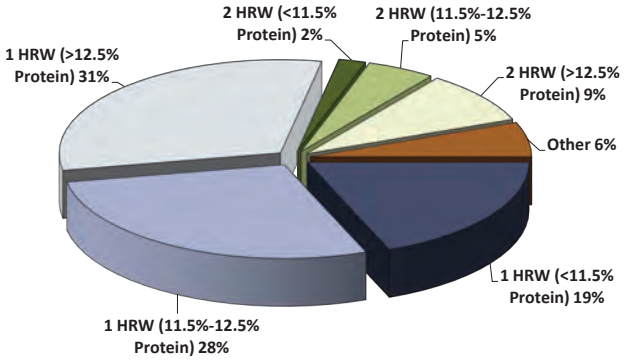
PNW EXPORTABLE



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



HARVEST SURVEY

Weather and Harvest: A mild and dry winter allowed planting to begin in late March in the four-state region, about three weeks ahead of normal, with nearly all completed by mid-May. Favorable conditions in the Pacific Northwest (PNW) allowed planting to proceed at a normal pace.

Moisture was adequate early with favorable temperatures. As the season progressed rainfall diminished, especially across eastern and southern areas with the crop relying mostly on subsoil moisture. Temperatures also were warmer than normal across much of the region, but the advanced maturity of the crop and limited disease pressure enabled the crop to maintain a favorable yield outlook. PNW growing conditions were also favorable early but yield potential later declined with very hot temperatures and limited rainfall.

Harvest began in mid-July, about two weeks earlier than normal. Warm, dry conditions prevailed for much of August allowing for rapid harvest progress. Harvest was complete by mid-August in southern and eastern areas, and early September in northern and western 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 786 samples were collected from fields, at bin sites on farm or at elevators during harvest in Minnesota (117), Montana (153), North Dakota (391), South Dakota (83), Washington, Idaho and Oregon (42). The samples represent approximately 95% of the HRS crop produced in 2012. Samples were segregated by export region (East and West) and composited by protein range as follows: <13.5%, 13.5%-14.5%, and >14.5%. The methods are described in the Analysis Methods section of this booklet.

Wheat and Grade Data: The 2012 HRS crop is one-fourth larger than 2011; planted area increased marginally while yields increased significantly across central parts of the four-state region. The average grade is US No. 1 Dark Northern Spring (DNS), and 86% of the crop grades No. 1. The crop averages 14.7% protein, similar to last year and above the 5-year average of 14.1%.

Test weight averages 61.3 lb/bu (80.6 kg/hl), higher than last year and near the 5-year average. Test weights improved notably across the East region. More than half of the crop exceeds 60 lb/bu (79 kg/hl). Thousand kernel weights improved across both West and East with an overall average of 28.9 g, somewhat below the 5-year average, but up from 26.5 g last year; only 13% of the 2012 crop falls below 25.0 g compared to one-third in 2011. Kernel ash in 2012 of 1.57% is similar to the 5-year average and notably lower than 1.72% in 2011.

Total defects at 1.4% are lower than the 2.0% in 2011 and equal to the 5-year average. Damaged kernels are 0.0% for both the East and West regions compared to 0.3% and 0.2%, respectively, in 2011. Shrunken and broken kernels average just 0.9% in the East, compared to 1.7% in 2011. Isolated areas have some kernel damage due to minor disease pressure which also elevated DON levels in those areas. However, average DON is only 0.1 ppm, well below 0.8 ppm in 2011, with the West averaging 0.1 ppm and the East 0.0 ppm.

Protein averages 14.7%, similar to last year and well above the 5-year average of 14.1%. Two-thirds of the crop is above 14%, with protein higher in the West averaging 15.0% compared to the East at 14.4%. With the rapid, dry harvest, moisture at 11.7% is very low. The falling number of 418 sec indicates the crop is free of sprout damage.

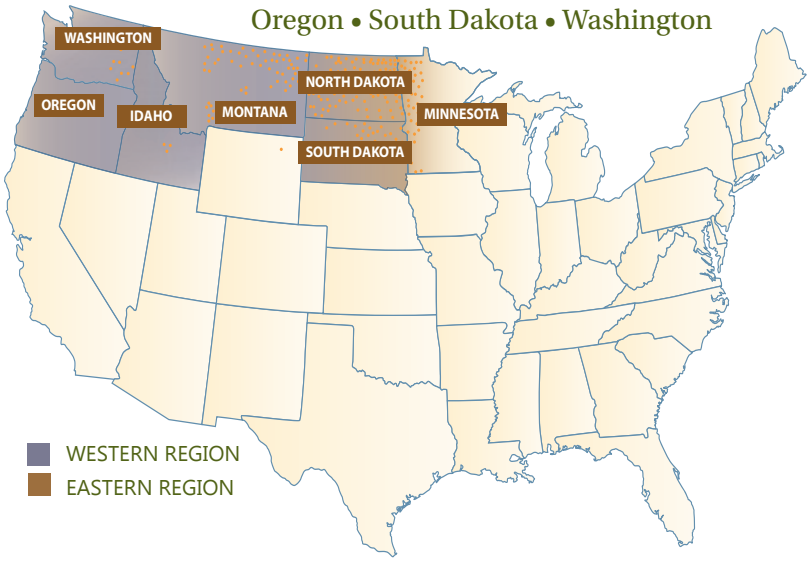
Flour and Baking Data: Average Buhler Lab Mill extraction is 68.9%, compared to 68.5% in 2011. Flour ash is lower at 0.50%, compared to 0.55% in 2011. Wet gluten values are slightly lower than 2011, averaging 35.8% overall, compared to 36.7%. Starch damage is lower than 2011, 7.3% compared to 8.2%.

Farinograph stability times are slightly longer and peak times shorter. At 12.9 min overall, stability is below the 5-year average of 13.9, but up from 12.0 in 2011. Stability shows the greatest improvement across the West, averaging 13 min compared to 11.5 in 2011. Overall farinograph absorption of 63.7% is 1.3 percentage points below 2011 with the West similar to last year at 64.0% and the East lower at 63.5%.

The extensograph and alveograph indicate stronger, more resistant dough in the 2012 crop. The extensograph shows stronger dough parameters compared to 2011 and the 5-year average. Resistance values average 473 BU compared to only 376 BU in 2011 and 432 for the 5-year average and are higher for both West and East regions. However, the dough is somewhat less extensible compared to both last year and the 5-year average. The alveograph shows improved dough

SEVEN STATES SURVEYED

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



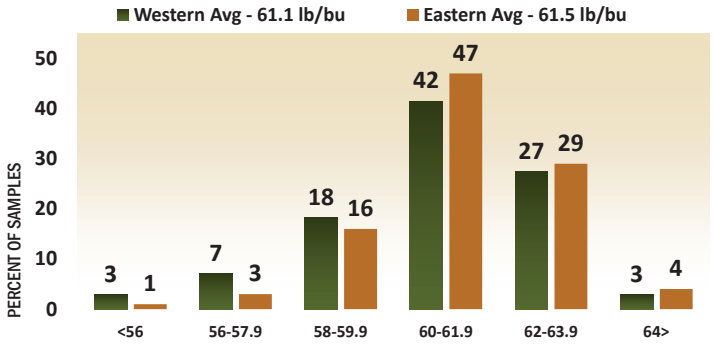
strength with an average W value of 367, compared to 324 in 2011, but slightly less than the 5-year average of 391. The West has slightly stronger W values than the East, 376 versus 359, respectively. The overall P/L ratio of 0.85 is up from 0.66 last year and near the 5-year average of 0.91. Both West and East show improved P/L ratios compared to 2011.

Baking tests show lower bake absorption but higher loaf volumes. Average loaf volume is 999 cc, up from 975 last year and 956 for a 5-year average. Loaf volumes show a strong correlation with protein content, and the West shows the greatest improvement over 2011, averaging 1009 cc, with the East similar to 2011 at 989. Bread scores show slightly poorer grain and texture, averaging 8.1 on a scale of 1 to 10, compared to 8.6 in 2011 and 8.5 for a 5-year average.

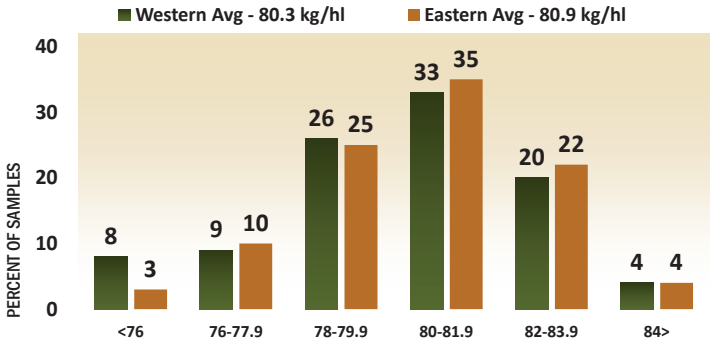
Summary: The 2012 HRS crop has very high protein, a high grade profile with improved kernel weights, near zero damaged kernels, low moisture content and larger production. Functional quality is somewhat improved with greater dough strength and larger loaf volumes. Buyers are encouraged to retain DON specifications, even though average DON levels are near zero, as there were isolated areas that experienced disease pressure. Overall the crop shows good balance in quality parameters from east to west, and buyers should be pleased with the value the 2012 crop affords them.

Continued on next page

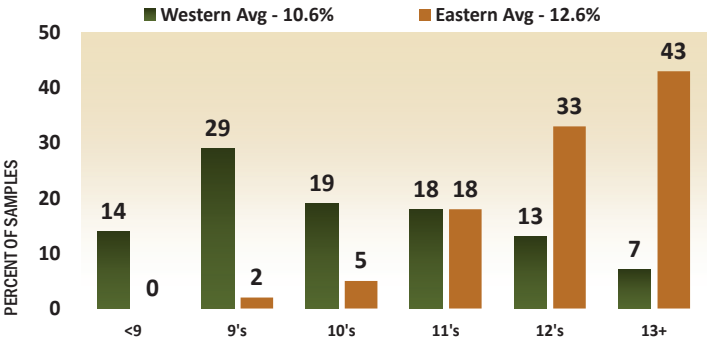
TEST WEIGHT | Pounds/Bushel



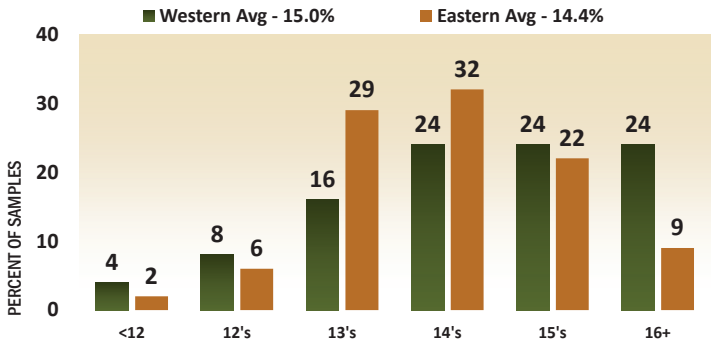
HECTOLITER WEIGHT | Kilograms/Hectoliter



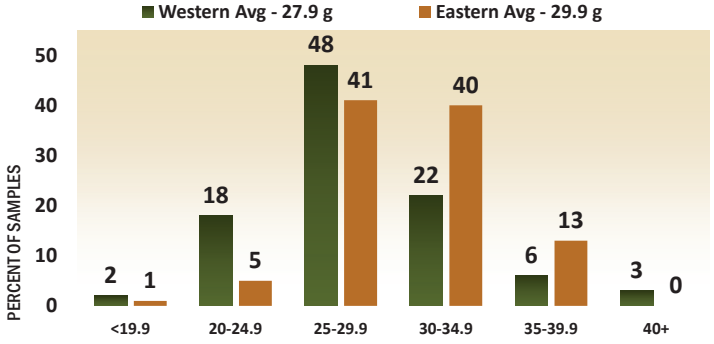
WHEAT MOISTURE | Percent



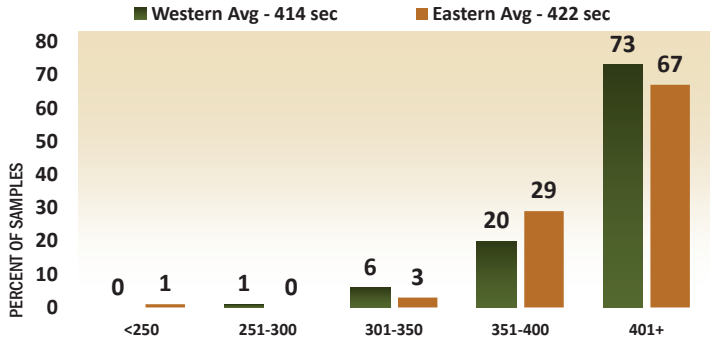
PROTEIN (12% MB) | Percent



1000 KERNEL WEIGHT | Grams



FALLING NUMBER | Seconds



EXPORT CARGO SURVEY

The export cargo data represents 420 individual sublot samples provided by USDA's Federal Grain Inspection Service for crop years 2011 (collected from October 2011 through June 2012) and 2010. Of 142 2011-crop samples, 114 were from PNW, 0 from 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					
	2012 By Protein				2011	5-year
	Low	Med	High	Overall	Overall	Average
Wheat Grade Data:						
Test Weight (lb/bu)	61.8	61.6	60.9	61.3	60.4	61.1
(kg/hl)	81.3	81.0	80.1	80.6	79.4	80.4
Damaged Kernels (%)	0.1	0.0	0.0	0.0	0.2	0.1
Foreign Material (%)	0.0	0.0	0.1	0.0	0.0	0.0
Shrunken & Broken (%)	1.3	1.1	1.6	1.4	1.7	1.3
Total Defects (%)	1.4	1.1	1.7	1.4	1.9	1.4
Vitreous Kernels (%)	74	68	81	76	81	73
Grade	1 NS	1 NS	1 DNS	1 DNS	1 DNS	1 NS
Wheat Non-Grade Data:						
Dockage (%)	0.9	0.6	0.7	0.7	0.6	0.6
Moisture (%)	11.7	12.1	11.4	11.7	11.9	12.2
Protein (%) 12%/0% moisture basis	12.8/14.5	14.2/16.1	15.8/17.9	14.7/16.7	14.8/16.8	14.1/16.0
Ash (%) 14%/0% moisture basis	1.56/1.81	1.54/1.79	1.58/1.84	1.57/1.82	1.72/2.00	1.60/1.86
1000 Kernel Weight (g)	30.7	30.1	27.5	28.9	26.5	31.2
Kernel Size (%) lg/md/sm	41/55/4	44/53/4	27/67/6	35/60/5	28/66/6	47/49/5
Single Kernel: Hardness	86.7	85.0	84.1	84.9	86.2	78.9
Weight (mg)	33.1	33.0	31.2	32.1	30.7	33.4
Diameter (mm)	2.41	2.40	2.28	2.34	2.28	2.62
Sedimentation (cc)	52.8	61.3	64.7	61.3	60.4	58.0
Falling Number (sec)	421	414	420	418	368	388
DON (ppm)	<0.5	<0.5	<0.5	<0.5	0.8	
Flour Data:						
Lab Mill Extraction (%)	69.7	69.7	68.2	68.9	68.5	68.8
Color: L*	91.1	90.7	90.8	90.8	90.7	90.6
a*	-1.0	-0.9	-1.0	-1.0	-0.9	-1.1
b*	8.9	8.9	9.5	9.2	8.9	9.5
Protein (%) 14%/0% moisture basis	11.9/13.8	13.2/15.3	14.6/17.0	13.6/15.9	13.5/15.7	13.0/15.2
Ash (%) 14%/0% moisture basis	0.49/0.57	0.50/0.58	0.51/0.59	0.50/0.59	0.55/0.64	0.51/0.59
Wet Gluten (%)	30.0	34.8	38.6	35.8	36.7	35.3
Gluten Index	94.1	88.4	81.6	86.1	86.4	92.5
Falling Number (sec)	407	415	433	423	389	406
Amylograph Viscosity: 65g (BU)	779	719	728	735	573	628
100g (BU)	2942	2873	2740	2820	1976	2366
Starch Damage (%)	7.7	7.7	6.8	7.3	8.2	7.6
Dough Properties:						
Farinograph:						
Peak Time (min)	5.8	7.3	7.6	7.2	7.7	7.8
Stability (min)	10.8	11.7	14.4	12.9	12.0	13.9
Absorption (%)	61.4	64.1	64.4	63.7	65.0	65.7
Classification	4.5	5.0	6.0	5.4	5.2	5.6
Alveograph: P (mm)	92	91	97	94	83	103
L (mm)	102	123	108	111	125	113
P/L Ratio	0.90	0.74	0.90	0.85	0.66	0.91
W (10^{-4} joules)	333	379	373	367	324	391
Extensograph: Resistance (BU)	443/562	466/608	489/717	473/654	376/475	432/556
(45/135 min) Extensibility (cm)	16.8/14.3	17.2/14.4	16.3/14.0	16.7/14.2	17.8/18.2	17.9/17.3
Area (sq cm)	98/103	107/114	102/129	103/119	90/113	102/124
Baking Evaluation:						
Absorption (%)	61.1	62.5	63.8	62.9	63.7	64.3
Crumb Grain and Texture	7.8	8.2	8.1	8.1	8.6	8.5
Loaf Volume (cc)	909	962	1055	999	975	956
% Area Production:	**19**	**31**	**50**	**100**		

2012 Protein Range: Low, less than 13.5%; Med, 13.5 - 14.5%; High, 14.5% or greater

Western Regional Average						Eastern Regional Average					
2012 By Protein				2011	5-year	2012 By Protein				2011	5-year
Low	Med	High	Overall	Overall	Average	Low	Med	High	Overall	Overall	Average
61.7	61.9	60.6	61.1	60.9	60.7	61.9	61.4	61.4	61.5	60.0	61.4
81.1	81.4	79.7	80.3	80.1	79.9	81.4	80.7	80.7	80.9	78.9	80.7
0.0	0.0	0.0	0.0	0.2	0.1	0.2	0.0	0.0	0.0	0.3	0.2
0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.8	1.5	2.1	1.9	1.8	1.6	0.8	0.9	1.0	0.9	1.7	1.0
1.8	1.5	2.2	2.0	2.0	1.7	1.0	0.9	1.0	0.9	2.0	1.2
94	78	88	87	84	84	55	64	71	65	79	65
1 DNS	1 DNS	1 DNS	1 DNS	1 DNS	1 DNS	1 NS	1 NS	1 NS	1 NS	1 DNS	1 NS
1.2	0.8	0.9	0.9	0.7	0.6	0.6	0.5	0.6	0.5	0.6	0.6
10.6	10.7	10.6	10.6	11.1	11.6	12.7	12.8	12.5	12.6	12.6	12.7
12.7/14.4	14.2/16.1	16.0/18.2	15.0/17.1	14.8/16.8	14.4/16.4	12.8/14.5	14.1/16.0	15.6/17.7	14.4/16.4	14.8/16.8	13.8/15.7
1.57/1.83	1.56/1.82	1.58/1.84	1.58/1.84	1.64/1.91	1.55/1.80	1.54/1.79	1.53/1.78	1.58/1.84	1.56/1.81	1.78/2.07	1.64/1.90
29.7	29.6	26.7	27.9	27.1	30.5	31.7	30.3	28.7	29.9	26.0	31.8
28/67/5	34/61/5	22/70/8	26/68/7	27/67/6	37/57/6	53/44/3	48/49/3	34/62/4	43/53/3	29/65/6	54/43/3
87.5	80.9	82.0	82.8	83.6	78.5	86.0	86.9	87.1	86.8	88.4	79.3
32.2	33.2	30.8	31.6	31.4	32.4	34.0	32.9	31.7	32.6	30.1	34.2
2.35	2.35	2.24	2.29	2.29	2.56	2.46	2.42	2.34	2.39	2.27	2.67
54.8	61.6	64.6	62.1	62.3	61.1	50.9	61.2	64.7	60.6	58.9	55.5
409	411	417	414	366	385	432	416	424	422	369	390
<0.5	<0.5	<0.5	<0.5	0.6		<0.5	<0.5	<0.5	<0.5	1.0	
68.7	69.1	67.8	68.2	66.9	68.1	70.6	70.0	68.8	69.6	69.7	69.4
91.1	90.9	90.9	90.9	90.9	90.7	91.0	90.6	90.6	90.7	90.5	90.6
-1.1	-1.0	-1.0	-1.0	-1.0	-1.1	-0.9	-0.9	-1.0	-0.9	-0.9	-1.1
9.1	9.1	9.5	9.4	8.9	9.5	8.7	8.8	9.4	9.1	8.9	9.4
11.6/13.5	13.1/15.2	14.7/17.1	13.8/16.0	13.4/15.6	13.4/15.6	12.1/14.1	13.2/15.4	14.4/16.8	13.5/15.7	13.6/15.8	12.8/14.8
0.48/0.56	0.50/0.58	0.50/0.58	0.50/0.58	0.50/0.58	0.48/0.56	0.49/0.57	0.50/0.58	0.52/0.61	0.51/0.59	0.60/0.70	0.53/0.62
28.8	35.5	38.9	36.3	36.8	36.4	31.1	34.4	38.2	35.3	36.6	34.4
93.0	81.3	76.5	80.6	84.8	91.4	95.1	91.8	89.0	91.4	87.8	93.3
422	412	431	425	401	415	393	417	436	420	379	395
783	669	757	744	662	697	776	742	686	726	503	575
2896	2567	2813	2779	2236	2584	2984	3018	2635	2858	1770	2199
8.0	7.6	6.8	7.2	7.6	7.3	7.5	7.7	6.9	7.3	8.6	7.8
5.5	8.0	8.0	7.5	7.7	9.4	6.0	7.0	7.0	6.8	7.8	6.6
8.5	11.0	15.0	13.0	11.5	15.5	13.0	12.0	13.5	12.8	12.5	12.7
62.1	63.8	64.6	64.0	64.4	65.9	60.8	64.2	64.1	63.5	65.4	65.6
4.0	5.0	6.0	5.4	5.4	5.8	5.0	5.0	6.0	5.4	5.0	5.4
96	93	97	96	80	104	88	90	97	92	85	102
94	119	118	114	132	117	109	125	93	109	120	110
1.02	0.78	0.82	0.84	0.61	0.89	0.81	0.72	1.04	0.85	0.71	0.92
320	368	396	376	320	411	345	384	341	359	327	375
419/555	395/585	535/710	485/655	370/469	455/597	466/568	500/619	422/727	462/652	380/480	415/523
16.6/13.6	15.9/13.9	16.9/14.5	16.6/14.2	18.2/18.1	18.0/17.8	17.0/14.9	17.8/14.7	15.4/13.4	16.7/14.2	17.5/18.2	17.8/17.0
93/98	82/102	116/133	105/120	92/114	107/137	103/107	119/119	82/124	101/119	89/112	98/115
61.5	62.9	64.2	63.4	63.6	64.5	60.8	62.2	63.3	62.4	63.9	64.1
7.5	8.0	8.0	7.9	8.8	8.5	8.0	8.3	8.3	8.2	8.5	8.5
865	930	1080	1009	955	954	950	978	1020	989	990	957
9	**10**	**29**	**49**			**10**	**21**	**20**	**51**		

2012 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	
	2011	2010	2011	2010	2011	2010
Wheat Grade Data:						
Test Weight (lb/bu)	61.7	61.6	61.6	62.3	61.7	61.8
(kg/hl)	81.1	81.0	81.0	81.9	81.2	81.2
Damaged Kernels (%)	0.6	0.4	1.9	1.4	1.0	1.2
Foreign Material (%)	0.1	0.1	0.1	0.1	0.1	0.1
Shrunken & Broken (%)	1.5	1.1	1.7	0.9	1.3	0.8
Total Defects (%)	2.2	1.6	3.8	2.4	2.4	2.1
Vitreous Kernels (%)	79	66	40	45	69	51
Grade	1 DNS	1 NS	2 NS	1 NS	1 NS	1 NS
Wheat Non-Grade Data:						
Dockage (%)	0.4	0.3	0.7	0.6	0.4	0.7
Moisture (%)	11.6	11.8	12.6	12.0	12.6	12.9
Protein (%) 12%/0% moisture basis	14.0/15.9	13.6/15.5	13.9/15.8	13.0/14.8	13.5/15.3	13.0/14.8
Ash (%) 14%/0% moisture basis	1.56/1.81	1.51/1.76	1.68/1.96	1.51/1.76	1.60/1.86	1.55/1.81
1000 Kernel Weight (g)	30.9	32.7	29.3	32.1	31.1	32.7
Kernel Size (%) lg/md/sm	37/58/5	50/47/3	43/52/5	55/43/2	46/50/4	54/43/2
Single Kernel: Hardness	81.2	78.8		82.4	82.4	80.3
Weight (mg)	30.2	31.8		31.9	30.0	32.1
Diameter (mm)	2.64	2.70		2.76	2.67	2.75
Sedimentation (cc)						
Falling Number (sec)	419	384	417	387	417	407
DON (ppm)	0.6	0.1		0.1	0.9	0.2
Flour Data:						
Lab Mill Extraction (%)	69.5	69.6	69.6	70.4	69.2	70.4
Color: L*	90.5	90.8	90.2	90.7	90.6	90.7
a*	-0.9	-0.9	-0.9	-1.0	-0.9	-0.9
b*	9.2	8.6	9.1	8.8	9.0	8.6
Protein (%) 14%/0% moisture basis	13.0/15.1	12.5/14.6	12.8/14.9	11.9/13.9	12.4/14.4	11.9/13.9
Ash (%) 14%/0% moisture basis	0.53/0.61	0.53/0.62	0.54/0.63	0.53/0.61	0.55/0.63	0.56/0.65
Wet Gluten (%)	35.4	33.4	33.7	31.7	33.7	31.6
Gluten Index	89.0	90.5	94.7	93.6	91.7	93.1
Falling Number (sec)	467	418	436	407	463	430
Amylograph Viscosity: 65g (BU)	596	523	507	554	635	602
100g (BU)						
Starch Damage (%)						
Dough Properties:						
Farinograph:						
Peak Time (min)	7.2	5.9	7.2	4.8	6.9	5.0
Stability (min)	10.3	10.4	12.4	10.2	11.0	10.5
Absorption (%)	64.0	64.4	62.7	64.3	63.1	63.8
Classification	4.8	4.7	5.3	4.6	5.0	4.8
Alveograph: P (mm)	89	103	94	109	90	106
L (mm)	116	109	108	103	112	96
P/L Ratio	0.77	0.94	0.87	1.06	0.80	1.10
W (10^{-4} joules)	340	380	354	400	335	362
Extensograph: Resistance (BU)						
(45/135 min) Extensibility (cm)						
Area (sq cm)						
Baking Evaluation:						
Absorption (%)	65.0	64.1	61.6	63.4	65.2	63.6
Crumb Grain and Texture	8.4	8.4	8.3	8.2	8.5	8.2
Loaf Volume (cc)	975	925	987	900	966	891
Sample Count:	**138**	**152**	**3**	**40**	**29**	**58**

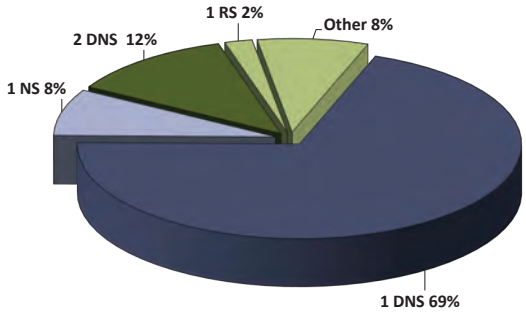
Hard Red Spring Production

for the major producing states (million metric tons)

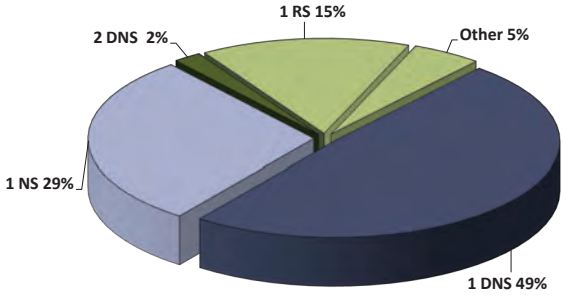
	2012	2011	2010	2009	2008
Idaho	0.5	0.6	0.7	0.6	0.5
Minnesota	2.0	1.9	2.3	2.2	2.7
Montana	2.6	2.1	2.8	1.9	1.6
North Dakota	7.0	4.7	7.8	7.9	6.7
Oregon	0.1	0.1	0.1	0.1	0.1
South Dakota	1.1	1.0	1.6	1.8	1.9
Washington	0.4	0.5	0.4	0.4	0.3
Seven-State Total	**13.7**	**11.0**	**15.8**	**14.9**	**13.8**
Total HRS Production	**13.7**	**11.0**	**15.8**	**14.9**	**13.9**

Based on USDA crop estimates of September 28, 2012.

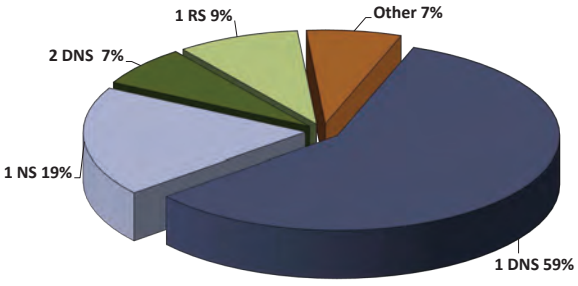
WESTERN REGION



EASTERN REGION



OVERALL

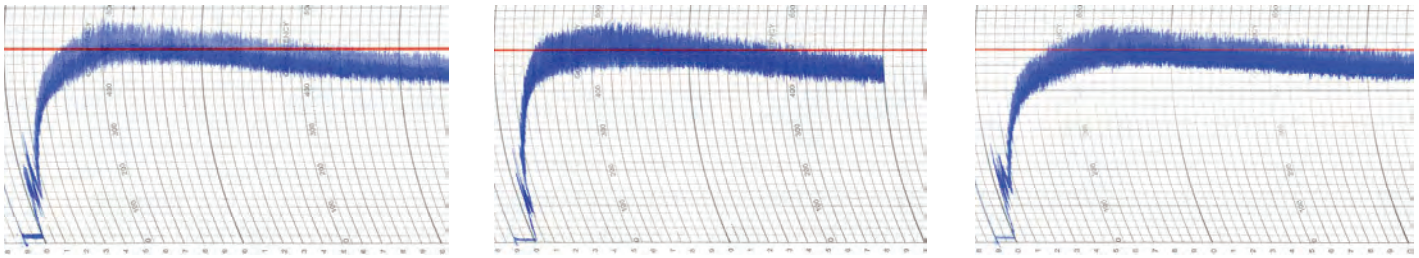


ABOUT HARD RED SPRING WHEAT

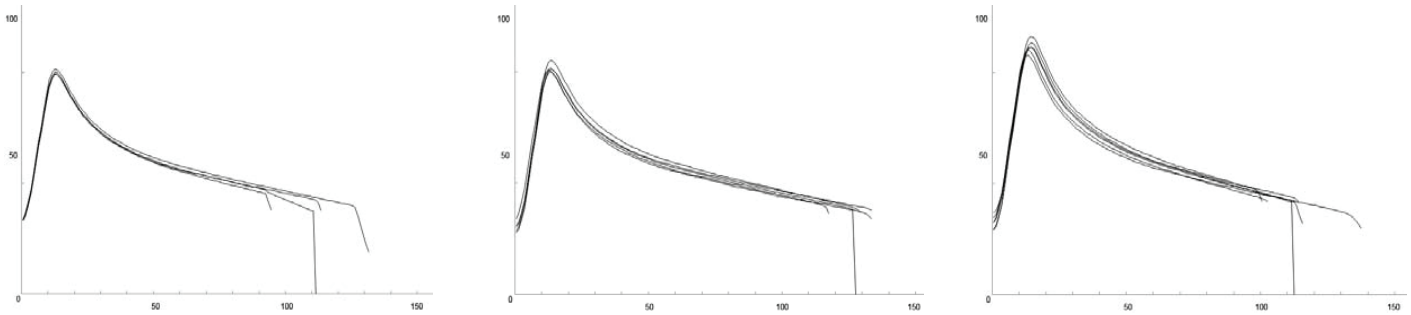
Highest protein content, hard endosperm, red bran, strong gluten, high water absorption. Used in pan breads, hearth breads, rolls, croissants, bagels, hamburger buns, pizza crust and for blending.



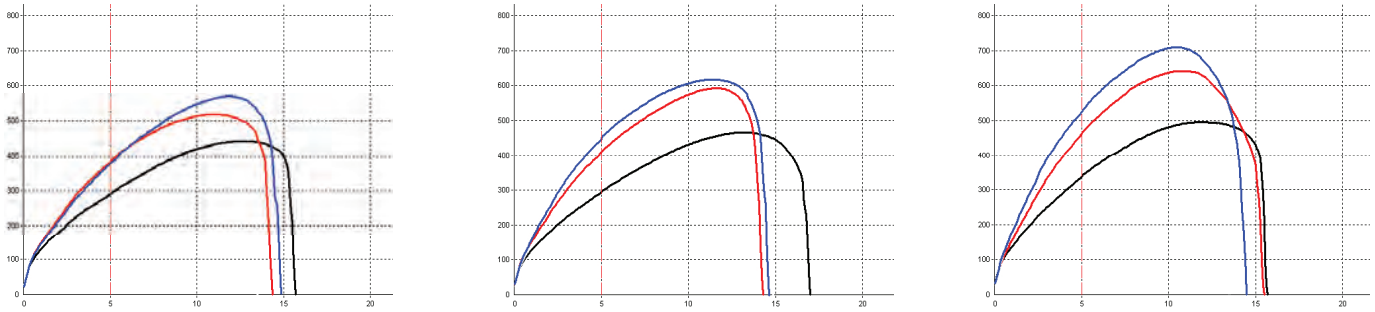
FARINOGRAMS*



ALVEOGRAMS



EXTENSOGRAMS



LOW PROTEIN | MEDIUM PROTEIN | HIGH PROTEIN

*Representing 2012 Composite Average



HARVEST SURVEY

Hard white wheat (HW) was primarily grown in the states of California, Colorado, Idaho, Kansas, Nebraska, and Washington this year. Other states such as Montana, North Dakota, South Dakota, and Oregon also had limited production. According to U.S. Wheat Associates (USW) production estimates, total 2012 HW production was 770,100 metric tons* (MT), down slightly from last year's USW estimated production of 777,200 MT.

Survey Methods: HW samples were collected from four regions: Pacific Northwest (PNW), California, Southern Plains, and Northern Plains. PNW samples were collected from state and private grain inspection agencies and commercial wheat handling operations. Southern Plains samples were collected by Plains Grains, Inc., Stillwater, OK, and the Colorado Wheat Administrative Committee. Northern Plains samples were collected by North Dakota State University and South Dakota State University, and California samples were collected by California Wheat Commission. Wheat grading was conducted by the Federal Grain Inspection Service, Portland, Oregon. All other tests were conducted by the Wheat Marketing Center (WMC), Portland, Oregon.

HW samples were made into eight composites, based on four regions (PNW, California, Southern Plains, and Northern Plains) and four protein levels (<11.5%, 11.5 – 12.5%, 12.6 – 13.5%, and >13.5%). No region had all four protein levels. 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 the USW's Asian Products Collaborative Program.

Wheat and Grade Data: All samples graded as US No. 1 with test weights from 60.3 to 65.6 lb/bu (79.3 to 86.2 kg/hl). Wheat moisture content was in the range of 7.8-9.9%. The ash content ranged from 1.29% to 1.48% (14% mb). The PNW medium-protein composite and California medium- and high-protein composites had much higher thousand kernel weights and kernel diameters than other composites. Falling number values were 320 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 71.4% to 75.3%, whiteness (L*) value was from 90.6 to 92.0, and flour ash varied from 0.51% to 0.56% (14% mb), slightly higher than previous years. The higher flour ash content was a result of inclusion of flour from shorts and brans by the use of a bran finisher and additional sifting.

Flour wet gluten contents were from 26.3% to 34.9% depending on flour protein content. Amylograph peak viscosities were between 616 and 960 BU, which showed varied starch pasting properties. Starch damage values ranged from 4.4% to 5.8%. Lactic acid SRC values were 146% or higher, indicating strong gluten strength for bread baking.

Farinograph absorption ranged from 58.1% to 64.3%, and stability times were 12.1-42.0 min, exhibiting typically medium to strong dough characteristics of HW. 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 71-125 mm for P values, 90-196 mm for L values, and 354-488 10^{-4} J for W values. Extensograph data at 135-minute resting showed that maximum resistance was in the range of 601-1269 BU, and extensibility was from 5.6-20.3 cm.

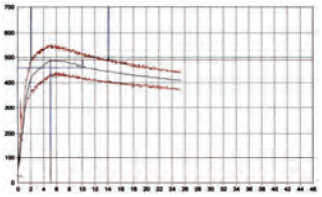
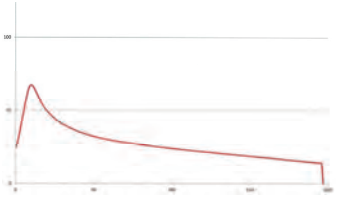
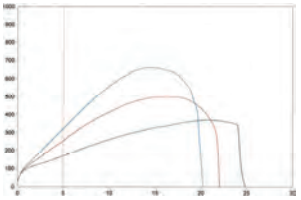
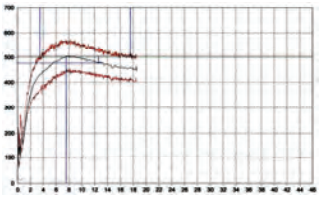
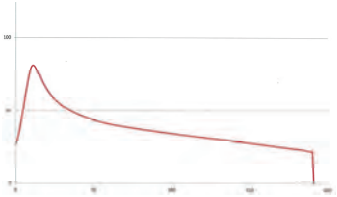
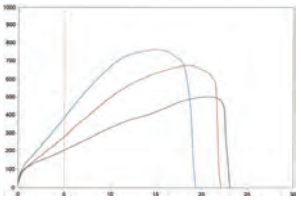
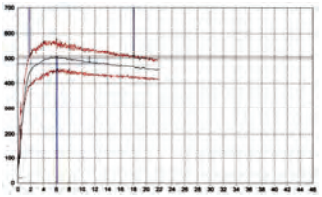
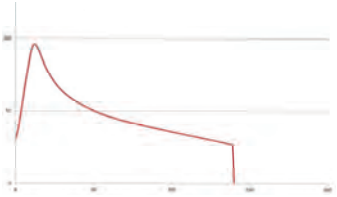
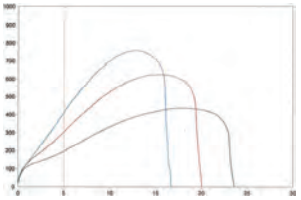
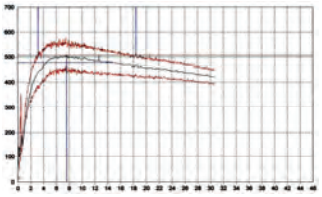
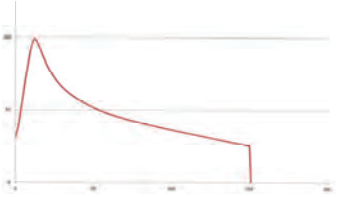
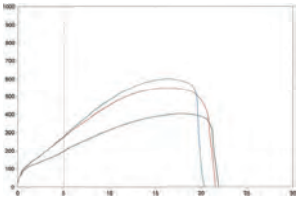
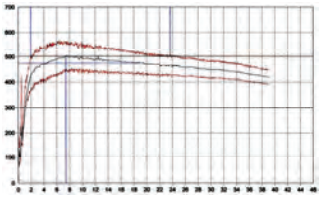
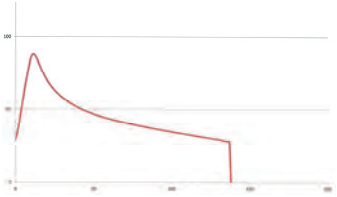
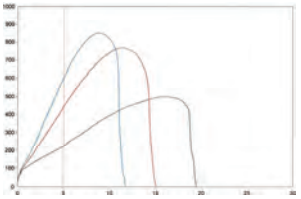
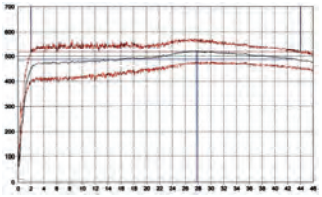
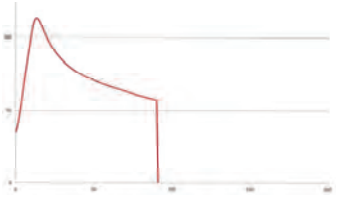
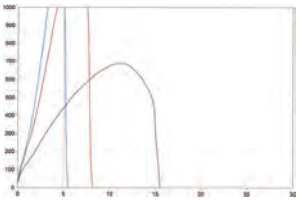
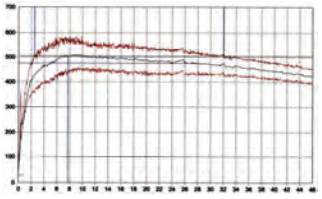
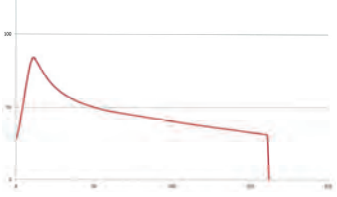
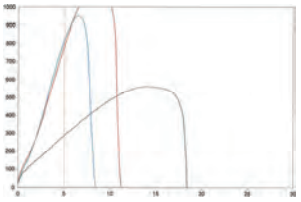
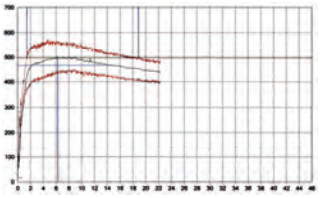
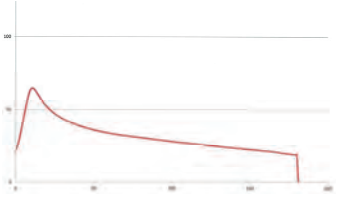
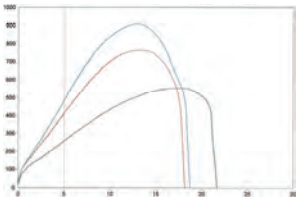
All samples showed very good baking performance relative to their protein content, with the bake absorptions in the range of 62.9-69.5%, loaf volume from 882 to 1033 cc, and the crumb grain and texture scores of 6.5-7.5 points.

Noodle Evaluation: HW flours and a control flour were evaluated for both Chinese raw noodles (white salted) and Chinese wet noodles (yellow alkaline). Because high-extraction, straight-grade flour was used for making these noodles, the noodle color of both Chinese raw noodles and uncooked wet noodles appeared to be dull, and the color stability scores were lower compared to the control noodle which was made from ~60% extraction patent flour. If lower extraction patent flour were used, the noodle color score would be much improved for all samples. However, the cooked noodle texture of both noodle types was very firm and chewy as determined by the instrumental measurement for all samples. It is recommended to use 60-65% extraction flour to produce Asian noodles with this year's HW.

Steamed Bread Evaluation: HW flours were evaluated for Asian steamed breads in comparison with a control flour. Results showed that most samples were acceptable for steamed breads except for the PNW very high-protein composite which had a lower score.

Summary: This year's samples showed very good quality performance in milling, dough rheological properties, and end-products including pan breads and steamed breads. For Asian noodle applications, it is recommended to use 60-65% extraction patent flour to reduce ash content and improve the noodle color while maintaining acceptable noodle texture.

* USDA estimates 2012 HW production at 591,000 tons.

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

Hard White	Pacific Northwest		California		Southern Plains			Northern Plains
	Medium	Very High	Medium	High	Medium	High	Very High	Medium
Wheat Grade Data:								
Test Weight (lb/bu)	63.4	61.3	63.7	65.6	61.5	60.3	61.1	63.0
(kg/hl)	83.3	80.6	83.7	86.2	80.9	79.3	80.4	82.8
Damaged Kernels (%)	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Foreign Material (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Shrunken & Broken (%)	0.9	0.9	0.5	0.3	0.7	0.9	1.3	0.6
Total Defects (%)	1.2	0.9	0.5	0.3	0.7	0.9	1.4	0.6
Grade	1 HW	1 HW	1 HW	1 HW	1 HW	1 HW	1 HW	1 HW
Wheat Non-Grade Data:								
Dockage (%)	0.2	0.2	0.2	0.0	1.1	0.6	0.7	0.2
Moisture (%)	8.7	8.6	9.0	9.1	9.3	9.9	7.8	9.8
Protein (%) 12%/0% moisture basis	12.3/14.0	13.7/15.6	12.0/13.6	13.4/15.2	12.2/13.9	13.2/15.0	14.3/16.2	12.1/13.7
Ash (%) 14%/0% moisture basis	1.39/1.62	1.47/1.71	1.41/1.64	1.46/1.70	1.29/1.50	1.35/1.57	1.45/1.69	1.48/1.72
1000 Kernel Weight (g)	36.7	32.3	36.2	38.8	28.4	25.1	20.2	33.1
Kernel Size (%) lg/md/sm	82/17/1	71/28/1	84/15/1	90/9/1	55/45/0	43/55/2	21/78/1	80/20/0
Single Kernel: Hardness	69.9	75.6	77.3	71.5	82.5	88.1	90.6	66.5
Weight (mg)	39.2	33.0	37.0	39.6	31.7	29.0	25.2	33.1
Diameter (mm)	2.82	2.65	2.84	2.94	2.61	2.54	2.44	2.69
Sedimentation (cc)	41.8	54.5	38.5	48.2	39.6	44.1	43.9	52.0
Falling Number (sec)	371	384	345	320	424	392	431	379
Flour Data:								
Lab Mill Extraction (%)	74.8	73.2	71.6	73.3	71.9	71.6	71.4	75.3
Color: L*	91.9	91.7	91.8	92.0	91.1	91.6	90.6	91.9
a*	-2.1	-2.1	-2.2	-1.7	-2.7	-2.7	-2.6	-2.2
b*	7.6	8.6	8.4	6.5	8.9	9.8	9.1	8.0
Protein (%) 14%/0% moisture basis	11.6/13.5	13.2/15.3	11.4/13.3	12.9/15.0	11.3/13.1	12.5/14.5	13.9/16.2	11.2/13.0
Ash (%) 14%/0% moisture basis	0.53/0.62	0.53/0.62	0.52/0.60	0.51/0.59	0.51/0.59	0.53/0.62	0.56/0.65	0.54/0.63
Wet Gluten (%)	31.0	33.6	29.8	34.9	27.2	26.5	32.5	26.3
Gluten Index	94.2	95.8	95.2	88.3	98.0	98.8	95.7	99.1
Falling Number (sec)	389	408	414	411	452	417	494	383
Amylograph Viscosity 65 g (BU)	821	801	795	616	960	860	718	759
Starch Damage (%)	5.2	4.4	5.4	4.8	5.0	5.8	4.4	4.8
Solvent Retention Capacity (%)								
Water/50% Sucrose	66/109	70/112	62/115	61/114	66/110	71/121	65/107	64/101
5% Lactic Acid/5% Na_2CO_3	146/87	162/86	147/93	157/89	148/88	168/98	151/84	153/79
Dough Properties:								
Farinograph:								
Peak Time (min)	5.2	7.7	6.2	7.7	7.5	27.9	7.8	6.4
Stability (min)	12.1	14.1	16.3	15.2	21.7	42.0	29.6	17.4
Absorption (%)	59.6	61.7	62.1	64.3	59.9	61.4	60.0	58.1
Alveograph: P (mm)	74	89	106	109	97	125	92	71
L (mm)	196	191	139	150	137	90	161	181
P/L Ratio	0.38	0.47	0.76	0.73	0.71	1.39	0.57	0.39
W (10-4 joules)	354	473	435	465	408	441	488	378
Extensograph: Resistance (BU)	369/658	501/762	435/757	403/601	497/848	686/1269	560/951	553/908
(45/135 min) Extensibility (cm)	24.8/20.3	23.1/19.3	23.6/16.7	21.9/20.3	19.5/11.7	15.6/5.6	18.6/8.5	21.7/18.8
Area (sq cm)	115/163	135/182	130/152	112/148	115/113	131/67	127/81	149/205
Baking Evaluation:								
Bake Absorption (%)	64.6	66.8	67.1	69.5	65.1	66.6	65.1	62.9
Crumb Grain and Texture	7.0	7.5	7.0	7.0	6.5	6.5	7.5	7.5
Loaf Volume (cc)	939	1022	918	957	920	979	1033	882

2012 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	Pacific Northwest		California		Southern Plains			Northern Plains
	Medium	Very High	Medium	High	Medium	High	Very High	Medium
Chinese Raw Noodle-Making Quality:								
Color at 0/24 hour: L*	81.8/66.1	80.2/67.1	82.6/69.9	80.8/66.3	81.9/70.2	82.4/69.0	79.3/68.2	81.5/70.0
a*	0.6/1.2	0.8/1.7	0.3/0.7	1.0/1.4	-0.1/0.1	0.0/0.1	0.2/0.8	0.6/1.3
b*	18.0/21.0	21.1/23.9	19.4/23.2	17.1/19.0	22.0/26.0	19.9/26.1	22.6/26.5	19.7/23.3
Change in L* (0-24 hr)	15.7	13.1	12.7	14.5	11.7	13.5	11.2	11.6
Cooking Yield (5 min, %)	117	111	119	116	118	112	111	114
Sensory Color Stability Score	5.3	6.0	6.5	5.3	6.2	5.7	5.8	6.5
Instrumental Texture:								
Firmness (g)	1271	1479	1335	1283	1360	1510	1604	1385
Springiness (%)	93.7	94.4	94.5	95.0	94.5	95.3	94.3	94.3
Cohesiveness	0.65	0.64	0.65	0.65	0.65	0.64	0.64	0.64
Chewiness (g)	771	897	815	795	840	926	967	837
Chinese Wet Noodle-Making Quality:								
Uncooked Color at 0/24 hour: L*	77.6/63.3	77.9/64.7	79.3/66.6	77.3/62.5	79.0/66.3	78.0/65.6	77.8/64.3	81.0/68.1
a*	-1.8/-0.1	-1.5/-0.5	-1.7/-0.4	-1.3/0.0	-1.9/-0.3	-2.0/-0.3	-1.6/-0.2	-1.2/-0.1
b*	19.3/21.6	21.4/23.0	21.4/24.3	17.5/20.5	22.5/25.5	22.4/25.4	22.7/24.8	21.2/24.5
Change in L* (0-24 hr)	14.3	13.2	12.8	14.8	12.7	12.4	13.4	13.0
Parboiled Color at 0/24 hour: L*	73.7/73.5	74.0/74.3	75.4/75.5	73.3/73.6	75.8/75.9	74.7/74.4	74.7/74.5	76.1/75.9
a*	-1.4/-2.1	-1.3/-2.1	-1.9/-2.4	-1.1/-1.8	-1.9/-2.5	-1.2/-2.3	-1.3/-2.1	-1.8/-2.0
b*	27.6/26.3	28.9/27.9	29.4/28.5	25.1/24.1	31.2/30.2	31.8/30.1	30.3/29.4	29.0/27.7
Cooking Yield (1.5 min, %)	62	61	63	62	61	59	60	60
Uncooked Color Stability Score	5.3	5.7	6.2	5.3	6.3	5.8	6.0	7.0
Parboiled Color Stability Score	5.5	6.0	6.3	5.5	6.5	6.0	6.0	6.5
Instrumental Texture:								
Firmness (g)	865	909	875	869	884	1026	1036	925
Springiness (%)	95.8	95.1	95.7	95.7	96.5	96.6	96.1	96.8
Cohesiveness	0.63	0.62	0.64	0.64	0.64	0.59	0.60	0.62
Chewiness (g)	525	535	534	530	548	588	601	555
Asian-Type Steamed Bread Evaluation:								
Specific Volume (ml/g)	3.0	2.8	2.9	2.9	3.1	3.0	3.1	2.8
Total Score	69.6	63.5	70.3	70.8	70.2	71.2	69.9	70.0

2012 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: Planting of the Northern durum crop began earlier than normal in April and favorable weather conditions allowed planting to finish by the end of May, about two weeks ahead of normal. Moisture was more than adequate at the beginning of the growing season allowing for good crop development. July and August were hot and dry, but adequate subsoil moisture and advanced crop maturity minimized yield losses. Dry conditions minimized disease pressure but pockets did experience some disease. Early planting and hot, dry conditions pushed crop development ahead of average. Harvest began in late July and finished by mid-September with very few weather-related delays.

Survey Methods: A total of 221 samples were collected from the primary durum growing areas of North Dakota (163) and Montana (58). State offices of the National Agricultural Statistics Service collected samples directly from producers in the field, from farm bins or at local elevators. These samples represent the grain at the point of origin before any conditioning or market blending, and represent the entire harvested crop, not just the crop being marketed at harvest time. Analysis was conducted by the Durum Quality Lab, North Dakota State University, Fargo, North Dakota.

Wheat and Grade Data: Acreage of durum in the Northern region increased by over 60% in 2012 after hitting a record low in 2011. Increased acreage combined with slightly higher yields led to an almost doubling of production in the Northern durum region.

Average test weight is slightly higher than last year and the 5-year average at 60.6 lb/bu (78.9 kg/hl), and vitreous kernel (HVAC) content is slightly improved at 89%. About 83% of the crop is above the Hard Amber Durum (HAD) minimum of 75% HVAC, while nearly two-thirds is above 90%. The average grade is US No. 1 HAD, with over 50% of the crop grading No. 1 HAD.

Average thousand kernel weight is higher than last year at 36.9 g, but falls below the 5-year average. Protein is one percentage point higher than the 2011 crop and half a point higher than the 5-year average at 14.6%. Total defects are equal to last year's 1.8% with the majority being shrunken and broken kernels. Similar to last year, DON levels are elevated in areas where disease pressure was higher. Falling numbers are very strong this year with the average being 412 sec.

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.

While the majority of the crop grades high, there are isolated areas with higher damage levels or reduced levels of kernel vitreousness. Maintaining stringent contract specifications will ensure buyers receive the quality of durum they desire.

Semolina and Processing Data: Milling performance, based on the Buhler Lab Mill, indicates total and semolina extraction levels lower than last year and the 5-year average. Total extraction is 68.6% and semolina extraction is 63.4% compared to the 5-year average of 70.6% and 64.2%, respectively. Average semolina ash of 0.63% is lower than both last year and the 5-year average.

Semolina mixing properties are stronger than last year and the gluten index continues to increase each year. Gluten index this year is 60.6, up significantly from the 5-year average of 51.8. The high vitreous kernel counts and sound crop resulted in lower speck counts (23 per 10 sq in versus 31 in 2011) and better pasta color compared to last year. Cooking loss is nearly one percentage point lower than 2011 at 5.3% and with similar cooked firmness.

Summary: Buyers will enjoy a larger durum crop that grades high and has good overall quality. Especially notable are improvements in semolina and processing characteristics such as higher gluten indexes, improved pasta color and lower cooking loss. With some variance in quality within areas this year, buyers are encouraged to maintain stringent contract specifications to ensure they receive the quality they need.

DESERT DURUM®

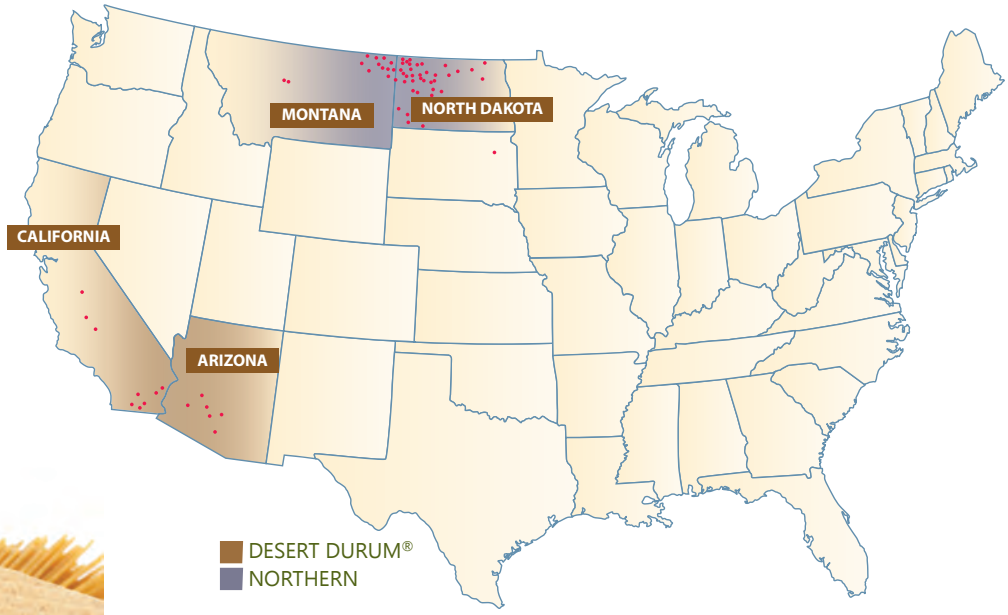
Desert Durum®, a trademark of the Arizona Grain Research and Promotion Council and the California Wheat Commission, applies only to durum wheat produced under irrigation in the states of Arizona and California.

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 Desert Durum® acreage harvested in Arizona and southern California for the 2012 harvest season was somewhat greater than 2011. Grain yields were generally slightly below normal. The crop again exhibited consistently large kernel size and low moisture, traits that contribute to achieving high extraction rates. Overall, grain quality characteristics met expectations. In summary, the 2012 Desert Durum® crop will deliver the valuable milling, semolina, and pasta quality traits that customers have learned to expect and appreciate.

EXPORT CARGO SURVEY

The durum export cargo data represents 29 individual sublot samples provided by USDA's Federal Grain Inspection Service for crop year 2011 (collected from October 2011 through June 2012) and 50 samples for 2010. Grade data are the actual official grades on the individual sublots. Processing analysis was conducted by North Dakota State University.

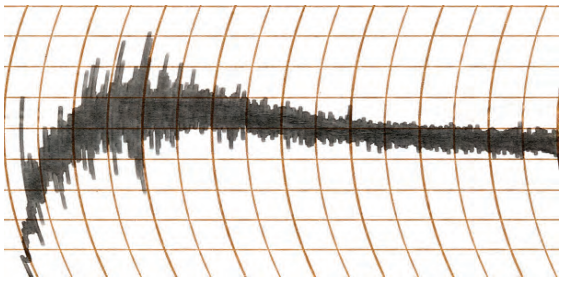




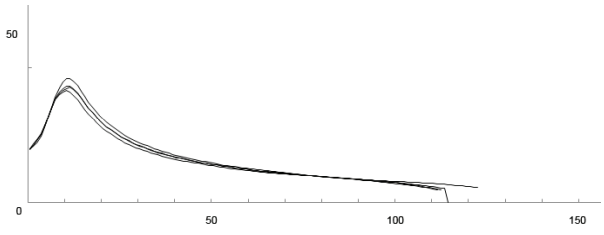
FOUR STATES SURVEYED

Arizona • California • Montana • North Dakota

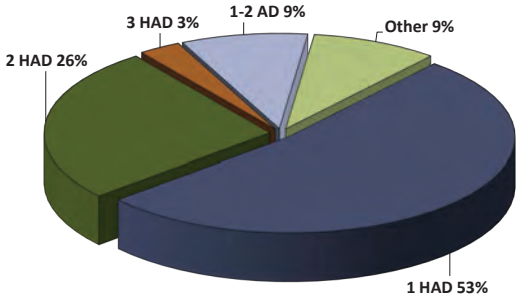
NORTHERN DURUM REGIONAL AVERAGE



MIXOGRAM
(SCORE = 5.4)



ALVEOGRAM

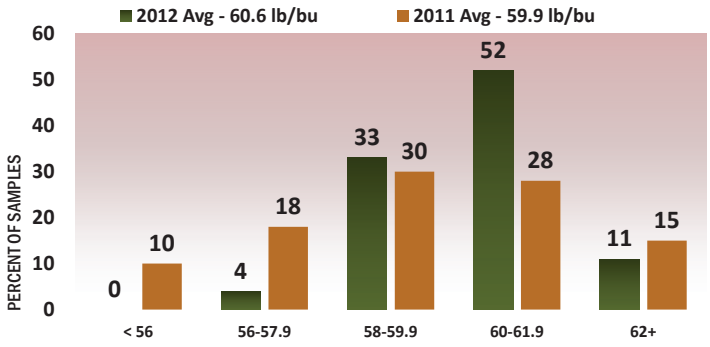


NORTHERN DURUM GRADE DISTRIBUTION

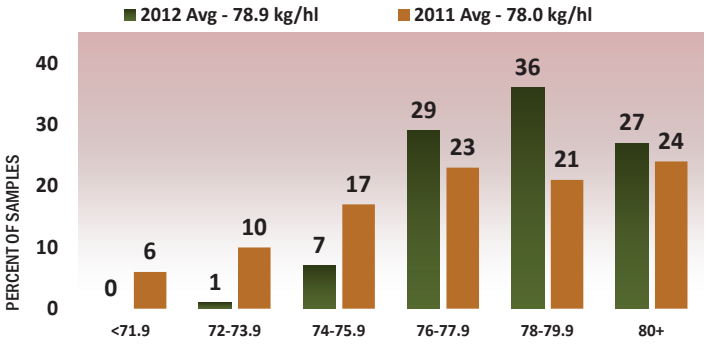
Durum	Harvest Data						Export Cargo Data			
	Northern Durum			Desert Durum®			Northern Durum		Desert Durum®	
	2012	2011	5-Year Avg	2012	2011	5-Year Avg	2011	2010	2011	2010
Wheat Grade Data:										
Test Weight (lb/bu)	60.6	59.9	60.3	62.3	62.9	62.8	60.2	60.3	62.0	62.8
(kg/hl)	78.9	78.0	78.5	81.2	81.8	81.7	78.5	78.5	80.7	81.7
Damaged Kernels (%)	0.5	0.4	0.5	0.2	0.3	0.3	2.3	3.9	0.7	0.4
Foreign Material (%)	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.1	0.1
Shrunken and Broken (%)	1.3	1.4	1.1	0.6	0.5	0.4	1.5	1.3	1.0	0.7
Total Defects (%)	1.8	1.8	1.7	0.9	0.8	0.8	4.0	5.3	1.8	1.2
Contrasting Classes (%)	0.0	0.0	0.2	0.0	0.0	0.0	1.1	1.1	0.2	0.2
Vitreous Kernels (%)	89.0	88.0	86.2	97.1	97.2	95.8	72.3	65.0	93.9	95.2
Grade	1 HAD	2 HAD	1 HAD	I HAD	1 HAD	1 HAD	2 AD	3 AD	1 HAD	1 HAD
Wheat Non-Grade Data:										
Dockage (%)	0.9	1.4	1.3	0.4	0.4	0.3	0.7	0.6	0.6	0.5
Moisture (%)	10.5	11.6	11.7	6.3	6.3	6.6	12.4	12.2	6.7	6.8
Protein (%) 12%/0% moisture basis	14.6/16.6	13.6/15.5	14.1/16.0	13.7/15.5	13.6/15.5	13.4/15.3	13.7/15.6	13.3/15.1	13.3/15.1	12.9/14.7
Ash (%) 14%/0% moisture basis	1.57/1.83	1.71/1.99	1.57/1.83	1.74/2.02	1.78/2.06	1.71/1.99	1.65/1.92	1.54/1.79	1.63/1.90	1.57/1.82
1000 Kernel Weight (g)	36.9	36.6	37.6	45.2	50.6	51.5	40.4	39.4	47.1	47.1
Kernel Size (%) lg/md/sm	64/29/7	36/57/7	39/55/6	86/14/0	90/10/0	93/7/0	46/49/5	50/46/4	69/28/3	76/22/2
Falling Number (sec)	412	372	359				318	274	914	892
Sedimentation (cc)	49	43	47							
DON (ppm)	1.0	1.0	<0.5				0.7	<0.5	0.0	0.0
Semolina Data:										
Lab Mill Extraction (%)	68.6	70.4	70.6	75.5	73.8	75.6	69.5	71.7	71.0	70.8
Semolina Extraction (%)	63.4	64.5	64.2	62.0	62.8	63.1	64.2	64.6	65.8	64.7
Ash (%) 14%/0% moisture basis	0.63/0.73	0.66/0.77	0.67/0.78	0.91/1.06	0.86/1.00	0.86/1.00	0.67/0.78	0.69/0.80	0.67/0.78	0.69/0.81
Specks (no/10 sq in)	23	31	29	4	5	7	23	33	21	27
Protein (%) 14%/0% moisture basis	13.7/15.9	12.4/14.4	13.0/15.1	12.5/14.5	12.6/14.6	12.4/14.4	12.4/14.4	12.2/14.1	12.2/14.2	11.8/13.7
Wet Gluten (%)	37.0	35.6	36.9	32.5	31.5	33.2				
Gluten Index	60.6	55.5	51.8				61.6	57.1	84.2	90.1
Mixograph Classification	5.6	5.4	5.4				6.4	6.2	7.4	7.7
Alveograph: P (mm)	44.6	42.4	48.1	101.7	81.1	82.3				
L (mm)	126.5	99.1	93.0	59.6	64.1	60.6				
P/L Ratio	0.36	0.44	0.52	1.76	1.31	1.36				
W (10-4 joules)	141	105	116	205	181	170				
Color: L*	85.0	84.6	85.1		88.1	88.1	84.8	84.8	84.8	85.2
a*	-2.8	-2.7	-2.8		2.0	2.0	-2.5	-2.6	-2.7	-2.6
b*	29.8	29.7	28.7	25.6	25.9	25.9	26.7	26.5	27.8	26.8
Spaghetti Processing Data:										
Color Score	9.5	9.3	9.0	8.2	8.7	8.6	8.4	8.3	9.0	9.1
Cooked Weight (gm)	31.3	32.1	31.8	29.8	29.7	30.0	32.0	31.8	31.1	31.3
Cooking Loss (%)	5.3	6.4	6.0	7.4	7.2	7.5	5.8	6.4	5.8	6.2
Cooked Firmness (g cm)	5.1	5.3	5.2	7.6	7.7	7.5	4.7	4.8	5.4	5.4
Sample Count:							**15**	**31**	**14**	**19**

NORTHERN DURUM DISTRIBUTIONS

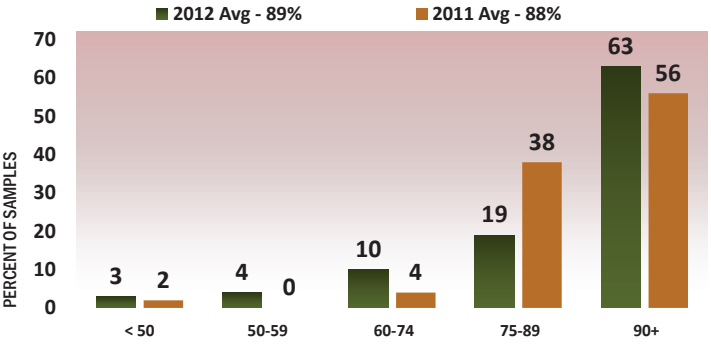
TEST WEIGHT | Pounds/Bushel



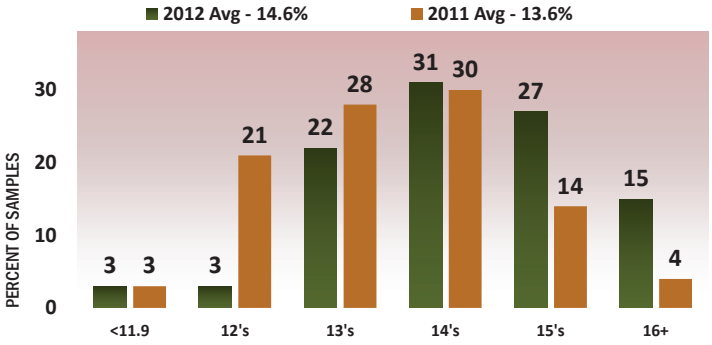
HECTOLITER WEIGHT | Kilograms/Hectoliter



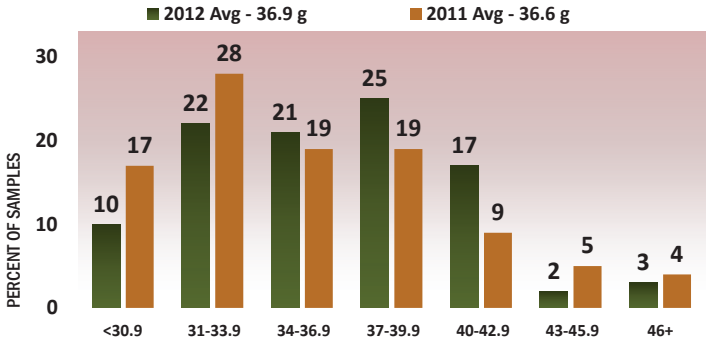
VITREOUS KERNELS | Percent



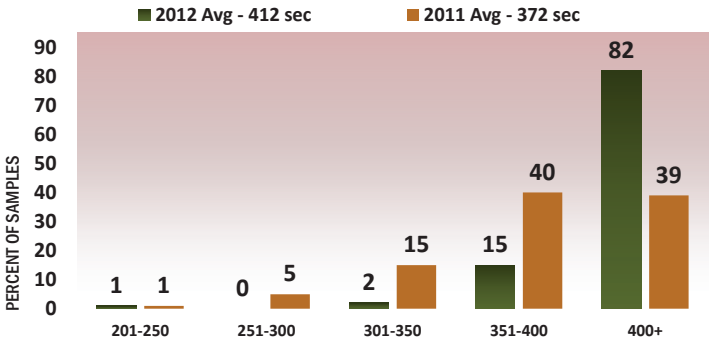
PROTEIN (12% MB) | Percent



1000 KERNEL WEIGHT | Grams



FALLING NUMBER | Seconds



Durum Production

for the major producing states (million metric tons)

	2012	2011	2010	2009	2008
Arizona	0.3	0.2	0.3	0.3	0.4
California	0.4	0.3	0.3	0.5	0.4
Montana	0.4	0.3	0.5	0.5	0.3
North Dakota	1.2	0.5	1.8	1.7	1.2
Total Durum Production	**2.2**	**1.4**	**2.9**	**3.0**	**2.3**

Based on USDA crop estimates of September 28, 2012.

PACIFIC NORTHWEST SOFT WHITE



THREE STATES SURVEYED

Idaho • Oregon • Washington

HARVEST SURVEY

Weather and Harvest: The Pacific Northwest (PNW) had adequate soil moisture at planting, and most of the area received adequate rainfall during the winter and spring. Although generally cool temperatures prevailed during the growing season, hot and dry conditions occurred at the end of wheat kernel development and continued throughout harvest.

Survey and Analysis Methods: A total of 553 soft white and 55 white club wheat samples were collected from state and private grain inspection agencies and commercial wheat handling operations. USDA's Federal Grain Inspection Service graded and tested protein content on wheat samples. For further testing, three composites were made according to protein content (Low <9.0%, Medium 9.0-10.5%, and High >10.5%) and one composite of all white club samples. Wheat and flour quality testing and data analyses were conducted by the Wheat Marketing Center, Portland, Oregon. Laboratory testing was conducted according to either American Association of Cereal Chemists Approved Methods (11th Edition) or Wheat Marketing Center Standard Methods.

Wheat and Grade Data: The average test weight for the 2012 soft white (SW) at 61.0 lb/bu (80.2 kg/hl) was similar to last year's average at 60.9 lb/bu (80.1 kg/hl), and white club (WC) at 60.3 lb/bu (79.3 kg/hl) was slightly above last year's average at 59.9 lb/bu (78.8 kg/hl). Other Federal Grain Inspection Service grading factors for SW and WC were similar to last year and the 5-year averages. SW dockage decreased to 0.4% from 0.7% last year, and WC decreased to 0.7% from 1.0% last year. SW wheat moisture decreased to 9.5% from 9.7% last year and WC decreased to 8.9% from 9.2% last year.

Soft white wheat protein (12% mb) of 9.8% was higher than last year's 9.2%, but lower than the 5-year average. WC protein at 10.2% was higher than last year, but the same as the 5-year average. SW wheat ash (14% mb) at 1.35% was the same as last year and slightly lower than the 5-year average, but WC wheat ash of 1.31% was higher than last year and the 5-year average. Thousand kernel weights for both SW and WC were heavier than last year and 5-year averages. Falling numbers were 320 sec for SW and 308 sec for WC, both of which were higher than last year and similar to the 5-year averages.

Flour, Dough and Baking Data: Buhler Laboratory Mill flour extraction for SW of 75.7% was slightly higher than last year and the 5-year average, but WC extraction of 75.3% was lower than last year. Flour protein (14% mb) was 8.7% and 9.1% for SW and WC, respectively. Flour ash (14% mb) for both SW and WC was similar to last year, but greater than the 5-year averages. Falling number values were 378 sec for SW and 353 sec for WC. Amylograph peak viscosity values of 470 BU for SW and 464 BU for WC were higher than last year, but lower than the 5-year averages. Starch damage values were slightly higher for SW and slightly lower for WC than last year and the 5-year averages. For both SW and WC, farinograph stability times are longer and water absorptions slightly higher than last year, but all are similar to 5-year averages. SW and WC showed longer alveograph L values than last year and the 5-year averages. Extensograph extensibility for SW and WC were longer than last year and the 5-year averages. Sponge cake volume for SW of 1219 cc was slightly lower with lower score than last year and the 5-year average. The volume for WC of 1239 cc was also slightly less than last year, but slightly greater than the 5-year average. SW cookie diameter was slightly less than last year, but slightly larger than the 5-year average. WC cookie diameter was slightly larger than last year and 5-year average. SW and WC cookie spread factors were similar to last year, but higher than the 5-year averages.

Chinese Southern-Type Steamed Bread: Each flour was made into southern-type steamed bread and compared with control flour. Specific volumes were lower for SW, but similar for WC to last year and the 5-year averages. Total scores were similar to last year's average and the 5-year averages for SW, but lower than last year and the 5-year averages for WC.

EXPORT CARGO SURVEY

The PNW SW export cargo data show the results of analyses of individual sublot samples including 89 drawn from the 2010 crop and 62 from the 2011 crop (August 2011 through May 2012). 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.

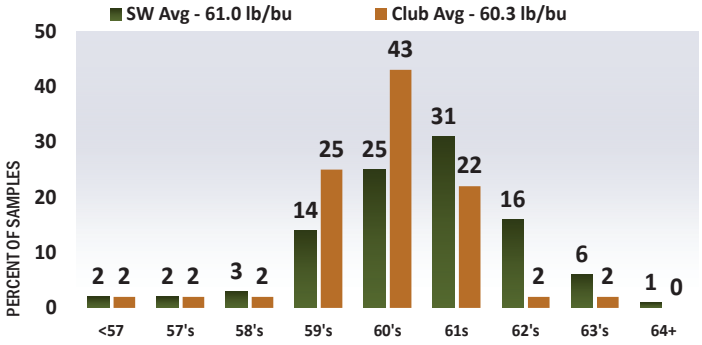
Pacific Northwest Soft White Wheat Production

in major producing states (million metric tons)

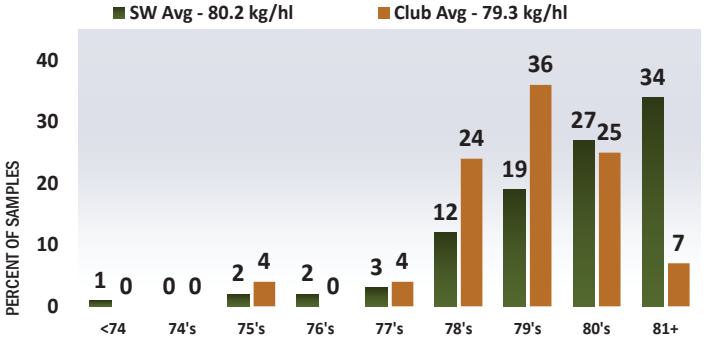
	2012		2011		2010		2009		2008	
	SW	CLUB	SW	CLUB	SW	CLUB	SW	CLUB	SW	CLUB
Washington	2.5	0.42	3.1	0.4	2.8	0.3	2.3	0.2	2.4	0.1
Oregon	1.4	0.02	1.8	0.0	1.5	0.0	1.2	0.0	1.3	0.0
Idaho	1.5	0.02	1.8	0.1	1.6	0.1	1.3	0.0	1.4	0.0
Three-State Total	**5.4**	**0.46**	**6.7**	**0.5**	**5.9**	**0.4**	**4.9**	**0.2**	**5.1**	**0.2**
Three-State Total Soft White Wheat	**5.9**		**7.2**		**6.3**		**5.1**		**5.3**	
Total US Soft White Wheat	**6.5**		**7.9**		**6.9**		**5.7**		**6.1**	

Based on USDA crop estimates of September 28, 2012.

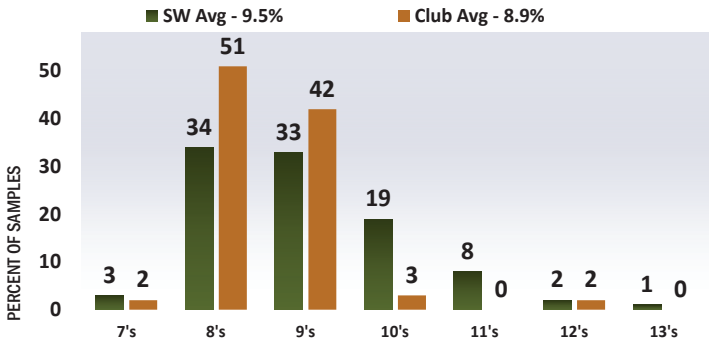
TEST WEIGHT | Pounds/Bushel



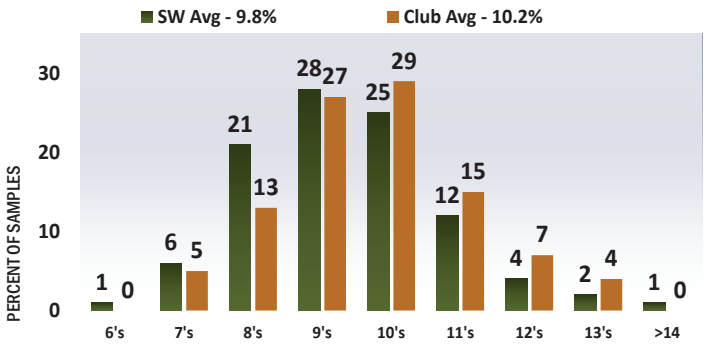
HECTOLITER WEIGHT | Kilograms/Hectoliter



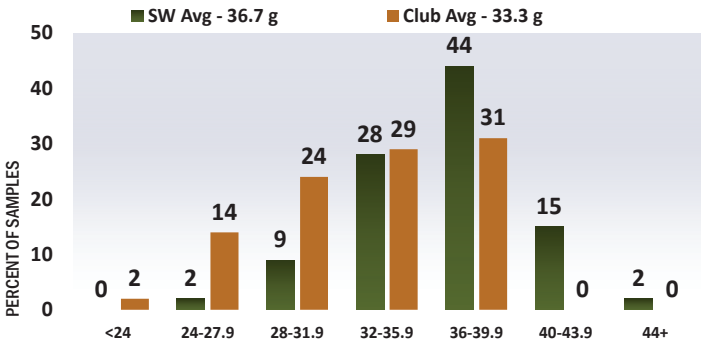
WHEAT MOISTURE | Percent



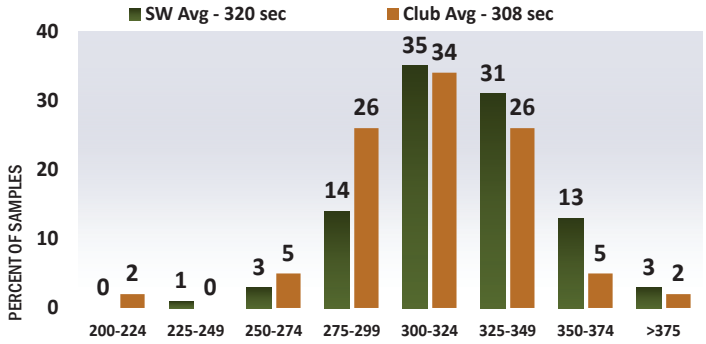
PROTEIN (12% MB) | Percent



1000 KERNEL WEIGHT | Grams



FALLING NUMBER | Seconds

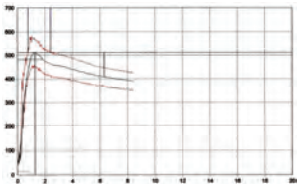


FARINOGRAMS

ALVEOGRAMS

EXTENSOGRAMS

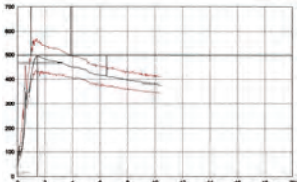
LOW PROTEIN

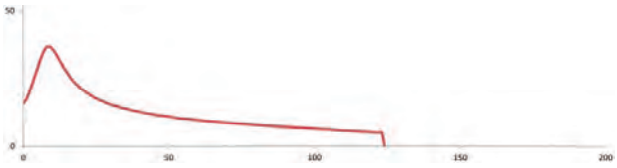


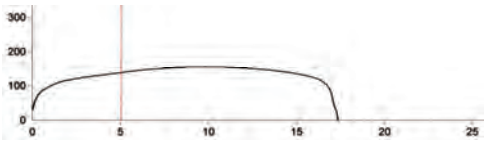




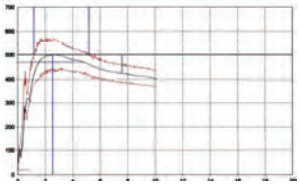
MEDIUM PROTEIN

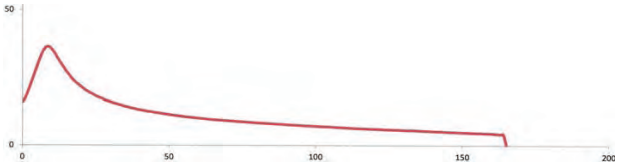


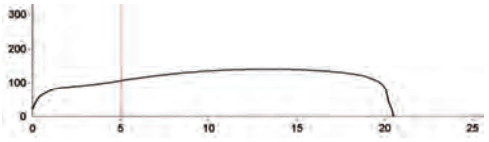




HIGH PROTEIN







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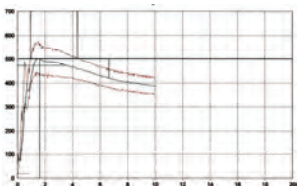

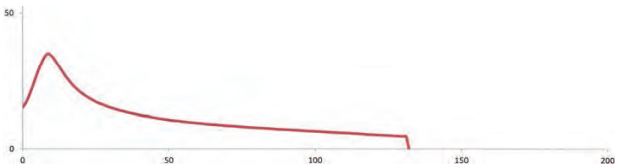

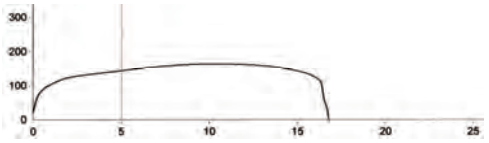

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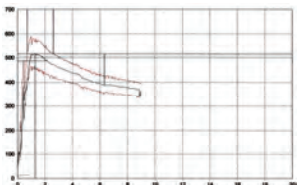
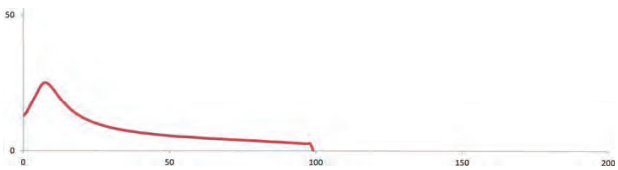
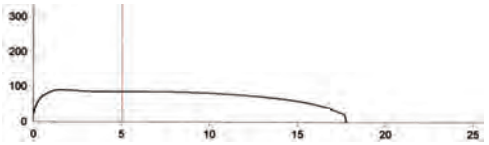






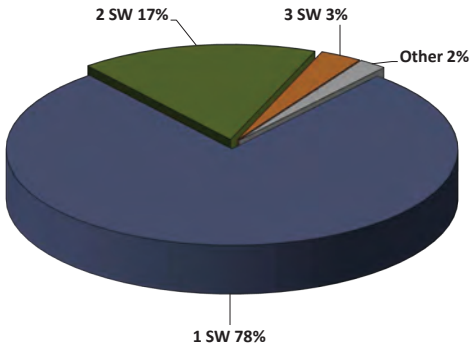
Soft White	2012					2011		5-Year Average	
	Soft White By Protein				Club				
	Low	Med	High	Overall	Average	SW	Club	SW	Club
Wheat Grade Data:									
Test Weight (lb/bu)	60.8	61.2	60.8	61.0	60.3	60.9	59.9	59.8	59.8
(kg/hl)	80.0	80.5	80.0	80.2	79.3	80.1	78.8	78.7	78.7
Damaged Kernels (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Foreign Material (%)	0.1	0.1	0.1	0.1	0.1	0.0	0.2	0.1	0.1
Shrunken & Broken (%)	0.4	0.5	0.7	0.5	0.8	0.6	0.9	0.8	1.2
Total Defects (%)	0.5	0.6	0.8	0.6	0.9	0.7	1.1	0.9	1.3
Grade	1 SW	1 SW	1 SW	1 SW	1 WC	1 SW	1 WC	2 SW	1 WC
Wheat Non-Grade Data:									
Dockage (%)	0.5	0.4	0.5	0.4	0.7	0.7	1.0	0.7	0.9
Moisture (%)	10.0	9.3	9.3	9.5	8.9	9.7	9.2	9.5	9.1
Protein (%) 12%/0% moisture basis	8.3/9.4	9.8/11.1	11.5/13.1	9.8/11.1	10.2/11.6	9.2/10.5	8.7/9.9	10.1/11.5	10.2/11.6
Ash (%) 14%/0% moisture basis	1.32/1.53	1.34/1.56	1.37/1.59	1.35/1.57	1.31/1.52	1.35/1.57	1.23/1.43	1.37/1.59	1.28/1.48
1000 Kernel Weight (g)	37.6	36.6	35.5	36.7	33.3	36.0	33.0	34.4	31.5
Kernel Size (%) lg/md/sm	92/8/0	88/11/1	84/15/1	88/11/1	82/17/1	87/12/1	81/18/1	80/19/1	74/25/1
Single Kernel: Hardness	35.6	36.5	34.6	35.7	32.3	35.9	34.7	33.9	34.2
Weight (mg)	40.4	39.6	38.6	39.6	36.0	38.9	35.2	37.7	34.9
Diameter (mm)	2.88	2.83	2.79	2.83	2.65	2.80	2.66	2.75	2.62
Sedimentation (cc)	16.5	17.1	21.4	18.1	12.7	12.9	10.1	16.8	15.0
Falling Number (sec)	312	323	337	320	308	306	284	324	314
Flour Data:									
Lab Mill Extraction (%)	75.9	75.8	74.8	75.7	75.3	75.4	77.1	71.4	72.8
Color: L*	92.0	92.1	91.4	91.9	91.9	91.9	92.3	92.1	92.2
a*	-2.6	-2.5	-2.4	-2.5	-2.4	-2.5	-2.6	-2.5	-2.3
b*	8.7	8.4	7.8	8.3	7.7	7.8	7.8	8.1	7.7
Protein (%) 14%/0% moisture basis	7.3/8.5	8.6/10.0	10.3/12.0	8.7/10.1	9.1/10.6	8.4/9.8	8.0/9.3	8.7/10.1	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	0.49/0.57	0.51/0.59	0.48/0.56	0.46/0.53	0.45/0.53
Wet Gluten (%)	13.2	18.6	22.8	18.1	23.5	19.8	10.4	22.0	17.5
Gluten Index	72.7	50.4	45.6	55.4	42.5	76.6	70.3	65.8	35.9
Falling Number (sec)	358	379	400	378	353	333	312	324	314
Amylograph Viscosity 65 g (BU)	446	467	502	470	464	424	458	503	514
Starch Damage (%) (14% mb)	5.1	4.8	3.6	4.6	3.3	4.2	3.5	4.5	4.0
Solvent Retention Capacity (%)									
Water/50% Sucrose	57/93	55/93	58/94	56/94	54/84	57/91	54/84	54/103	51/95
5% Lactic Acid/5% Na_2CO_3	90/83	89/81	95/80	91/81	76/72	103/85	86/78	103/82	84/75
Dough Properties:									
Farinograph: Peak Time (min)	1.3	1.5	2.6	1.7	1.3	1.5	1.4	1.6	1.5
Stability (min)	1.6	2.9	4.0	3.4	1.9	2.6	1.5	3.7	2.0
Absorption (%)	52.9	53.7	54.7	53.5	51.9	53.0	51.2	53.4	52.3
Alveograph: P (mm)	46	41	40	39	28	41	24	42	31
L (mm)	67	123	164	131	98	109	71	114	82
P/L Ratio	0.69	0.33	0.24	0.30	0.29	0.38	0.34	0.37	0.44
W (10^{-4} joules)	85	100	117	101	53	92	38	106	52
Extensograph: Resistance (BU)	201	155	139	163	89	171	108	206	103
(45 min) Extensibility (cm)	15.3	17.4	20.5	16.8	17.8	15.2	14.2	16.2	16.1
Area (sq cm)	47	41	42	42	23	40	22	50	24
Baking Evaluation:									
Sponge Cake: Volume (cc)	1265	1209	1187	1219	1239	1226	1247	1200	1226
Score	54	51	42	50	53	54	53	51	51
Cookie: Diameter (cm)	8.6	8.6	8.5	8.6	9.1	8.8	9.0	8.4	8.7
Spread Factor (width/height)	10.4	10.0	9.2	9.9	12.0	10.0	11.9	9.1	10.8
Pan Bread Bake Absorbtion (%)[1]			59.2						
Crumb Grain and Texture (1-10)[1]			6.0						
Loaf Volume (cc)[1]			747						
Chinese Southern-Type Steamed Bread Evaluation:									
Specific Volume (ml/g)	1.8	1.8	1.9	1.8	2.3	2.0	2.1	2.3	2.4
Total Score	65.3	68.0	69.3	67.6	66.3	67.7	67.5	67.5	66.6
% of Area Production:	**28**	**46**	**26**	**100**	**100**				

2012 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	2011	2010
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 grown over a wide area of the eastern United States. About 8.3 million acres were seeded in the fall of 2011, down 3% from 2010. Area increases in the Southeast were offset by decreases in the Corn Belt and Northeast, primarily due to a late row crop harvest. Ohio planted a record low area due to wet soil conditions. By May 1, 2012, conditions in the major SRW growing states were predominately rated fair to excellent, with less than 10% rated as poor or very poor. Conditions in Ohio were slightly poorer, as planting was delayed by a late fall harvest and some areas of excessive moisture in the winter. Harvest began in mid-May, several weeks ahead of the normal pace. North Carolina experienced some rain delays in May and Ohio lagged somewhat behind other states in crop maturity. However, harvesting continued ahead of normal pace and was essentially complete in early July, about two weeks earlier than normal.

Survey Methods: Great Plains Analytical Laboratory (formerly CII Laboratory Services), Kansas City, Missouri, collected and analyzed 492 samples 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; remaining tests were determined 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" values. Gulf-tributary states include Arkansas, Illinois, Indiana, Kentucky, Missouri, and Ohio and account for about 81% of production surveyed. East Coast tributary states include Maryland, North Carolina and Virginia and represent the remaining 19% of production surveyed. The states surveyed typically account for 60%-70% of total SRW production.

Wheat and Grade Data: The 2012 SRW crop averages US Grade No. 1 with overall average test weight of 60.2 lb/bu (79.2 kg/hl), about 1.4 lb/bu (1.8 kg/hl) above 2011 and the 5-year average. The Gulf-tributary average of 60.5 lb/bu (79.5 kg/hl) is 2.2 lb/bu (2.7 kg/hl) above the 5-year average. Harvest rain delays in North Carolina may have reduced the East Coast average of 59.2 lb/bu (77.9 lb/bu). Gulf area averages for damaged kernels (0.8%) and total defects (1.4%) are lower than the 5-year averages of 1.2% and 2.0%, respectively. East Coast values for these two averages are similar to the 5-year averages. Protein content of 9.9% (12% moisture basis) is lower than last year and the 5-year average, mainly as a result of lower average values in the Gulf area. Average DON values in all states are less than 1.0 ppm and most are below 0.5 ppm, well below historical values. The composite average falling number of 329 sec is similar to the 5-year average.

Flour and Baking Data: Buhler laboratory mill flour extraction is well above the already high 2011 value and 3.8% higher than the 5-year average, suggesting the crop has very good milling characteristics. While farinograph absorption is above the 5-year averages, average peak and stability times and alveograph W values are all slightly below last year and the 5-year averages. Composite average loaf volume and cookie spread ratio values are also somewhat below last year and the 5-year averages.

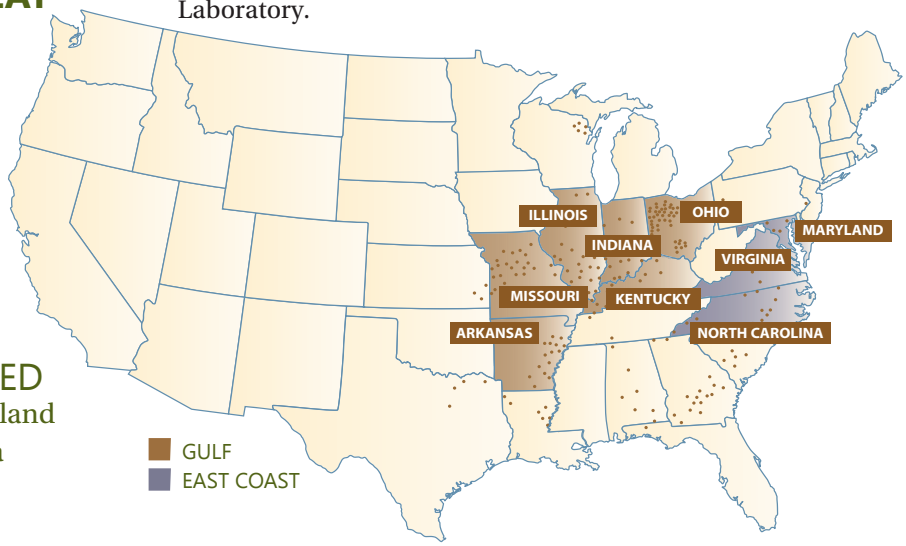
Summary: The 2012 SRW crop is very sound with mostly high test weights, large kernel size and good milling characteristics, and is relatively free of higher DON values. Protein, dough processing and end product values are somewhat lower than the 5-year averages. Buyers are encouraged to craft specifications carefully in order to receive qualities that meet their needs either for traditional soft wheat products or blending with stronger wheat.

EXPORT CARGO SURVEY

The export cargo data represents 157 individual sublot samples for crop years 2012 and 2011 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

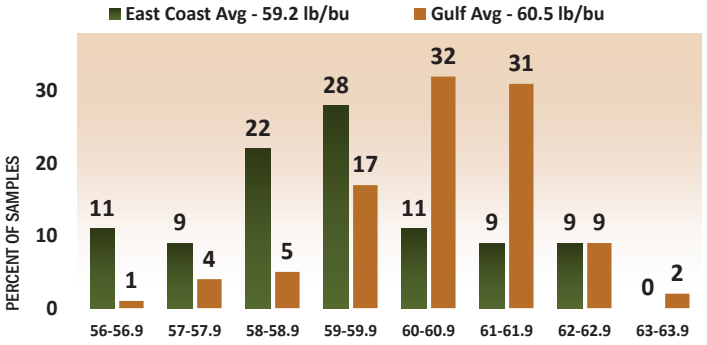
Low protein content, soft endosperm, red bran, weak gluten. Used in pastries, cakes, cookies, crackers, pretzels, and flat breads. Can also be used for blending.



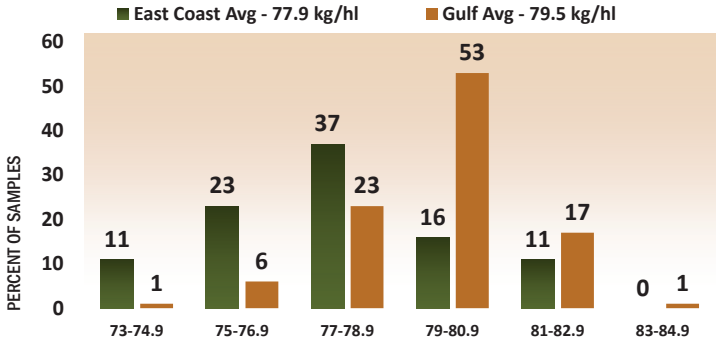
NINE OF SIXTEEN STATES SURVEYED

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

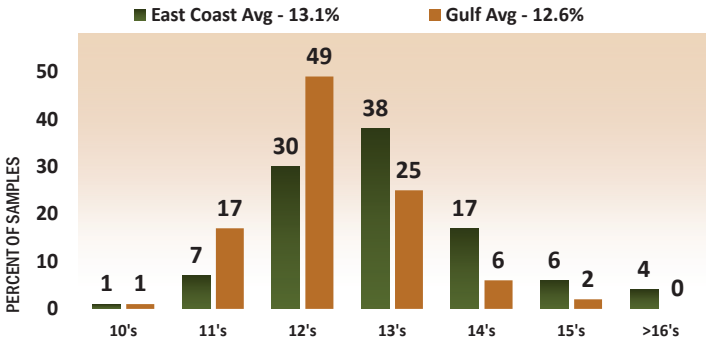
TEST WEIGHT | Pounds/Bushel



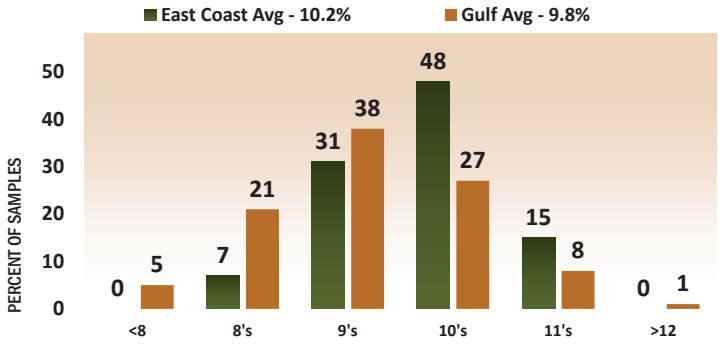
HECTOLITER WEIGHT | Kilograms/Hectoliter



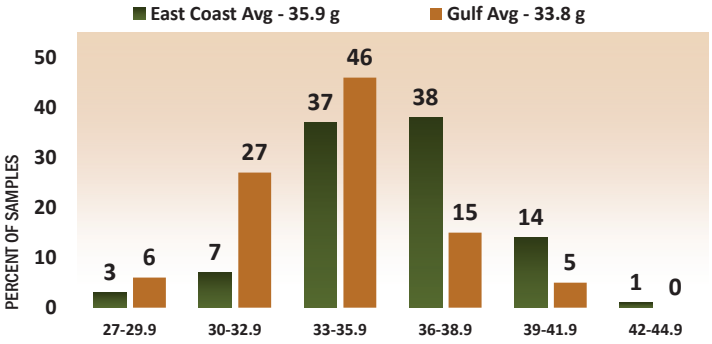
WHEAT MOISTURE | Percent



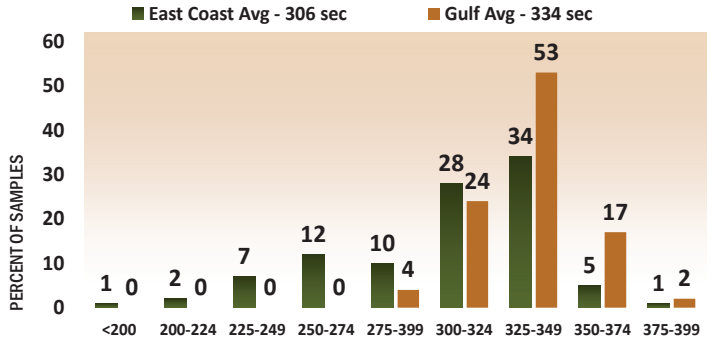
PROTEIN (12% MB) | Percent



1000 KERNEL WEIGHT | Grams

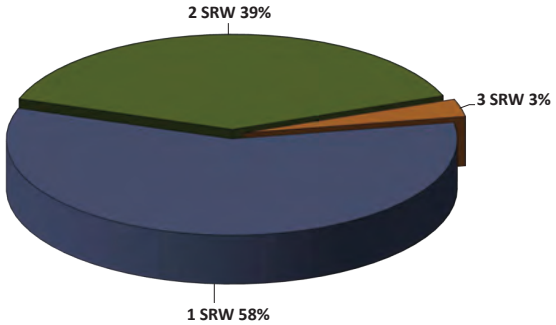


FALLING NUMBER | Seconds





GRADE DISTRIBUTION*



*Based on 36 composite samples.

SOFT RED WINTER | HARVEST DATA

Soft Red Winter	Composite Average			East Coast			Gulf Ports		
	2012	2011	5-Year Avg	2012	2011	5-Year Avg	2012	2011	5-Year Avg
Wheat Grade Data:									
Test Weight (lb/bu)	60.2	58.8	58.7	59.2	59.6	59.8	60.5	58.7	58.3
(kg/hl)	79.2	77.4	77.2	77.9	78.4	78.7	79.5	77.2	76.8
Damaged Kernels (%)	0.8	0.7	1.2	1.1	1.1	1.1	0.8	0.6	1.2
Foreign Material (%)	0.2	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.2
Shrunken & Broken (%)	0.5	0.4	0.6	0.5	0.4	0.5	0.5	0.5	0.6
Total Defects (%)	1.5	1.3	1.8	1.7	1.6	1.6	1.4	1.2	2.0
Grade	1 SRW	2 SRW	2 SRW	2 SRW	2 SRW	2 SRW	1 SRW	2 SRW	2 SRW
Wheat Non-Grade Data:									
Dockage (%)	0.7	0.6	0.9	0.8	0.8	0.9	0.7	0.6	0.8
Moisture (%)	12.7	12.9	12.9	13.1	12.7	12.9	12.6	12.9	12.9
Protein (%) 12%/0% moisture basis	9.9/11.2	10.2/11.6	10.1/11.5	10.2/11.6	10.3/11.7	10.4/11.8	9.8/11.1	10.2/11.6	10.2/11.5
Ash (%) 14%/0% moisture basis	1.50/1.75	1.53/1.78	1.55/1.80	1.46/1.70	1.46/1.70	1.50/1.74	1.51/1.76	1.54/1.79	1.56/1.81
1000 Kernel Weight (g)	34.2	31.9	32.6	35.9	33.4	33.8	33.8	31.6	31.7
Kernel Size (%) lg/md/sm	85/14/01	82/17/01	82/17/1	86/13/01	83/16/01	83/16/1	85/14/01	82/17/01	81/18/1
Single Kernel: Hardness	29.2	28.9	21.2	23.3	28.2	23.8	30.5	29.0	22.5
Weight (mg)	33.9	32.3	31.5	34.8	33.2	32.8	33.7	32.2	31.1
Diameter (mm)	2.66	2.64	2.33	2.68	2.64	2.37	2.65	2.64	2.34
Sedimentation (cc)	13.4	11.9	12.4	14.6	13.1	14.6	13.2	11.6	12.0
Falling Number (sec)	329	328	331	306	346	339	334	324	332
DON (ppm)	<0.5	1.1	1.2	0.5	0.5	0.7	<0.5	1.2	1.5
Flour Data:									
Lab Mill Extraction (%)	73.4	71.4	69.6	73.3	71.2	69.0	73.5	71.4	70.2
Color: L*	93.2	93.4	93.4	93.0	93.5	93.4	93.2	93.4	93.3
a*	-2.8	-3.1	-3.1	-2.8	-3.2	-3.1	-2.8	-3.1	-3.1
b*	8.3	8.1	8.3	8.3	8.4	8.2	8.3	8.1	8.3
Protein (%) 14%/0% moisture basis	8.4/9.8	8.6/10.0	8.5/9.9	8.8/10.2	8.6/10.0	8.7/10.1	8.3/9.7	8.7/10.1	8.5/9.9
Ash (%) 14%/0% moisture basis	0.46/0.54	0.44/0.51	0.44/0.51	0.46/0.54	0.43/0.50	0.43/0.50	0.46/0.54	0.44/0.51	0.45/0.52
Wet Gluten (%)	22.2	23.6	22.6	23.6	23.5	22.4	21.9	23.7	22.9
Gluten Index	73.5	79.6	76.9	74.8	79.5	81.1	73.1	79.7	77.4
Falling Number (sec)	342	339	331	315	346	339	348	337	332
Amylograph Viscosity 65 g (BU)	603	614	641	425	687	618	644	598	641
Starch Damage (%)	4.9	4.3	4.4	5.0	4.3	4.5	4.8	4.3	4.5
Solvent Retention Capacity (%)									
Water/50% Sucrose	58/111	54/103	55/108	60/109	54/105	55/111	58/109	54/100	55/105
5% Lactic Acid/5% Na_2CO_3	112/84	113/78	112/81	115/85	113/80	114/82	111/84	110/78	111/81
Dough Properties:									
Farinograph:									
Peak Time (min)	1.6	1.9	1.7	1.8	2.2	1.9	1.5	1.8	1.7
Stability (min)	2.7	3.0	2.9	2.7	2.7	3.0	2.7	3.0	3.0
Absorption (%)	53.2	52.7	52.0	53.3	53.5	52.6	53.1	52.6	52.1
Alveograph: P (mm)	41	36	39	39	37	43	41	36	38
L (mm)	87	92	87	99	95	87	84	92	91
P/L Ratio	0.47	0.39	0.45	0.40	0.38	0.49	0.49	0.39	0.42
W (10-4 joules)	86	85	89	89	83	98	85	86	90
Baking Evaluation:									
Crumb Grain	5.2	5.2	5.3	5.3	5.2	5.5	5.2	5.2	5.2
Crumb Texture	5.5	5.1	5.3	5.6	5.2	5.5	5.5	5.1	5.3
Loaf Volume (cc)	676	740	732	700	734	725	671	741	740
Cookie Spread Ratio	7.9	9.4	9.2	7.7	9.3	8.7	8.0	9.4	9.3
% of Area Sampled:	**100%**			**19%**			**81%**		

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

Soft Red Winter	2012	2011
Wheat Grade Data:		
Test Weight (lb/bu)	60.2	59.8
(kg/hl)	79.1	78.7
Damaged Kernels (%)	1.4	2.3
Foreign Material (%)	0.1	0.1
Shrunken & Broken (%)	0.7	0.8
Total Defects (%)	2.2	3.2
Grade	1 SRW	2 SRW
Wheat Non-Grade Data:		
Dockage (%)	0.8	0.9
Moisture (%)	12.4	12.2
Protein (%) 12%/0% moisture basis	10.9/12.3	10.5/11.9
Ash (%) 14%/0% moisture basis	1.46/1.70	1.53/1.78
1000 Kernel Weight (g)	30.9	30.2
Kernel Size (%) lg/md/sm	82/17/1	82/17/1
Single Kernel: Hardness	0.0	27.2
Weight (mg)	0.0	32.2
Diameter (mm)	0.00	2.64
Sedimentation (cc)	13.8	13.1
Falling Number (sec)	341	347
DON (ppm)	0.0	1.0
Flour Data:		
Lab Mill Extraction (%)	73.9	73.6
Color: L*	92.6	92.6
a*	-2.5	-2.9
b*	7.8	8.1
Protein (%) 14%/0% moisture basis	9.3/10.8	8.8/10.3
Ash (%) 14%/0% moisture basis	0.47/0.55	0.46/0.54
Wet Gluten (%)	25.1	22.9
Gluten Index	87.6	81.0
Falling Number (sec)	393	375
Amylograph Viscosity 65 g (BU)	666	638
Starch Damage (%)		
Solvent Retention Capacity (%)		
Water/50% Sucrose		
5% Lactic Acid/5% Na_2CO_3		
Dough Properties:		
Farinograph:		
Peak Time (min)	1.7	1.6
Stability (min)	3.5	3.3
Absorption (%)	52.7	53.2
Alveograph: P (mm)	40	44
L (mm)	110	81
P/L Ratio	0.37	0.54
W (10^{-4} joules)	108	99
Baking Evaluation:		
Crumb Grain	5.3	5.4
Crumb Texture	5.6	5.6
Loaf Volume (cc)	745	708
Cookie Spread Ratio	8.0	8.0
Sample Count:	**38**	**119**

Soft Red Winter Production

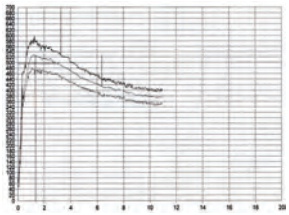
in major producing states (million metric tons)

	2012	2011	2010	2009	2008
Alabama	0.3	0.4	0.2	0.3	0.4
Arkansas	0.7	0.8	0.2	0.5	1.5
Georgia	0.3	0.3	0.1	0.3	0.6
Illinois	1.1	1.3	0.4	1.2	1.9
Indiana	0.5	0.7	0.4	0.8	1.1
Kentucky	0.8	0.8	0.4	0.6	0.9
Louisiana	0.4	0.4	0.1	0.3	0.6
Maryland	0.4	0.3	0.2	0.3	0.4
Michigan	0.7	0.9	0.6	0.7	0.8
Mississippi	0.5	0.6	0.1	0.2	0.8
Missouri	1.0	0.9	0.3	0.9	1.5
North Carolina	1.2	1.1	0.4	0.8	1.2
Ohio	0.8	1.3	1.2	1.9	2.0
South Carolina	0.3	0.3	0.1	0.2	0.3
Tennessee	0.6	0.6	0.3	0.5	0.9
Virginia	0.4	0.5	0.2	0.3	0.5
16-State Total	**10.1**	**11.2**	**5.5**	**9.7**	**15.3**
Total SRW Production	**11.4**	**12.5**	**6.5**	**11.0**	**16.7**

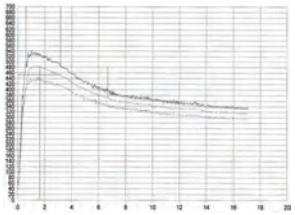
Based on USDA crop estimates of September 28, 2012.

FARINOGRAMS

GULF

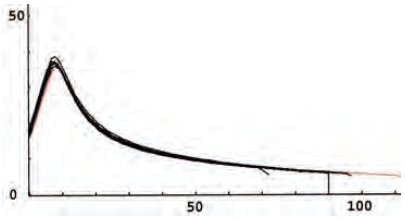


EAST COAST

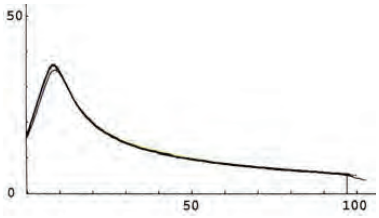


ALVEOGRAMS

GULF



EAST COAST





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 min. 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 of the HW flours: Chinese raw noodles and Chinese wet noodles. The Chinese raw noodle formula was: flour 100%, salt 1.2%, and distilled water 28%. The Chinese 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 Chinese wet noodles, noodle sheet color was measured on both uncooked and parboiled (boiling for 1.5 min) sheets. Cooking yield is % of weight gain after cooking for 5 min for Chinese raw noodles and for 1.5 min for Chinese 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 hr and 24 hr 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 values of these textural parameters 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

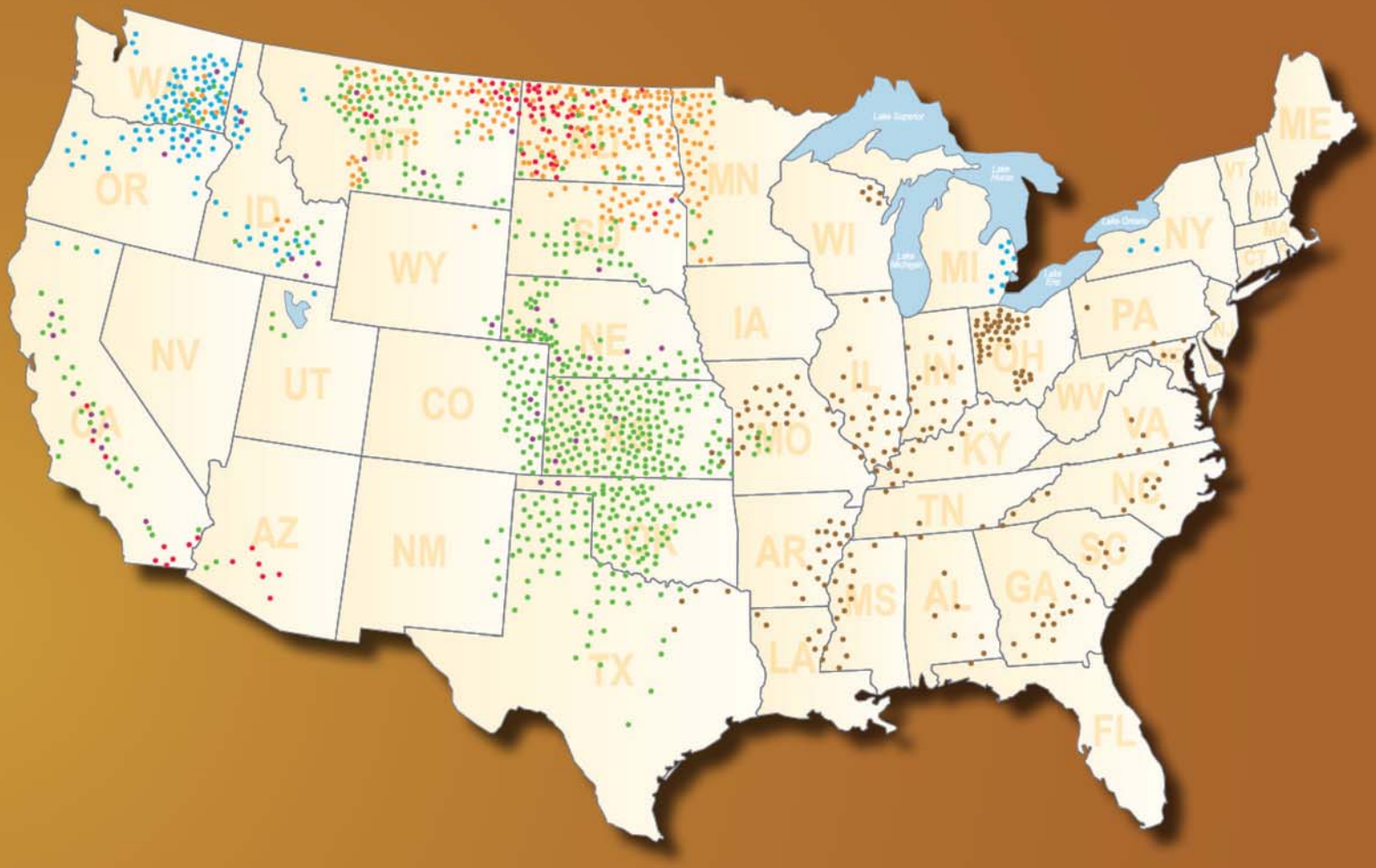
Grading Factors	Grades U.S. Nos.				
	1	2	3	4	5
	Minimum limits:				
Test Weight (lbs/bu)					
Hard Red Spring or White Club	58.0	57.0	55.0	53.0	50.0
All other classes and subclasses	60.0	58.0	56.0	54.0	51.0
Test Weight (kg/hl)					
Hard Red Spring or White Club	76.4	75.1	72.5	69.9	66.0
Durum	78.2	75.6	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:				
Other material (1000 gram sample)					
Animal filth	1	1	1	1	1
Castor beans	1	1	1	1	1
Crotalaria seeds	2	2	2	2	2
Glass	0	0	0	0	0
Stones	3	3	3	3	3
Unknown foreign substance	3	3	3	3	3
Total 4/	4	4	4	4	4
Insect-damaged kernels					
in 100 grams	31	31	31	31	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.

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.

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PROVIDING SERVICES TO: Philippines			
MEXICO CITY (Regional Office)	(5255) 5-202-2075	(5255) 2-623-1109	InfoMexico@uswheat.org
PROVIDING SERVICES TO: Anguilla, Antigua-Barbuda, Bahamas, Barbados, Belize, Bermuda, Cayman Islands, Costa Rica, Cuba, Dominica, Dominican Republic, El Salvador, French West Indies, Grenada, Guadeloupe, Guatemala, Guyana, Haiti, Honduras, Jamaica, Leeward-Windward Islands, Mexico, Montserrat, Netherlands Antilles, Nicaragua, Panama, Puerto Rico, Saint Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Trinidad-Tobago, Turks & Caicos Islands, Venezuela, Virgin Islands (British)			
MOSCOW	(7 495) 956-9081	(7 495) 608-8124	InfoMoscow@uswheat.org
PROVIDING SERVICES TO: Azerbaijan, Armenia, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan			
ROTTERDAM (Regional Office)	(31 10) 413-9155	(31 10) 433-0438	InfoRotterdam@uswheat.org
PROVIDING SERVICES TO: Albania, Azerbaijan, Armenia, Austria, Belarus, Belgium, Bosnia, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Luxembourg, Macedonia, Malta, Moldova, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Tajikistan, Turkmenistan, Ukraine, United Kingdom, Uzbekistan			
SANTIAGO (Regional Office)	(56 2) 231-1636	(56 2) 232-9207	InfoSantiago@uswheat.org
PROVIDING SERVICES TO: Bolivia, Brazil, Chile, Colombia, Ecuador, Peru			
SEOUL	(822) 720-7926	(822) 720-7925	InfoSeoul@uswheat.org
PROVIDING SERVICES TO: Korea			
SINGAPORE (Regional Office)	(65) 6737-4311	(65) 6733-9359	InfoSingapore@uswheat.org
PROVIDING SERVICES TO: Afghanistan, Bangladesh, Burma, Cambodia, India, Indonesia, Malaysia, New Zealand, Pakistan, Philippines, Singapore, Sri Lanka, Thailand, Vietnam			
TAIPEI	(886 2) 2521-1144	(886 2) 2521-1568	InfoTaipei@uswheat.org
PROVIDING SERVICES TO: Taiwan			
TOKYO	(813) 5614-0798	(813) 5614-0799	InfoTokyo@uswheat.org
PROVIDING SERVICES TO: Japan			