U.S. DURUM WHEAT

MONTANA | NORTH DAKOTA

2013 REGIONAL QUALITY REPORT

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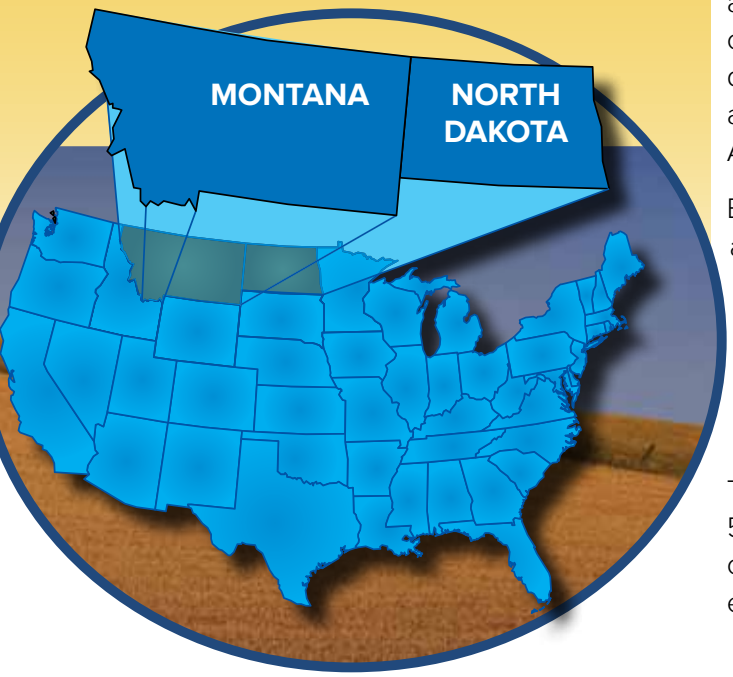


MAKING PREMIUM PASTA

DURUM—is the hardest of all wheats. Its density, combined with its high protein content and gluten strength, make durum the wheat of choice for producing premium pasta and couscous products. Pasta made from durum is firm with consistent cooking quality. Durum kernels are amber-colored and larger than those of other wheat classes. Also unique to durum is its yellow endosperm, which gives pasta its golden hue and the best color for couscous.

When durum is milled, the endosperm is ground into a granular product called semolina. A mixture of water and semolina forms a stiff dough. Pasta dough is then forced through dies, or metal discs with holes, to create hundreds of different shapes.

Durum production is geographically concentrated to the Northern Plains because it demands a special agronomic environment. The states of North Dakota and Montana in most years jointly produce 80 percent of the U.S. durum crop.

Survey data presented does not reflect the final 15% of the harvest due to extensive harvest delays this year.

2013 Overview

A challenging planting season dropped planted acres by one-third from 2012, but production declines were less, as an excellent growing season supported strong yields. The crop averages a #1 Hard Amber Durum (HAD) with eighty percent of the crop achieving a #1 HAD. There is a more extreme distribution of quality in 2013 due to impacts from harvest rains, and much of the remaining crop falls below a #3 grade or Amber Durum.

Excellent kernel fill conditions supported test weights, averaging 60.7 lbs/bu (79 kg/hl). More than eighty percent of the crop has greater than a 60 lb/bu (78.1 kg/hl) test weight. A crop average thousand kernel weight of 44.4 grams is well above the 5-year average of 38.2 grams. Nearly eighty-five percent of the crop boasts a 40 gram TKW or higher, compared to roughly twenty percent in 2012.

Total defects average 1%, lower than both 2012 and the 5-year average, with less damaged kernels, and lower levels of shrunken and broken kernels. Portions of the crop did experience Fusarium disease pressures during flowering,

resulting in those areas having higher kernel damage and DON levels. The crop average DON is 1.02 ppm, similar to 2012.

PRODUCTION DATA	2012	2013	2008-2012 AVERAGE
MILLION BUSHELS			
Montana	14.4	17.0	14.1
North Dakota	42.6	29.0	46.2
Regional Total	57.0	46.0	60.3
U.S. Total	82.0	61.5	86.5
MILLION METRIC TON			
Montana	0.39	0.46	0.38
North Dakota	1.16	0.79	1.26
Regional Total	1.55	1.25	1.64
U.S. Total	2.23	1.67	2.35

Source: USDA • 2013 Small Grains Summary

A crop average protein of 12.8% (12% mb) is nearly 2% below 2012 and about 1% below the 5-year average. Growing conditions which promoted high yields and good kernel fill reduced protein. Still more than one-half of the crop exceeds 13% protein. The lower protein contributed in part to lower average vitreous kernel levels of 85%, compared to 89% in 2012. Impacts from harvest rains led to a lower skew in falling numbers with the average at 375 seconds. One-fourth of the crop falls below 350 seconds, compared to only 3 percent last year. Still, more than one-half exceeds a very sound 400 seconds.

Milling performance, based on the Buhler Laboratory Mill, indicates semolina extractions above last year and the 5-year average. Total extraction is 70.3% and semolina extraction is 65.2% compared to the 2012 level of 68.6% and 63.4%, respectively. Average semolina ash of 0.66% is slightly higher than 2012 and the 5-year average.

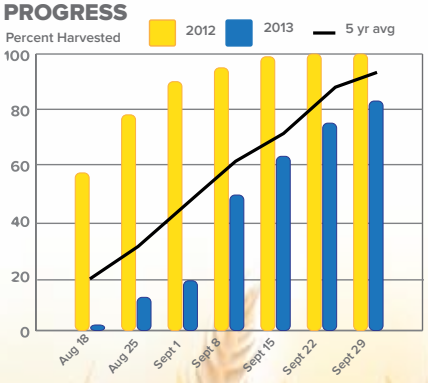
Semolina mixing properties are similar to last year with a slightly lower gluten index, 55% as compared to 61%. Semolina speck counts are slightly higher than 2012, but lower than the 5-year average. Cooking qualities are lower than 2012 and the 5-year average with lower color scores and less cooked firmness. The low protein levels and impacts of harvest time rains are factors likely leading to lower cooking qualities.

Buyers will need to be diligent in contract specifications in 2013 due to the more extreme range in quality across the crop. Key end-use quality factors are below 5-year average levels but that is based on the entire crop blended together. As the data shows, in addition to high kernel weight across the overall crop, a significant portion also remains above average for factors such as protein, falling number and vitreous kernels. Capturing this segment of the crop may require price premiums and more direct communication with sellers, but it will also ensure buyers receive the quality they need at the best value.

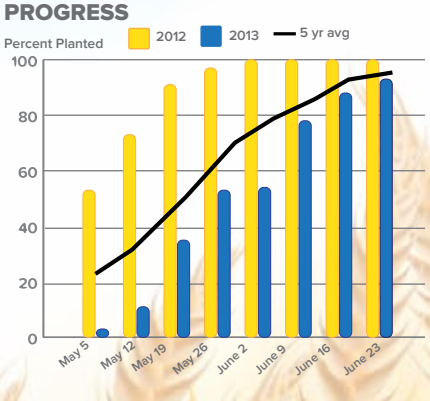
SEASONAL CONDITIONS

PLANTING of the Northern durum crop began in May, two to three weeks behind average, due to cool, wet conditions and early progress was slow. Excessive and frequent rains in late May stalled planting and pushed completion to mid-June, resulting in about one-third of the intended acreage left unplanted.

NORTH DAKOTA DURUM HARVEST PROGRESS



NORTH DAKOTA DURUM PLANTING PROGRESS



GROWING SEASON conditions early were characterized by cool temperatures and adequate to above-normal rainfall which slowed crop development but enhanced yield potential. Disease pressures were prevalent in areas that received frequent precipitation, but a drier and somewhat hotter weather pattern later in the season limited any significant impacts to isolated areas.

HARVEST began the last week of August and producers made steady progress through the middle of September. As harvest moved north, progress was slowed by frequent precipitation and delayed maturity due to the late planting season. These delays led to quality downgrades in portions of the later crop. Harvest was completed around mid-October.

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WHEAT CHARACTERISTICS

WHEAT GRADES as defined by the Federal Grain Inspection Service (FGIS) of the USDA Grain Inspection, Packers and Stockyards Administration (GIPSA), reflect the general quality and condition of a representative sample. U.S. grades are based on test weight and include limits on damaged kernels, foreign material, shrunken and broken kernels, and wheat of contrasting classes. Each determination is made on the basis of the grain when free from dockage and shrunken and broken kernels.

SUBCLASS is a separate marketing factor based on the weight percentage of kernels with a complete, hard and vitreous endosperm, the portion that makes semolina. For durum wheat the subclasses are:

- Hard Amber Durum (HAD)—at least 75 percent or more hard, vitreous kernels;
- Amber Durum (AD)— between 60 and 74 percent hard, vitreous kernels;
- Durum (D)—less than 60 percent hard, vitreous kernels.

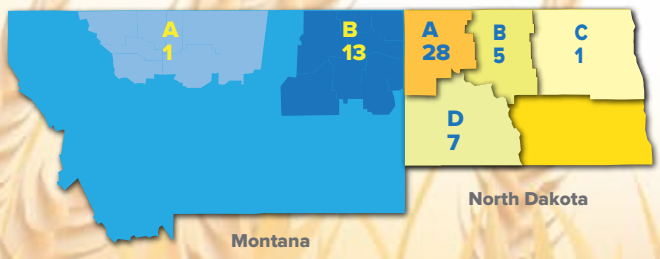
GRADING FACTORS	U.S. Grades 1	2	3	4	5
DURUM - MINIMUM TEST WEIGHTS					
Pounds per bushel	60.0	58.0	56.0	54.1	51.0
Kilograms per hectoliter	78.2	75.6	73.0	70.4	66.5
MAXIMUM PERCENT LIMITS OF:					
Damaged kernels					
Heat (part of total)	0.2	0.2	0.5	1.0	3.0
Total	2.0	4.0	7.0	10.0	15.0
Foreign material	0.4	0.7	1.3	3.0	5.0
Shrunken/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 OF:					
Other material					
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 material	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 is wheat that:

a. Does not meet the requirements for U.S. Nos. 1, 2, 3, 4, or 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 percent 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.

2012 DURUM WHEAT PRODUCTION DENSITY BY CROP REPORTING AREA
(million bushels: 1 metric ton = 36.74 bushels)



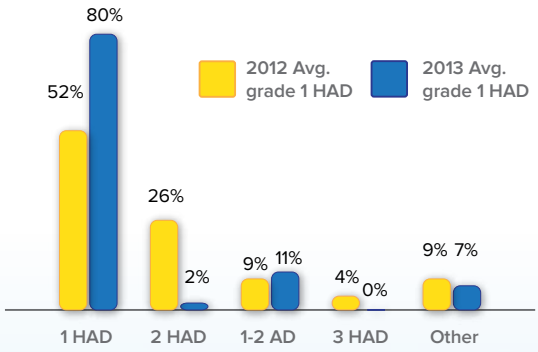
WHEAT GRADING DATA

OVERALL GRADE

The average grade for the region is 1 HAD. This grade represents average test weight of 60.7 pounds per bushel (79.0 kg/hl), total defects of 1.0 percent and vitreous kernel content of 85 percent.

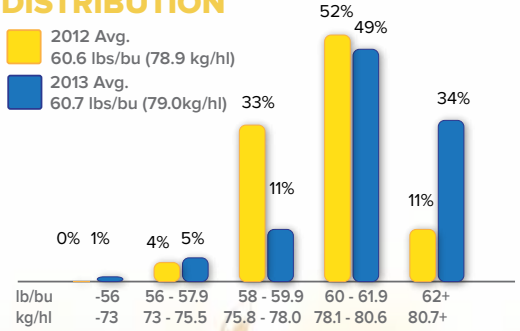
Eighty-two percent of the 2013 samples grade 2 HAD or better.

REGIONAL GRADE DISTRIBUTION



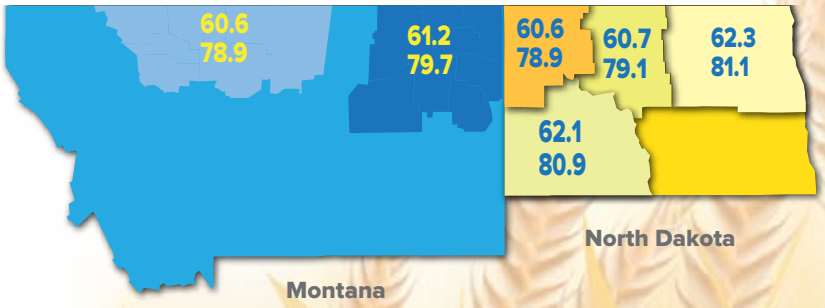
STATE AND CROP REPORTING AREA	TEST WEIGHT LBS/BU	TEST WEIGHT KG/HL	DAMAGE %	FOREIGN MATERIAL %	SHRUNKEN/ BROKEN KERNELS %	TOTAL DEFECTS %	CONTRASTING CLASSES %	U.S. GRADE	VITREOUS KERNELS %
MONTANA									
Area A	60.6	78.9	0.2	0.0	0.5	0.7	0.0	1 HAD	87
Area B	61.2	79.7	0.2	0.0	1.1	1.3	0.3	1 HAD	86
State Avg. 2013	61.1	79.6	0.2	0.0	1.0	1.2	0.3	1 HAD	86
State Avg. 2012	60.3	78.5	0.0	0.0	1.2	1.3	0.0	1 HAD	92
NORTH DAKOTA									
Area A	60.6	78.9	0.2	0.0	0.7	0.9	0.0	1 HAD	83
Area B	60.7	79.1	0.5	0.0	0.9	1.4	0.0	1 HAD	84
Area C	62.3	81.1	0.0	0.0	0.6	0.6	0.0	1 HAD	88
Area D	62.1	80.9	0.0	0.0	0.9	0.9	0.8	1 HAD	88
State Avg. 2013	60.5	78.7	0.2	0.0	0.8	1.0	0.2	1 HAD	84
State Avg. 2012	60.7	79.1	0.7	0.0	1.3	2.0	0.0	1 HAD	88
TWO-STATE REGION									
Avg. 2013	60.7	79.0	0.2	0.0	0.8	1.0	0.2	1 HAD	85
Avg. 2012	60.6	78.9	0.5	0.0	1.3	1.8	0.0	1 HAD	89
Five-Year Avg.	60.6	78.9	0.4	0.0	1.1	1.4	0.1	1 HAD	86

REGIONAL TEST WEIGHT DISTRIBUTION



Eighty-three percent of the 2013 samples have a test weight of 60 lb/bu (78.1 kg/hl) or greater.

TEST WEIGHT BY AREA



pounds per bushel - top
kilograms per hectoliter - bottom

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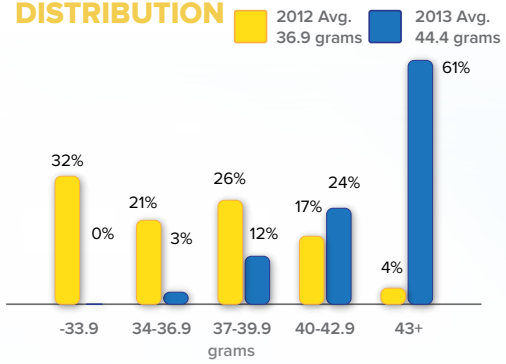
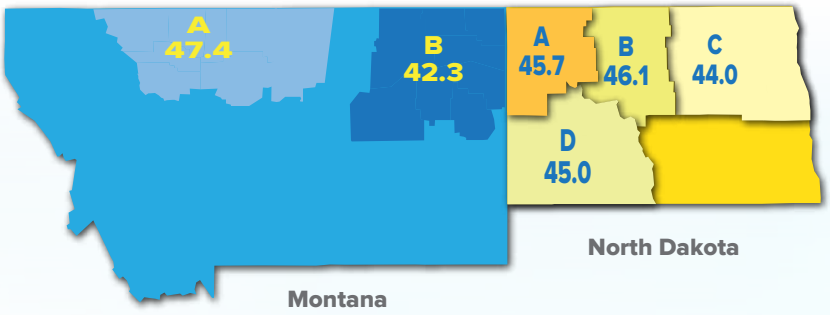
REGIONAL 1000 KERNEL WEIGHT DISTRIBUTION

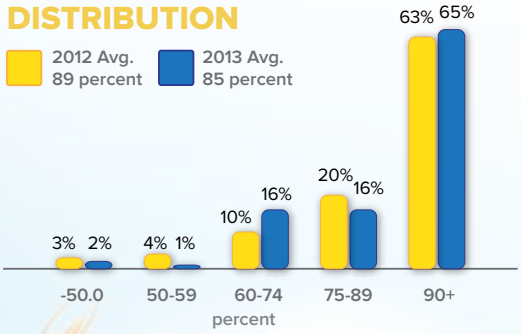


Ninety-seven percent of the 2013 samples have a thousand kernel weight of 37 grams or more.

1000 KERNEL WEIGHT BY AREA (grams)

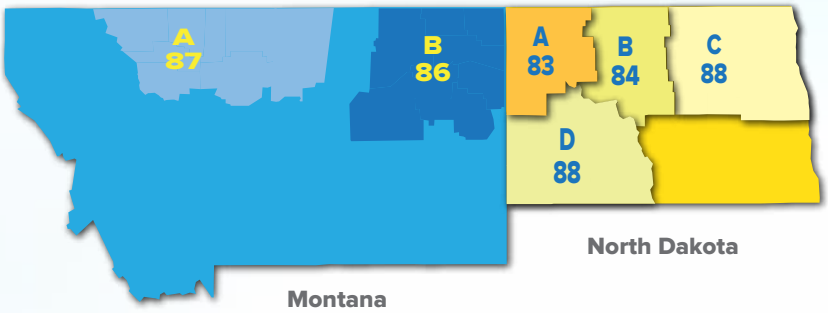


REGIONAL VITREOUS KERNEL DISTRIBUTION

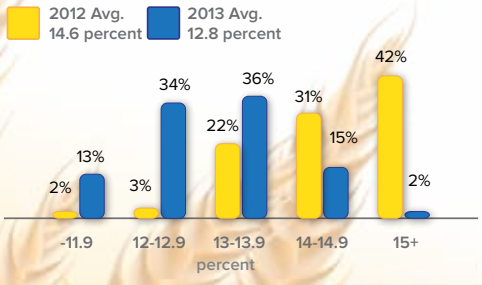


Eighty-one percent of the 2013 samples have 75 percent or greater vitreous kernels.

AVERAGE VITREOUS KERNELS BY AREA (percent)

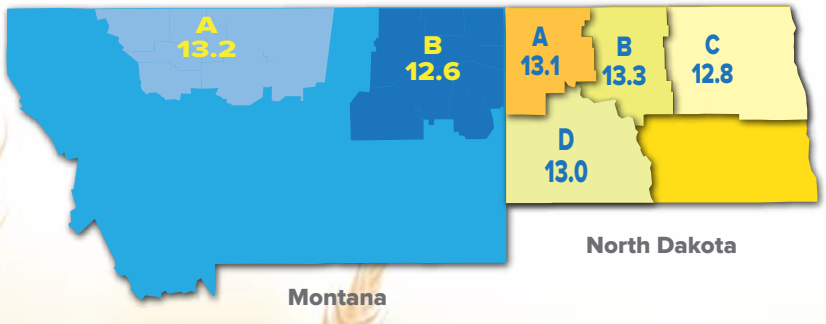


REGIONAL PROTEIN DISTRIBUTION



Fifty-three percent of the 2013 samples have a protein content of 13.0 percent or greater.

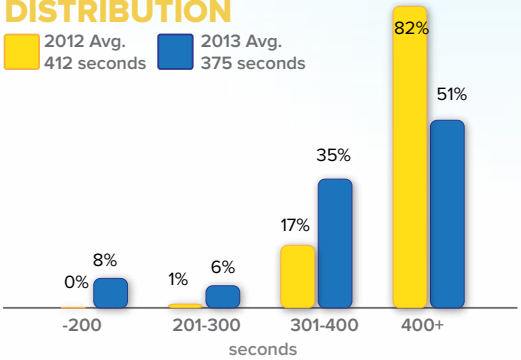
PROTEIN BY AREA - 12% moisture basis (percent)



OTHER KERNEL QUALITY DATA

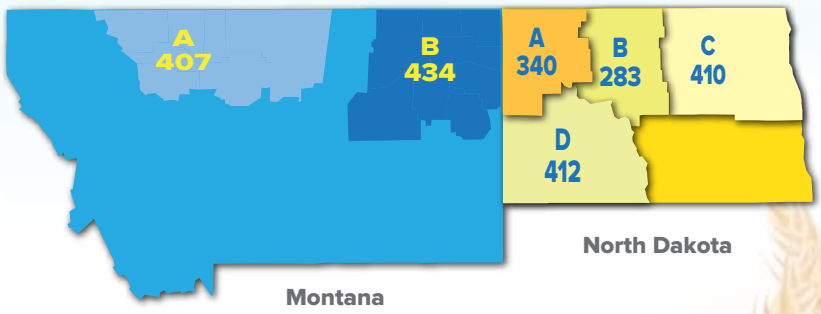
STATE AND CROP REPORTING AREA	DOCKAGE %	MOISTURE %	1000 KERNEL WEIGHT G	KERNEL DIST MEDIUM %	KERNEL DIST LARGE %	PROTEIN (0 % MOISTURE) %	PROTEIN (12 % MOISTURE) %	DON (PPM)	WHEAT ASH %	FALLING NUMBER (SEC)	SED (CC)
MONTANA											
Area A	0.8	11.3	47.4	26	72	15.0	13.2	<0.25	1.54	407	66
Area B	0.9	12.1	42.3	46	51	14.3	12.6	0.28	1.59	434	45
State Avg. 2013	0.9	12.0	43.0	43	54	14.4	12.6	0.24	1.58	430	48
State Avg. 2012	1.2	10.1	35.2	23	70	16.4	14.4	<0.25	1.63	439	56
NORTH DAKOTA											
Area A	0.9	12.3	45.7	35	62	14.9	13.1	1.39	1.56	340	40
Area B	1.0	12.7	46.1	28	69	15.1	13.3	2.63	1.54	283	50
Area C	0.6	12.5	44.0	33	65	14.5	12.8	1.00	1.66	410	57
Area D	0.9	12.0	45.0	39	59	14.8	13.0	0.76	1.61	412	51
State Avg. 2013	0.9	12.2	45.0	35	62	14.7	12.9	1.38	1.56	349	45
State Avg. 2012	0.9	10.6	37.4	31	62	16.6	14.6	1.30	1.55	403	47
TWO-STATE REGION											
Avg. 2013	0.9	12.1	44.4	37	59	14.6	12.8	1.02	1.57	375	46
Avg. 2012	0.9	10.5	36.9	29	64	16.6	14.6	0.97	1.57	412	49
Five-Year Avg.	1.1	11.4	38.2	48	46	15.9	14.0	0.53	1.55	368	47

REGIONAL FALLING NUMBER DISTRIBUTION

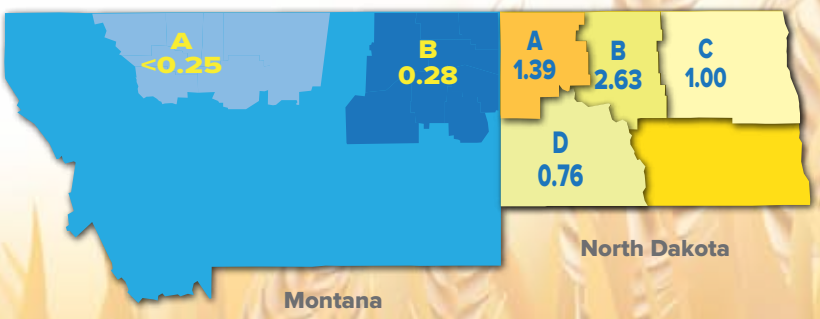


Eighty-six percent of the 2013 samples have a falling number of 300 seconds or better.

FALLING NUMBER BY AREA (seconds)



DON BY AREA (PPM)



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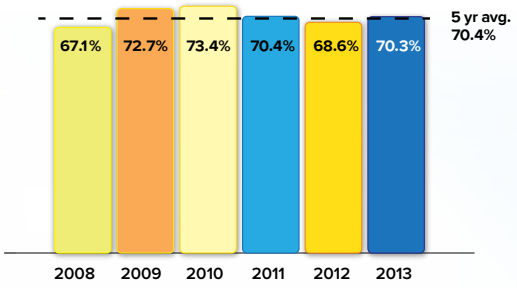
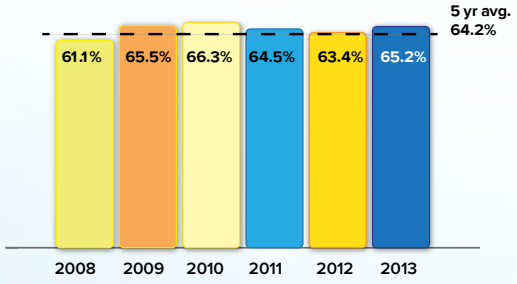
REGIONAL AVERAGE TOTAL EXTRACTION



The regional average is 70.3 percent, higher than last year and similar to the five-year average.

REGIONAL AVERAGE SEMOLINA EXTRACTION



The regional average is 65.2 percent, higher than last year and the five-year average.

MILLING CHARACTERISTICS

TOTAL EXTRACTION represents the portion of the kernel that can be milled into flour and semolina.

SEMOLINA extraction is the portion milled into semolina only.

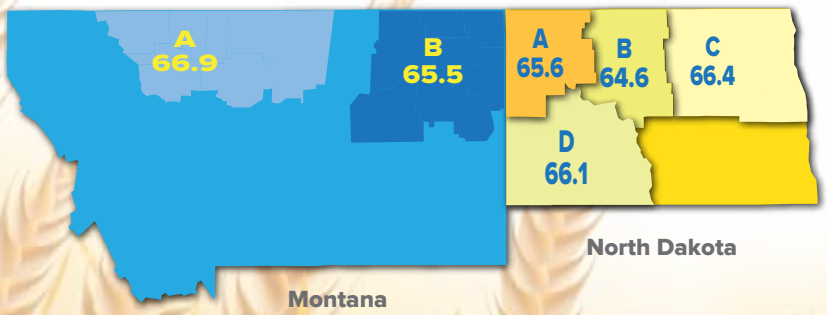
ASH CONTENT in the endosperm of durum is inherently higher than in the endosperm of other hard wheats, but can still be used as a relative measure of bran or mineral content in the flour and semolina.

SPECKS appear in semolina when small particles of bran or other material escape the cleaning and purifying process. Millers can control speck count by selecting durum that is free of disease and foreign material, thoroughly cleaning the durum, properly tempering and conditioning the wheat before milling, and by using purifiers to remove small bran particles from the semolina.

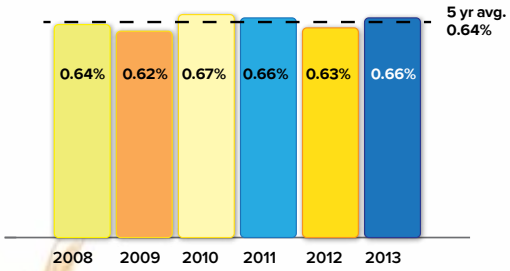
PROTEIN CONTENT in semolina has a high correlation with gluten content and, in turn, mechanical strength and cooking quality. Wet gluten is a quantitative measure of the gluten forming proteins in semolina that are primarily responsible for its mechanical strength and pasta quality.

MIXOGRAM curves reveal important information about the gluten quality of semolina and ultimately about the potential cooked firmness of pasta. Mixograms are rated on a scale of 1 to 8, with the higher values indicating stronger mixing characteristics.

SEMOLINA EXTRACTION BY AREA (percent)



REGIONAL AVERAGE ASH CONTENT

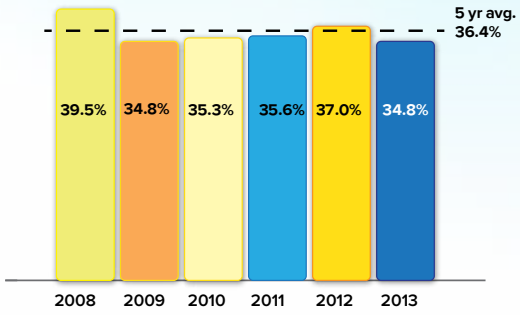


The 2013 crop produced semolina with an average ash content of 0.66 percent, higher than last year and the five-year average.

SEMOLINA QUALITY DATA

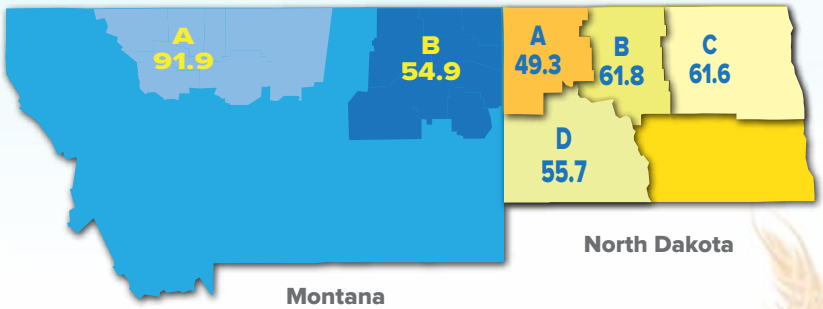
STATE AND CROP REPORTING AREA	TOTAL EXTRACTION %	SEMOLINA EXTRACTION %	ASH %	SPECKS NO/10 SQ IN %	PROTEIN (14 % MOISTURE) %	WET GLUTEN %	GLUTEN INDEX %	MIXOGRAM CLASSIFICATIO SCALE 1-8
MONTANA								
Area A	71.8	66.9	0.71	17	12.0	34.4	91.9	7.5
Area B	70.4	65.5	0.63	23	11.5	33.4	54.9	6.0
State Avg. 2013	70.6	65.7	0.64	22	11.6	33.5	60.1	6.2
State Avg. 2012	67.9	62.9	0.66	17	13.6	35.7	66.3	6.3
NORTH DAKOTA								
Area A	70.9	65.6	0.70	27	11.9	35.9	49.3	5.0
Area B	70.0	64.6	0.65	30	12.1	34.4	61.8	6.0
Area C	71.4	66.4	0.73	30	11.4	33.4	61.6	6.0
Area D	71.4	66.1	0.61	27	12.0	36.4	55.7	5.0
State Avg. 2013	70.2	65.0	0.66	27	11.8	35.3	52.8	5.1
State Avg. 2012	68.9	63.5	0.63	25	13.7	37.4	58.6	5.3
TWO-STATE REGION								
Avg. 2013	70.3	65.2	0.66	26	11.7	34.8	55.1	5.5
Avg. 2012	68.6	63.4	0.63	23	13.7	37.0	60.6	5.6
Five-Year Avg.	70.4	64.2	0.64	29	12.9	36.4	54.3	5.4

REGIONAL AVERAGE WET GLUTEN



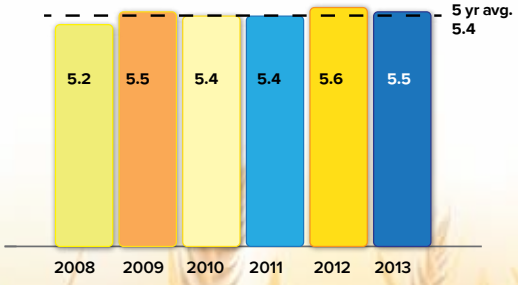
Average wet gluten content for the 2013 crop is 34.8 percent, lower than the five-year average.

GLUTEN INDEX BY AREA (percent)



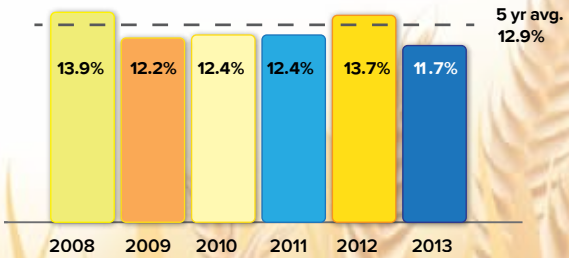
REGIONAL AVERAGE MIXOGRAM CLASSIFICATION

(scale of 1 to 8)



The average mixogram score is 5.5 (scale 1-8).

REGIONAL AVERAGE SEMOLINA PROTEIN CONTENT



The 2013 average semolina protein content is 11.7 percent, lower than last year and the five-year average.

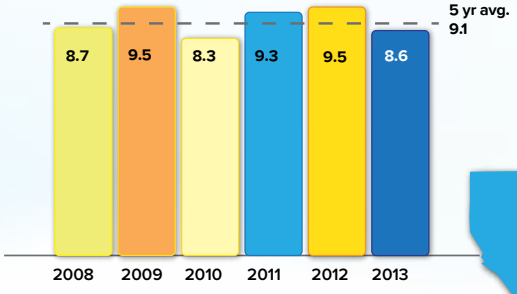
PASTA CHARACTERISTICS

DRY PASTA PROCESSORS want a finished product that is visually appealing, elastic and strong enough to resist breakage during cutting, packaging, handling and shipping, able to withstand the rigors of cooking, and satisfying to the consumer palate.

Yellow color in semolina and pasta is a traditional, rather than functional, mark of quality. In the early days of the pasta industry, before sophisticated testing evolved, consumers assumed that a yellow pasta was made from durum wheat, which is known to make pasta with superior cooking quality compared to that made from other hard wheats.

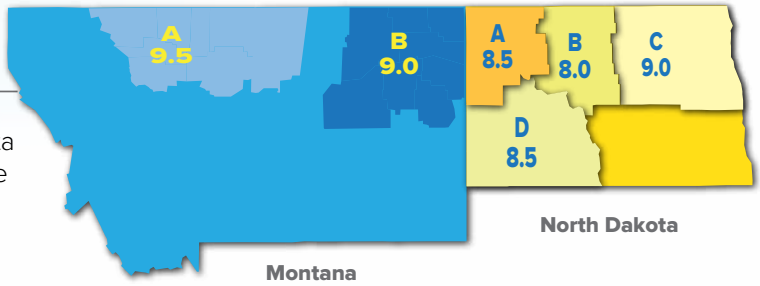
Most consumers prefer pasta that is "al dente," meaning it has some firmness to the bite. Good quality pasta that is cooked according to package directions should not be sticky or mushy when eaten.

REGIONAL AVERAGE COLOR SCORE (scale of 1-12)

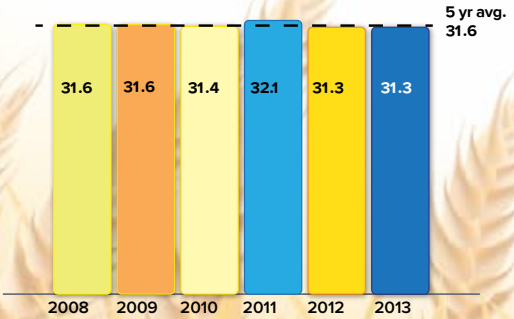


The 2013 average color score is 8.6. Pasta samples with scores of 8.0 or higher have good color.

COLOR SCORE BY AREA (scale of 1-12)

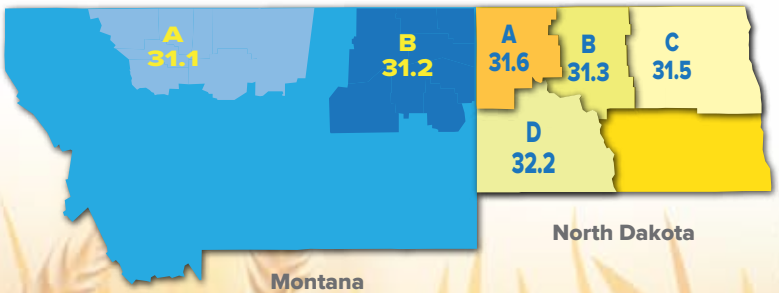


REGIONAL AVERAGE COOKED WEIGHT (grams)



The 2013 average cooked weight is 31.3 grams, the same as last year and similar to the five-year average.

COOKED WEIGHT BY AREA (grams)

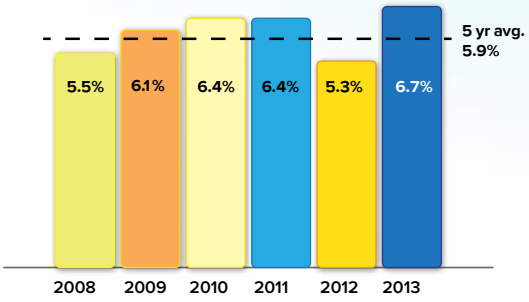


SEMOLINA AND SPAGHETTI QUALITY DATA

STATE AND CROP REPORTING AREA	SEMOLINA COLOR L (black-white)	SEMOLINA COLOR a (red-green)	SEMOLINA COLOR b (yellow-blue)	SPAGHETTI COLOR SCORE (1-12)	SPAGHETTI COOKED WEIGHT G	SPAGHETTI COOKING LOSS %	SPAGHETTI COOKED FIRMNESS G CM
MONTANA							
Area A	84.6	-3.21	29.3	9.5	31.1	6.5	4.6
Area B	85.7	-3.31	27.9	9.0	31.2	6.5	3.9
State Avg. 2013	85.6	-3.29	28.1	9.1	31.2	6.5	4.0
State Avg. 2012	85.3	-2.90	29.0	9.5	32.0	6.4	5.2
NORTH DAKOTA							
Area A	84.9	-3.19	27.6	8.5	31.6	6.9	4.0
Area B	84.6	-3.19	27.7	8.0	31.3	6.9	4.2
Area C	85.7	-3.26	27.1	9.0	31.5	6.4	4.0
Area D	85.0	-3.33	28.2	8.5	32.2	6.6	4.2
State Avg. 2013	84.1	-3.19	27.5	8.4	31.4	6.7	4.0
State Avg. 2012	84.9	-2.79	30.1	9.5	31.1	5.4	5.1
TWO-STATE REGION							
Avg. 2013	84.6	-3.23	27.7	8.6	31.3	6.7	4.0
Avg. 2012	85.0	-2.82	29.8	9.5	31.3	5.3	5.1
Five-Year Avg.	84.7	-2.79	27.9	9.1	31.6	5.9	5.1

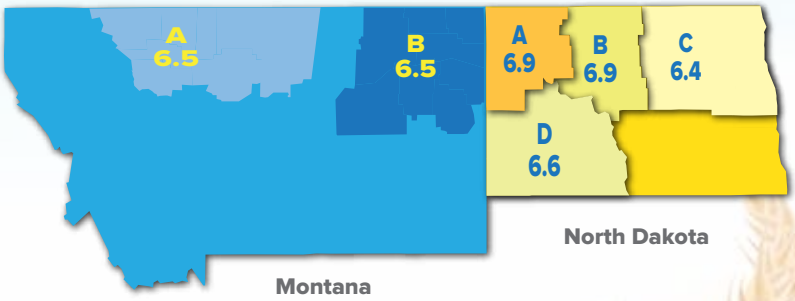
Semolina color performed on CIE color scale. Granulation size is approximately 40 percent above 425 microns and 12 percent below 180 microns.

REGIONAL AVERAGE COOKING LOSS

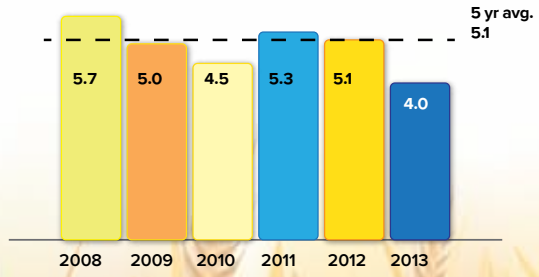


The 2013 average cooking loss is 6.7 percent, higher than last year and the five-year average.

COOKING LOSS BY AREA (percent)

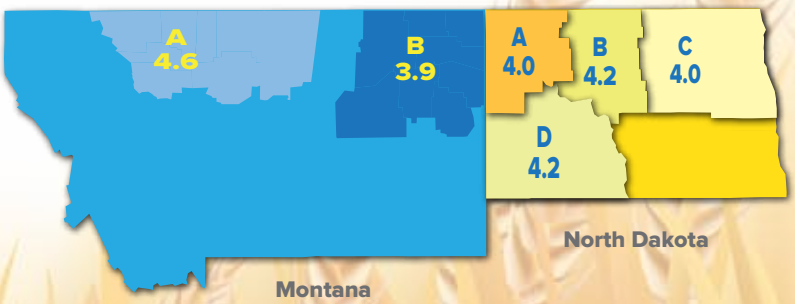


REGIONAL AVERAGE COOKED FIRMNESS (g cm)



The 2013 average cooked firmness is 4.0 grams.

COOKED FIRMNESS BY AREA (g cm)



AVERAGE QUALITY FACTORS FOR THE REGIONAL DURUM WHEAT CROP OVER RECENT YEARS

	2008	2009	2010	2011	2012	Five-Year Average	2013
GRADING AND WHEAT DATA							
Test Weight (lbs/bu)	60.2	61.4	60.0	59.9	60.6	60.6	60.7
Test Weight (kg/hl)	78.4	80.0	78.1	78.0	78.9	78.9	79.0
Total Defects (%)	1.6	1.1	2.0	1.8	1.8	1.4	1.0
Vitreous Kernels (%)	83	83	82	88	89	86	85
Grade	1 HAD	1 HAD	1 HAD	2 HAD	1 HAD	1 HAD	1 HAD
OTHER WHEAT DATA							
Dockage (%)	1.1	1.4	0.9	1.4	0.9	1.1	0.9
Protein: 12% moisture	14.8	13.5	13.4	13.6	14.6	14.0	12.8
1000 Kernel Weight (gm)	35.0	42.4	40.3	36.6	36.9	38.2	44.4
Moisture (%)	11.7	11.8	11.5	11.6	10.5	11.4	12.1
DON	0.01	0.16	0.32	0.96	0.97	0.53	1.02
Ash (%)	1.50	1.42	1.56	1.71	1.57	1.55	1.57
Falling Number (sec)	322	398	335	372	412	368	375
Sedimentation (cc)	49	50	43	43	49	47	46
SEMOLINA DATA							
Total Extraction (%)	67.1	72.7	73.4	70.4	68.6	70.4	70.3
Semolina Extraction (%)	61.1	65.5	66.3	64.5	63.4	64.2	65.2
Ash (%)	0.64	0.62	0.67	0.66	0.63	0.64	0.66
Wet Gluten (%)	39.5	34.8	35.3	35.6	37.0	36.4	34.8
Specks (no/10 sq in)	22	25	41	31	23	29	26
Protein (%)	13.9	12.2	12.4	12.4	13.7	12.9	11.7
Gluten Index (%)	41.4	58.9	55.2	55.5	60.6	54.3	55.1
Mixograph Classification	5.2	5.5	5.4	5.4	5.6	5.4	5.5
Color: L (black-white)	84.9	84.7	84.2	84.6	85.0	84.7	84.6
a (red-green)	-2.94	-2.80	-2.67	-2.74	-2.82	-2.79	-3.23
b (yellow-blue)	25.9	28.4	25.9	29.7	29.8	27.9	27.7
SPAGHETTI PROCESSING DATA							
Color Score (scale of 1-12)	8.7	9.5	8.3	9.3	9.5	9.1	8.6
L (black-white)	55.0	56.4	55.2	55.2	55.5	55.5	54.5
b (yellow-blue)	27.0	27.4	26.9	27.3	27.5	27.2	25.6
Cooked Weight (gm)	31.6	31.6	31.4	32.1	31.3	31.6	31.3
Cooking Loss (%)	5.5	6.1	6.4	6.4	5.3	5.9	6.7
Cooked Firmness (g cm)	5.7	5.0	4.5	5.3	5.1	5.1	4.0

Semolina color performed on CIE color scale. Granulation size is approximately 40 percent above 425 microns and 12 percent below 180 microns. Spaghetti color is performed on Hunter color scale.

EXPORT CARGO SAMPLING

SAMPLE COUNT	2011 (15)	2012 (6)
GRADING AND WHEAT DATA		
Test Weight (lbs/bu)	60.2	60.5
Test Weight (kg/hl)	78.5	78.9
Damaged Kernels (%)	2.3	1.2
Foreign Material (%)	0.2	0.1
Shrunken & Broken (%)	1.5	1.8
Total Defects (%)	4.0	3.1
Vitreous Kernels (%)	72	81
Grade	2 AD	2 HAD
OTHER WHEAT DATA		
Dockage (%)	0.7	0.5
Moisture (%)	12.4	10.9
Protein: 12% moisture (%)	13.7	14.3
Protein: Dry (%)	15.6	16.3
Ash: 14% moisture (%)	1.65	1.62
Ash: Dry (%)	1.92	1.88
1000 Kernel Weight (gm)	40	36
Kernel Size (%) lg/md/sm	46/49/5	37/57/6
Falling Number (sec)	318	451
DON (ppm)	0.6	0.7
SEMOLINA DATA		
Total Extraction (%)	69.5	68.8
Semolina Extraction (%)	64.2	62.8
Ash: 14% moisture (%)	0.67	0.68
Ash: Dry (%)	0.78	0.79
Gluten Index	62	56
Specks (no/10 sq in)	23	25
Protein: 14% moisture (%)	12.4	13.1
Protein: Dry (%)	14.4	15.2
Mixograph Classification (scale of 1-8)	6.4	5.7
Color: L (black-white)	84.8	84.9
a (red-green)	-2.54	-2.79
b (yellow-blue)	26.7	27.6
SPAGHETTI PROCESSING DATA		
Color Score (scale of 1-12)	8.4	8.8
Cooked Weight (gm)	32.0	32.6
Cooking Loss (%)	5.8	5.8
Cooked Firmness (g cm)	4.7	4.6

Semolina color performed on CIE color scale. Granulation size is approximately 40 percent above 425 microns and 12 percent below 180 microns.

Data contained in previous sections of this report are derived from the testing of samples gathered during harvest from origination points throughout the northern U.S. durum growing region. The results provide and assessment of the overall quality of the crop produced in a given year.

U.S. Wheat Associates, the export market development arm for American wheat growers, furthers this information by commissioning an export cargo sampling program. That data is shown in the table to the left. The program provides an accurate representation of the supplies moving through the grain marketing and transportation system and actually reaching export points. Results show the quality levels at which U.S. wheat is realistically traded and are useful to customers in developing reasonable purchase specifications.

The Federal Grain Inspection service oversees the program whereby all export inspection agencies at all ports collect every tenth sub lot sample from every vessel of U.S. wheat shipped during three two-month time periods annually.

The durum wheat samples are sent for analysis to the Durum Wheat Quality and Pasta Processing Laboratory in the North Dakota State University Plant Science Department. The samples represented here are based on samples collected from the fall of 2011 through the summer of 2012 for crop year 2011. For crop year 2012, samples tested were collected from the fall of 2012 through the spring of 2013. Grade data in the table is the actual official grade on individual sublots.

LABORATORY ANALYSIS

All quality data contained in this report is the result of testing and analysis conducted by or under the supervision of Dr. Frank Manthey, professor, Hiroshi Ando, food technologistsand Elena de la Pena and Claudia Carter, graduate assistants of the Durum Wheat Quality and Pasta Processing Laboratory in the Department of Plant Science at North Dakota State University, Fargo, North Dakota, USA.

COLLECTION • The North Dakota and Montana state offices of the National Agricultural Statistics Service obtained durum wheat samples during harvest directly from growers, farm bins and local elevators. These samples reflect the condition of the grain at the point of origin. Collection began in late August when approximately 10 percent of North Dakota's durum crop had been harvested and continued until early October. A total of 170 samples were collected during harvest from Montana (50) and North Dakota (120).

Collected samples fell short of the pre-harvest target due to the extended harvest season, and survey data presented does not reflect the final 15% of the harvest.

ANALYSIS • Half of the total wheat samples collected were analyzed for grade and other physical kernel characteristics. The data obtained from the analyses was used to generate frequency distributions as a percentage of the harvested crop. Distribution results may differ from data presented in the various tables, because the latter are derived from production adjusted averages, rather than simple averages.

All samples received in the laboratory were sub-sampled to obtain one composite sample for each of the four areas in North Dakota and one composite each of two areas for Montana. These were analyzed for grade and physical characteristics as well as milling performance and spaghetti processing qualities. Again, all state and regional averages have been adjusted to reflect production as opposed to simple averaging.

METHODS, TERMS, SYMBOLS

WHEAT

SAMPLE COLLECTION • Each sample contained approximately 2 to 3 pounds of wheat, stored in securely closed, moisture proof plastic bags.

MOISTURE • Official USDA procedure using Motomco Moisture Meter.

GRADE • Official United States Standards for Grain, as determined by a licensed grain inspector. North Dakota Grain Inspection Service, Fargo, ND, provided grades for composite wheat samples representing each crop reporting area.

VITREOUS KERNELS • Approximate percentage of kernels having vitreous endosperm, based on weights.

DOCKAGE • Official USDA procedure. All matter other than wheat which can be removed readily from a test portion of the original sample by use of an approved device (Carter Dockage Tester). Dockage may also include underdeveloped, shriveled and small pieces of wheat kernels removed in properly separating the material other than wheat and which cannot be recovered by properly rescreening or recleaning.

TEST WEIGHT • American Association of Cereal Chemists Method 55-10 approved April 1961, revised October 1999. Measured as pounds per bushel (lb/bu), kilograms per hectoliter (kg/hl) = (lbs/bu X 1.292) + 0.630. Approved Methods of the American Association of Cereal Chemists, Cereal Laboratory Methods (10th Edition), St. Paul, MN (2000).

THOUSAND KERNEL WEIGHT • Based on 10 gram sample of cleaned wheat (free of foreign material and broken kernels) counted by electronic seed counter.

KERNEL SIZE DISTRIBUTION • Determinations made according to the procedure described in Cereal Science Today 5:(3), 71 (1960). Kernels remaining over a Tyler No. 7 (2.92 mm opening) are classified as “large;” kernels passing through the top sieve but remaining on a Tyler No. 9 (2.24 mm opening) are classified as “medium” size kernels. Kernels passing through the second sieve are classed as “small.” Size is reported as percentage of large, medium, and small kernels.

PROTEIN • American Association of Cereal Chemists (AACC) Method: 46-30 (Combustion Method), expressed on dry basis and 12 percent moisture basis.

ASH • American Association of Cereal Chemists Method 08-01, approved April 1961, revised October 1999; expressed on a 14 percent moisture basis.

DON • Analysis was done on ground wheat using a gas chromatograph with an electron capture detector as described in J. Assoc. Official Anal. Chem 79,472 (1996)

FALLING NUMBER • American Association of Cereal Chemists Method 56-81B, approved November 1972, revised September 1999; units of seconds (14 percent moisture basis).

MICRO SEDIMENTATION • Determined as described by Dick, J.W. and Quick, J.S. Cereal Chem. 60(4):315-318, 1983.

WET GLUTEN • American Association of Cereal Chemists Method 38-12, approved October 1999; expressed on a 14 percent moisture basis determined with the glutomatic instrument.

GLUTEN INDEX • American Association of Cereal Chemists Method 38-12, approved October 1999; determined with the glutomatic instrument as an indication of gluten strength.

SEMOLINA

EXTRACTION AACC Method 26-41 (modified for the Buhler Mill). Expressed on a total product basis.

ASH AACC Method 08-01, approved April 1961, revised October 1999; expressed on a 14 percent moisture basis.

PROTEIN AACC Method 46-30 (combustion method), approved September 1995, revised October 1999, N x 5.7, expressed on a 14 percent moisture basis.

SPECKS The number of specks in semolina was determined on a flat surface under a constant light source, and counting the visible specks (brown and black particles) in three different one-inch square areas. The average of the three readings was converted to the number of specks per 10 square inches.

MIXOGRAPH Mixograph evaluation of semolina was performed according to the AACC Method 54-40A with some modifications: Ten grams of semolina (weighed on 14 percent moisture basis) were mixed for 8 min at constant water absorption of 5.8 ml, using a spring setting of 8. The mixograms were scored by comparing

them to reference mixograms. A scale of 1 to 8 is employed, higher values indicate strong mixing characteristics (see reference mixogram chart).

SPAGHETTI

PROCESSING • Pasta was made using the laboratory procedure described by Walsh, Ebeling, and Dick, Cereal Sci. Today: 16(11) 385, 1971. A 1-Kg semolina was mixed with the appropriate amount of water that gave a dough consistency of 32 percent total water absorption. The other processing conditions used were: Water temperature, 40 C, extruder shaft speed, 25 rpm and vacuum, 18 in. Hg; the dough was pressed through an 84-strand teflon-coated spaghetti die with 0.157 cm openings. The extruded spaghetti samples were dried at high temperature for 12 hrs, using maximum temperature and relative humidity of 73 C and 83 percent, respectively.

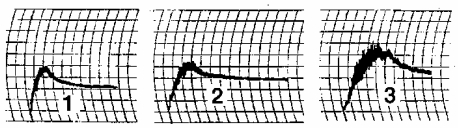
COLOR • Color scores were determined by light reflectance (AACC Method 14-22, 1983), using a Minolta Color Difference Meter (Model CR 310, Minolta Camera Co., Japan). The scores were generated according to the new color map designed by Debbouz (Pasta J. vol 6, No 6, 1994). A spaghetti sample with a score of 8.0 or higher is considered to have good color.

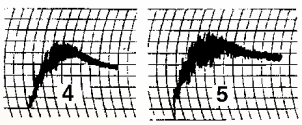
COOKED WEIGHT • AACC Method 66-50 with some modifications: 10 g of dry spaghetti were placed in 300 ml boiling distilled water and cooked for 12 min. The cooked and drained spaghetti sample was weighed and the results were reported in grams.

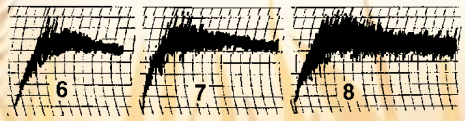
COOKING LOSS • AACC Method 66-50. Solids lost to the cooking water. After drying the residue was weighed and reported as percentage of the original dry sample.

FIRMNESS • AACC Method 66-50 with a Plexiglas tooth attached to a Texture Analyzer (Model TA-XT2, Texture Technology Corp., Scarsdale, New York).

REFERENCE MIXOGRAMS FOR DURUM WHEAT



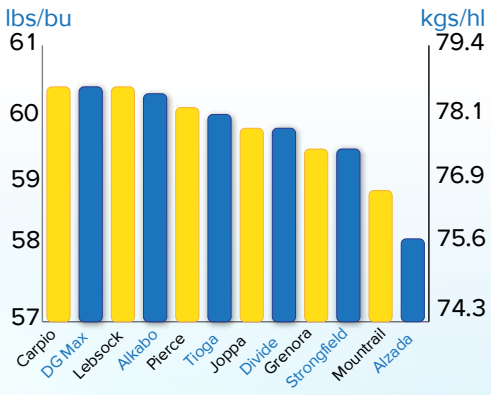




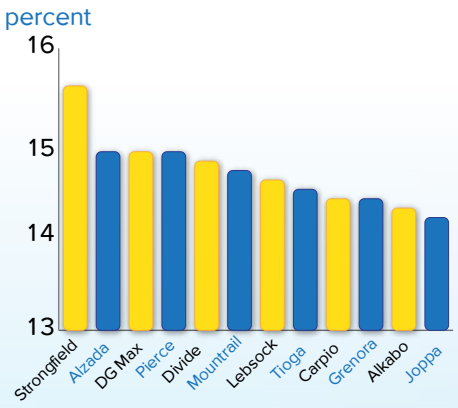
VARIETAL INFORMATION

QUALITY COMPARISON OF LEADING VARIETIES

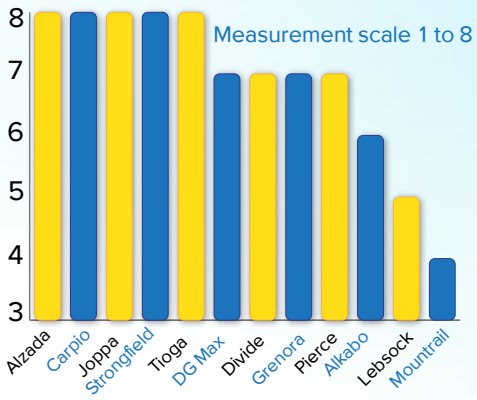
TEST WEIGHT



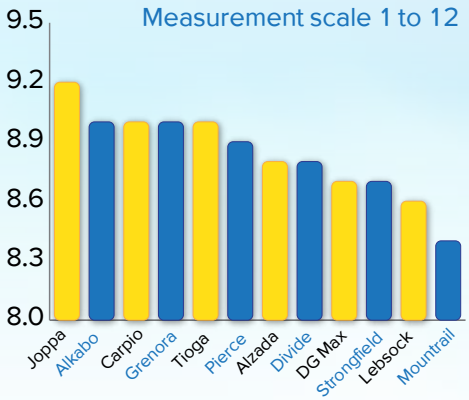
KERNEL PROTEIN



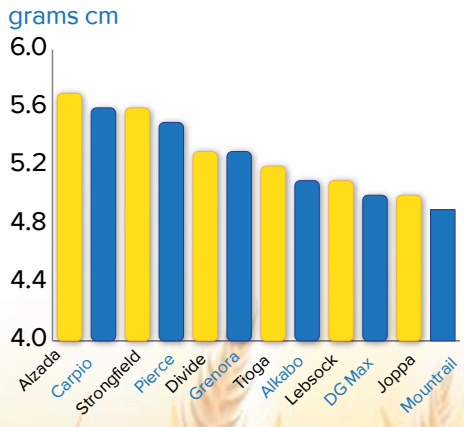
MIXOGRAPH



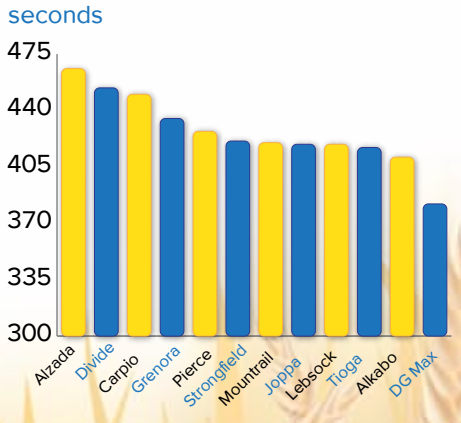
PASTA COLOR



COOKED FIRMNESS



WHEAT FALLING NUMBER



Quality products begin with quality ingredients. In the case of wheat, quality begins with the varieties planted. Within the durum class of wheat, there are different varieties available—all with relatively uniform characteristics. The public plant breeding program at North Dakota State University in Fargo develops and releases most of the durum varieties grown in the northern region, although some private firms also have durum breeding programs. Before any durum variety is released to the public, breeders are encouraged to show that it meets or exceed current standards for the class. Prospective releases are evaluated for milling and pasta characteristics as well as for yield, protein content, test weight, resistance to diseases and insects, and straw strength.

Environment influences the quality of varieties across growing areas and planting years. For this reason, wheat breeders use “check” or reference varieties to evaluate quality in experimental varieties. They test and analyze quality data from multiple years and growing locations before a variety is released.

Source: Advanced Yield Trials 2008-2012 crop years across multiple North Dakota locations.

VARIETAL INFORMATION

GROWN & TESTED IN NORTH DAKOTA • AGRONOMIC FACTORS

		AGRONOMIC DESCRIPTION		REACTION TO DISEASE[2]			AVERAGE YIELD 3-YEAR[3] North Dakota	
VARIETY	AGENT[1] OR ORIGIN	YEAR RELEASED	STRAW STRENGTH	LEAF RUST	FOLIAR DISEASE	HEAD SCAB	BU/ ACRE	MT/ HECT
Alkabo	ND	2005	v.strong	R	M	MS	56.7	3.81
Alzada	WB	2004	medium	R	S	VS	47.7	3.21
Carpio	ND	2012	medium	R	M	M	57.7	3.88
DG Max	DGP	2008	medium	MR	MR	MS	55.6	3.74
Divide	ND	2005	medium	R	M	MR	55.1	3.70
Grenora	ND	2005	medium	R	M	MS	56.7	3.81
Joppa	ND	2013	medium	R	M	M	60.4	4.06
Lebsock	ND	1999	strong	R	M	MS	56.8	3.82
Mountrail	ND	1998	medium	R	M	S	55.4	3.72
Pierce	ND	2001	medium	R	MS	S	57.0	3.83
Strongfield	CAN	2004	medium	R	MS	S	54.2	3.64
Tioga	ND	2010	strong	R	M	MS	56.4	3.79

Source: 2013 North Dakota Durum Wheat Variety Performance Descriptions

1. ND–North Dakota State University, WB–Westbred, CAN-Canada, DGP-Dakota Growers Pasta Co.
2. Reaction to Disease: resistant (R), moderately resistant (MR), intermediate (M), moderately susceptible (MS), susceptible (S), very susceptible (VS).
3. Three year average data 2010-12 from six locations across North Dakota, however in 2011 data from Carrington, Dickinson and Minot was not available.

GROWN & TESTED ACROSS NORTH DAKOTA • QUALITY & END-USE FACTORS

	QUALITY FACTORS[4]								
VARIETY	TEST WEIGHT LB/BU	TEST WEIGHT KG/HL	WHEAT PROTEIN %	WHEAT FALLING # SECONDS	MIXOGRAM SCORE (SCALE 1-8)	PASTA COLOR (SCALE 1-12)	GLUTEN INDEX %	COOKED FIRMNESS G CM	OVERALL PASTA QUALITY RATING[5]
Alkabo	60.3	78.5	14.3	411	6	9.0	58	5.1	good
Alzada	58.2	75.8	14.9	466	8	8.8	94	5.7	good
Carpio	60.4	78.7	14.4	450	8	9.0	93	5.6	excellent
DG Max	60.4	78.7	14.9	382	7	8.7	70	5.0	good
Divide	59.8	77.9	14.8	454	7	8.8	79	5.3	good
Grenora	59.5	77.5	14.4	435	7	9.0	70	5.3	good
Joppa	60.0	78.2	14.2	419	8	9.2	89	5.0	good
Lebsock	60.4	78.7	14.6	419	5	8.6	49	5.1	average
Mountrail	58.9	76.7	14.7	420	4	8.4	30	4.9	fair
Pierce	60.1	78.3	14.9	427	7	8.9	70	5.5	good
Strongfield	59.5	77.5	15.6	421	8	8.7	74	5.6	good
Tioga	60.0	78.2	14.5	417	8	9.0	85	5.2	good

4. Based on NDSU Durum Quality Lab testing of samples grown at multiple North Dakota locations during 2008-2012.

5. Based on kernel attributes, milling and semolina processing, pasta color, and spaghetti cooking performance. Ratings can be excellent, good, average, fair and poor.

Quality is influenced by environment and the genetic background in a particular variety. Breeders are working towards future varieties that have enhanced color and gluten strength, all important quality factors for end-users. In addition, varieties that can maintain quality under adverse environmental stress are important to both producers and end-users.

NORTH DAKOTA

The top five planted durum varieties in North Dakota are Divide, Alkabo, Mountrail, Tioga and Lebsock, according to the North Dakota Agricultural Statistics Service. The top five varieties account for 86 percent of the 850,000 planted acres.

DIVIDE is the top planted variety for the fifth straight year and holds a dominant one-third share of the acres in 2013. It is the top planted variety in all of the districts, except the west central region. Divide is also the second most popular variety in Montana, accounting for 22 percent of the acreage. It is a 2005 release from NDSU with good agronomic traits such as high yield potential and moderate resistance to Fusarium headblight. Divide also has strong gluten strength, good color and good end-use quality traits.

ALKABO accounts for 19 percent of North Dakota's acreage in 2013, up from 15 percent last year, and marking a sixth straight year of gains. It accounts for about 5 percent of the acres in Montana. Alkabo is a 2005 release from NDSU, that has balanced appeal across the main durum growing regions with producers and it is the leading variety in the west central district of North Dakota. Producers appreciate its high yield potential and strong straw strength, and end-users will appreciate its good end-use quality traits, especially its rating for pasta color.

TIOGA made notable gains in acres in North Dakota in 2013, advancing to an 11 percent share, up from 3 percent in 2012. A 2010 NDSU release, it is gaining popularity with producers seeking new genetics. Tioga shows marked improvements in dough strength and end-use quality characteristics over varieties it is replacing.

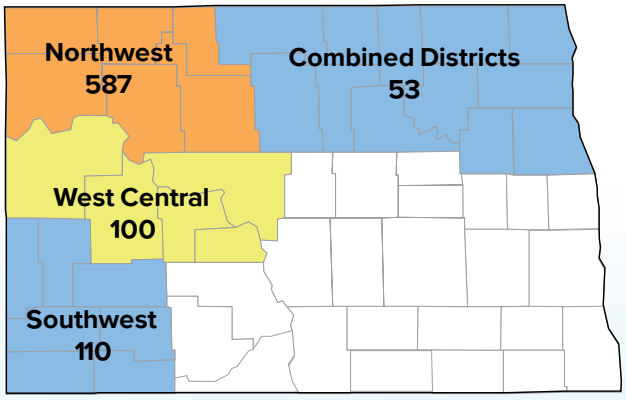
LEBSOCK is a 1999 NDSU release that continues to be a popular variety with producers due to good agronomic traits and high test weight. It continues to hold a 10 percent share in North Dakota but is down from its peak.

North Dakota Varieties Planted Acres

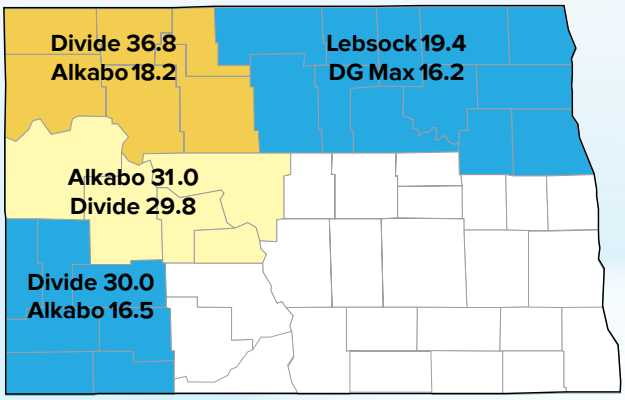
Variety	2012%[1]	2013%[1]	2013 Acres (1,000)
Divide	30.4	33.4	283.9
Alkabo	14.7	19.0	161.4
Mountrail	13.3	12.7	108.0
Tioga	2.9	10.7	90.7
Lebsock	10.3	10.3	87.8
Grenora	10.2	2.3	19.7
Dilse	1.3	1.5	13.1
Ben	1.3	1.5	12.4
DG Max	1.9	1.2	10.3
Pierce	3.4	1.0	8.7
Other[2]	10.3	6.4	54.0

1. Percentages may not add to 100 due to rounding.
2. Includes varieties with less than 1% of acreage in 2013 and unknown varieties.

North Dakota 2013 Planted Acres by NASS Districts (1,000 Acres)



North Dakota 2013 NASS Top Two Varieties by District (% of Acres)



North Dakota Varieties Share of 2013 Planted Acres by Crop District

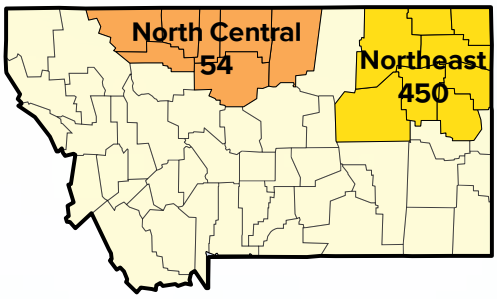
Variety	North West	West Central	South West	Combined Districts[1]	Total State
			percentage (%)[2]		
Divide	36.8	29.8	30.0	9.4	33.4
Alkabo	18.2	31.0	16.5	10.0	19.0
Mountrail	17.0	8.0	0.0	0.0	12.7
Tioga	8.8	16.0	15.6	10.8	10.7
Lebsock	9.4	5.4	15.3	19.4	10.3
Grenora	2.5	1.0	3.5	0.0	2.3
Dilse	1.4	0.0	4.5	0.0	1.5
Ben	1.7	0.0	1.1	2.5	1.5
DG Max	0.3	0.0	0.0	16.2	1.2
Pierce	0.6	2.3	0.0	4.9	1.0
Other[3]					
			1,000 acres (1 acre = 0.4 hectares)		
Total Acres[3]	587	100	110	53	850[4]

1. Data from North Central, Northeast, Central, East Central South Central and Southeast districts are combined to avoid disclosure of individual operations.
2. Percentages may not add to 100 due to rounding.
3. Includes varieties with less than 1% acreage in 2013 and unknown varieties.
4. September 30, 2013 small grain estimate was 795,000 acres.

U.S. DURUM WHEAT

MONTANA | NORTH DAKOTA

Montana 2013 Planted Acres by Crop District (1,000 acres)



MONTANA

Montana Agricultural Statistics Service reports the five most popular durum varieties in 2013 are Mountrail, Divide, Strongfield, Alzada and Grenora. The top varieties remain the same as 2012 and account for a combined 73 percent of the 520,000 planted acres.

MOUNTRAIL is the top planted variety with 23 percent of the acreage, down slightly from last year. It is also the third most popular variety in North Dakota with 13 percent of the acres. A 1998 NDSU release, Mountrail is being surpassed in quality by newer varieties, but remains popular with producers as a reliable, high yielding variety.

STRONGFIELD maintained third position in Montana with 11 percent of the acres, but is down from 16 percent last year. It is a 2004 release from Ag Canada that was developed for low grain cadmium, and it also has good end-use quality and a good disease tolerance.

Montana Varieties Share of 2013 Planted Acres by Crop District

Variety	North Central	North East	Total State
	percentage (%)[1]		
Mountrail	2.1	25.7	22.9
Divide	0.0	25.3	22.3
Strongfield	7.8	11.4	10.9
Alzada	64.9	2.6	9.2
Grenora	0.0	8.8	7.8
Westhope	2.8	6.4	5.9
Alkabo	0.0	5.1	4.5
Kyle	3.0	4.7	4.5
Vic	2.3	1.3	1.4
Lebsock	0.0	1.3	1.2
Other[2]	17.1	7.4	9.4
	1,000 acres (1 acre = 0.4 hectares)		
Total Acres	54	450	510[3]

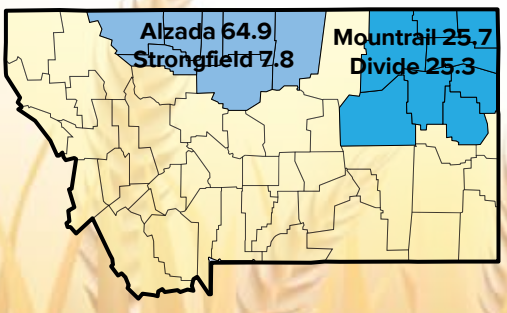
1. Percentages may not add to 100 due to rounding.
2. Includes varieties with less than 1% of acreage in 2013 and unknown varieties.
3. September 30, 2013 small grain estimate was 505,000 acres.

Montana Varieties Planted Acres

Variety	2012[1]	2013[1]	2013 Acres (1,000)
Mountrail	26.5	22.9	116.8
Divide	22.8	22.3	113.9
Strongfield	16.0	10.9	55.5
Alzada	8.1	9.2	48.7
Grenora	2.9	7.8	39.6
Westhope	1.3	5.9	30.3
Alkabo	3.9	4.5	23.0
Kyle	3.2	4.5	22.8
Vic	0.9	1.4	7.1
Lebsock	2.3	1.2	5.9
Other[2]	12.1	9.4	48.4

1. Percentages may not add to 100 due to rounding.
2. Includes varieties with less than 1% of acreage in 2013 and unknown varieties.

Montana 2013 NASS Top Two Varieties by District (% of Acres)



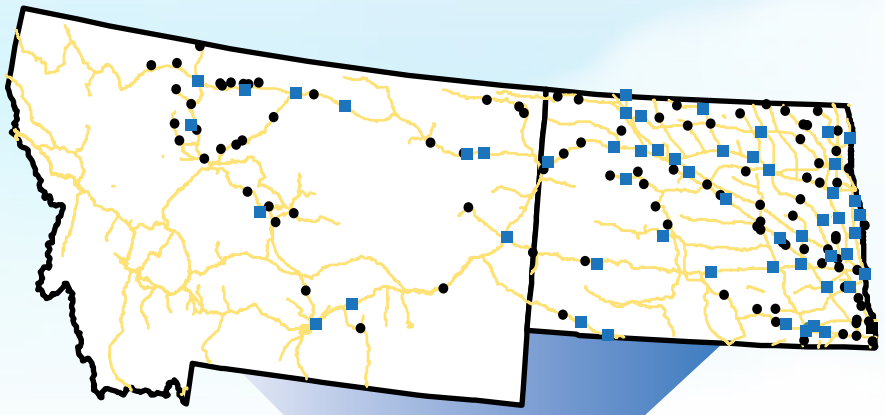
HANDLING & TRANSPORTATION

The durum wheat growing region in the Northern Plains has a vast network of country elevators to facilitate efficient and precise movement to domestic and export markets. On average, nearly 80 percent of the region's wheat moves to markets by rail. Duluth is the only export market easily serviced by trucks. Shipments to the Pacific Northwest and Gulf export markets are almost entirely by rail, with some barge movement to the Gulf. The dominant railroad is the Burlington Northern Santa Fe, followed by the Canadian Pacific.

A growing number of elevators in the region are investing to ship 100 car units. Each rail car holds approximately 3,500 bushels (95 metric tons) of wheat. Some of the 100-car shippers have invested in "shuttle" capabilities. Shuttle-equipped facilities receive the lowest rates, sharing volume and transaction efficiencies with the railroad.

The diverse rail shipping capacities and widespread network of elevators are strengths buyers can capitalize on, especially as their demand heightens for more precise quality specifications and consistency between shipments. Buyers are increasingly exploring origin-specific shipments. Many international buyers now find it possible to request wheat from certain locations to optimize the quality and value of wheat they purchase.

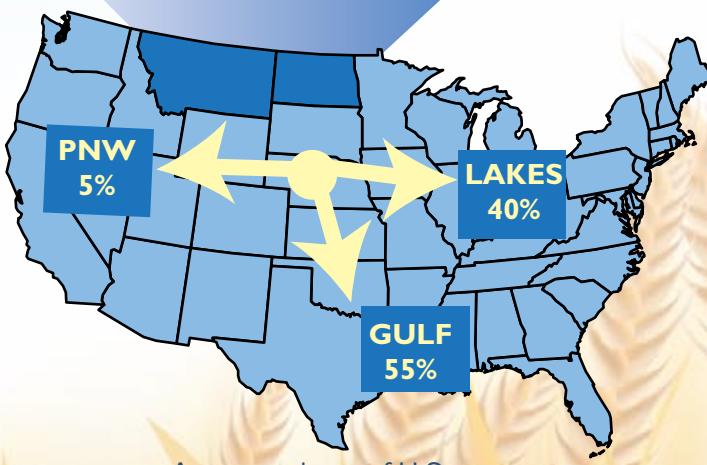
The rail and elevator network in the U.S. northern grown durum region is well suited for meeting the increasing quality demands of both domestic and international customers.



● Track for 50 to 99 rail cars
■ Track for 100 or more cars

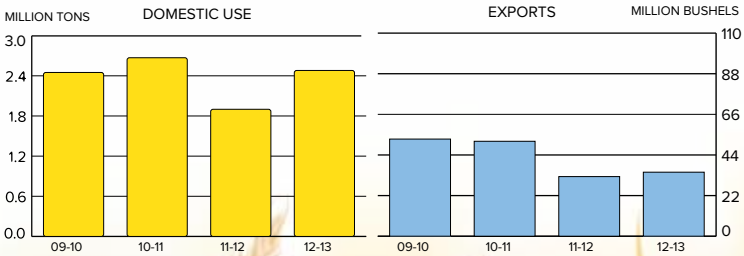
Source: Upper Great Plains Transportation Institute

Grain Handling and Transportation Facilities in the Four-State Region



Average share of U.S. Durum exports by port (2009-2012)

2009-12 U.S. Durum Domestic Use & Exports



Marketing Years (June-May)

FUNDING & SUPPORT PROVIDED BY

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