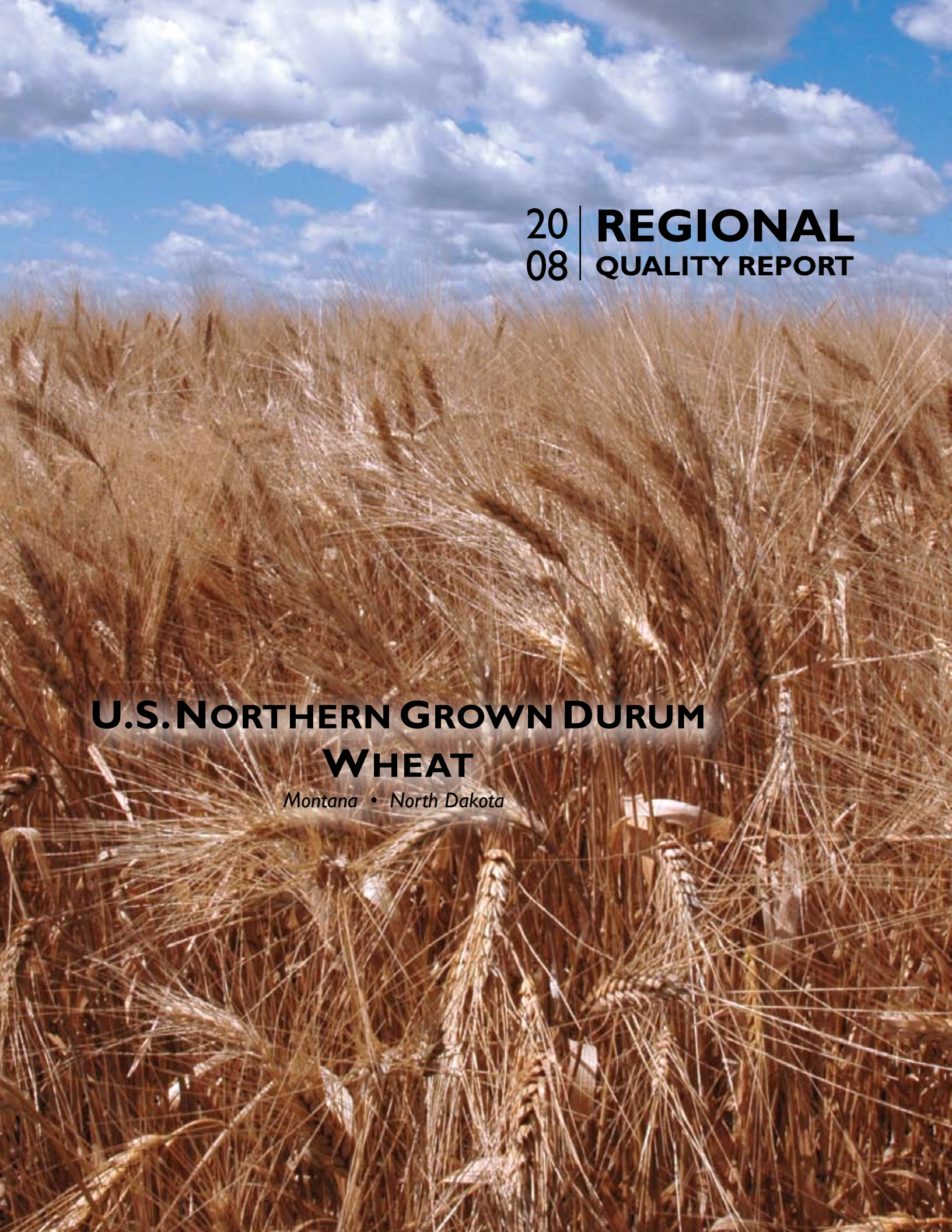

2008 REGIONAL QUALITY REPORT

U.S. Northern Grown Durum Wheat

Montana • North Dakota

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 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.

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. Farmers in California and Arizona grow the remainder.

2008 Overview

The 2008 northern durum crop has very low levels of damaged kernels and high average protein with a slightly higher test weight than last year which makes the overall grade a No. 1 Hard Amber Durum. Production is 4 percent lower than last year as severe mid-season drought conditions and an extremely dry subsoil moisture profile in key durum producing areas led to subpar yields in many areas, offsetting an increase in planted area.

Test weight averages 60.2 lb/bu (78.4 kg/hl) with 60 percent of the crop exhibiting a minimum test weight of 60 lb/bu (78.2 kg/hl) or higher, up from 50 percent last year. Thousand kernel weight values are higher and kernel ash levels are lower for all growing districts compared to 2007. Overall protein of 14.8 percent is down marginally from last year but still nearly one-half point higher than the five-year average. Nearly two-thirds of the crop grades a No. 2 Hard Amber Durum or better but there is a wider distribution of quality compared to 2007, especially for subclasses. The wider distribution is due to the extremes in growing season weather across the region, as well as an extended period of wet weather during the last one-third of the harvest.

The most notable shifts in quality parameters are lower average vitreous kernel counts and slightly lower falling number values. The average vitreous kernel count for the region is 83 percent, down from the exceptional level of 95 percent in 2007 and the five-year average of 91 percent. The average falling number value is 322 seconds, down from both last year and the five-year average. Although crop averages are lower for these two factors, fifty-six percent of the crop averages 90 percent or higher for vitreous kernels and eighty percent of the crop has a falling number of 350 seconds or greater.

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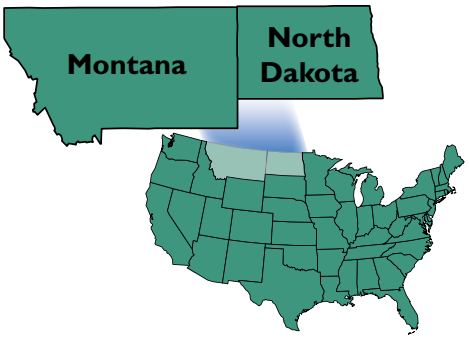
Cover photo: David Lipp, Fargo, N.D.



Milling tests using a Buhler laboratory mill reveal lower total and semolina extractions but a significant reduction in ash levels. Laboratory processing performance is revealing slightly greater cooked firmness and reduced cooking loss in the finished product. Due to the reduced vitreous kernel counts, average color scores are lower than last year and the five-year average. Mixing properties of the semolina are near last year's level but remain below the five-year average. The reduced color and weaker mixing qualities are solely due to the impacts of weather during harvest as the mix of varieties grown held mostly steady with a year ago.

The 2008 crop is of good quality for many factors. Although buyers can expect to find a wider range of value on various subclass qualities in the market, and customers that can utilize lower vitreous kernel levels for their end-use products will find good opportunity in the 2008 crop. Likewise, buyers that command stringent specifications for vitreous kernel counts and other factors will still find that a significant portion of the crop will meet their needs. Accurate contract specifications are always encouraged to ensure buyers get the quality of durum they need.

DURUM WHEAT PRODUCTION

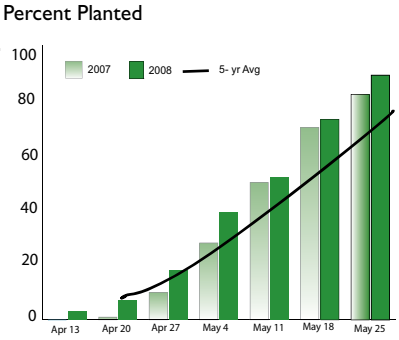
	2007	2008	2003-07 AVERAGE
MILLION BUSHELS			
Montana	11.4	10.8	13.4
North Dakota	43.8	42.3	51.0
Regional Total	55.2	53.1	64.4
U.S. Total	71.7	84.9	82.3
MILLION METRIC TONS			
Montana	0.31	0.29	0.36
North Dakota	1.19	1.15	1.39
Regional Total	1.50	1.44	1.75
U.S. Total	1.95	2.31	2.24

Source: USDA September 2008 Small Grains Summary

SEASONAL CONDITIONS

PLANTING began earlier than normal at the beginning of April. Progress was ahead of average due to dry conditions throughout most of April and May. Planting was mostly finished by the beginning of June, but concerns about the cool, and overly dry conditions had producers worried about crop emergence, which was behind average for the earlier planted crop.

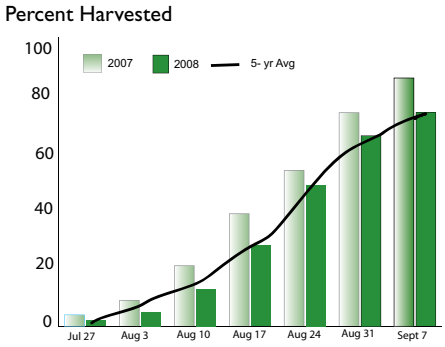
DURUM PLANTING PROGRESS



GROWING conditions improved in June as beneficial precipitation fell across most of the durum region and boosted crop conditions. However, the lack of sufficient subsoil moisture was still a concern in many areas in late June. In July, hot, dry conditions persisted and crop conditions and yield potential deteriorated quickly in a significant portion of the durum area. Disease pressures remained minimal.

HARVEST began in late August, behind average due to the slower than normal development of the crop. Harvest progressed at an average pace until early September when rain showers were persistent across the region, delaying harvest progress and causing some quality loss in areas. The majority of harvest was complete by the third week in September.

DURUM HARVEST PROGRESS



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.

SUBCLASSES

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.

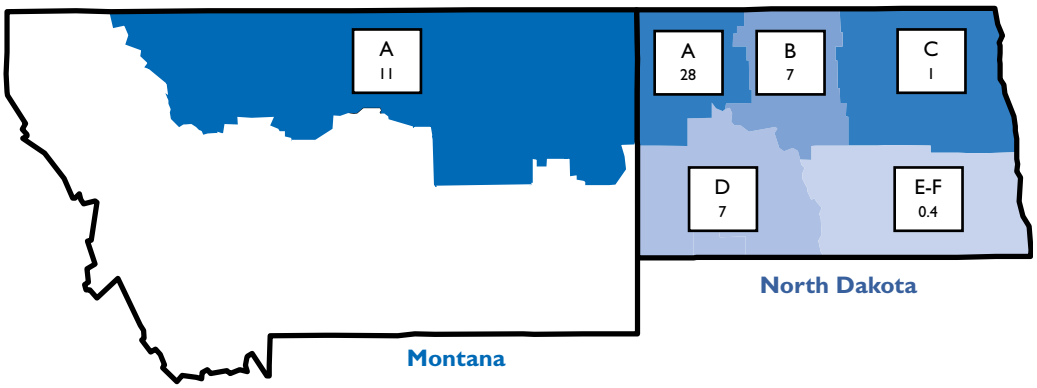
OFFICIAL U.S. GRADES AND GRADE REQUIREMENTS (Revised June 1993)

	U.S. GRADES				
GRADING FACTORS	1	2	3	4	5
DURUM—MINIMUM TEST WEIGHTS					
Pounds per bushel	60.0	58.0	56.0	54.0	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 substances	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.

Wheat samples were obtained in Montana and North Dakota in the crop reporting areas identified in color. Samples were gathered during harvest from growers, farm bins and country elevators.

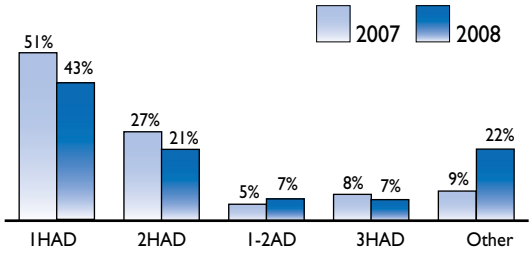
CROP REPORTING AREAS & 2007 DURUM WHEAT PRODUCTION (million bushels)



Source: National Agricultural Statistics Service
(2008 county estimates to be released in March 2009)

Photo credit: David Lipp, Fargo, N.D.

REGIONAL GRADE DISTRIBUTION

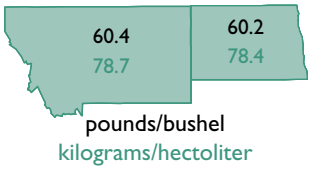


Sixty-four percent of 2008 samples grade No. 2 HAD or better, down from 78 percent in 2007.

OVERALL GRADE

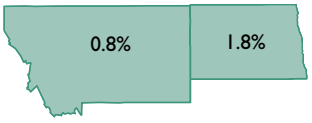
The average grade for the region is 1HAD. This grade represents average test weight of 60.2 pounds per bushel (78.4 kg/hl), total defects of 1.6 percent and vitreous kernel content of 83 percent.

TEST WEIGHT BY STATE

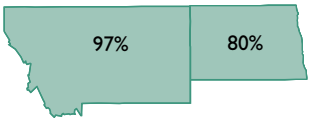


pounds/bushel
kilograms/hectoliter

AVERAGE TOTAL DEFECTS BY STATE



AVERAGE VITREOUS KERNELS BY STATE

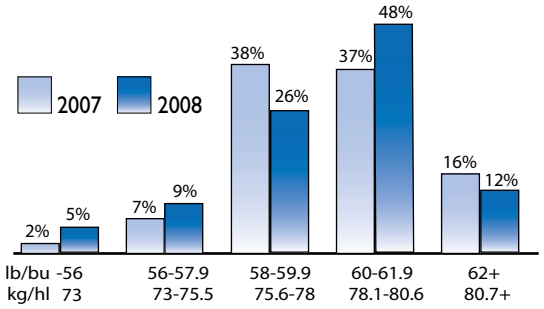


Wheat Grading Data

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									
State Avg. 2008	60.4	78.7	0.0	0.1	0.7	0.8	0.0	1HAD	97
State Avg. 2007	58.9	76.7	0.2	0.0	1.6	1.8	0.0	2HAD	99
NORTH DAKOTA									
Area A	60.3	78.5	0.4	0.0	1.4	1.8	0.0	1HAD	78
Area B	60.6	78.9	0.3	0.0	0.9	1.2	0.0	1HAD	76
Area C	61.2	79.7	0.4	0.0	0.7	1.1	0.0	1HAD	85
Area D	59.0	76.9	0.3	0.0	2.3	2.6	0.0	2HAD	90
State Avg. 2008	60.2	78.4	0.4	0.0	1.4	1.8	0.0	1HAD	80
State Avg. 2007	60.1	78.3	0.5	0.0	1.3	1.8	0.3	1HAD	94
TWO-STATE REGION									
Avg. 2008	60.2	78.4	0.3	0.0	1.3	1.6	0.0	1HAD	83
Avg. 2007	59.9	78.0	0.4	0.0	1.4	1.8	0.2	2HAD	95
Five-Year Avg.	60.7	79.0	0.4	0.0	1.3	1.7	0.1	1HAD	91

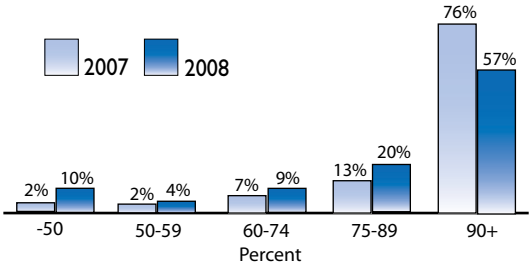
All state and regional averages have been adjusted to reflect production differences.

REGIONAL TEST WEIGHT DISTRIBUTION



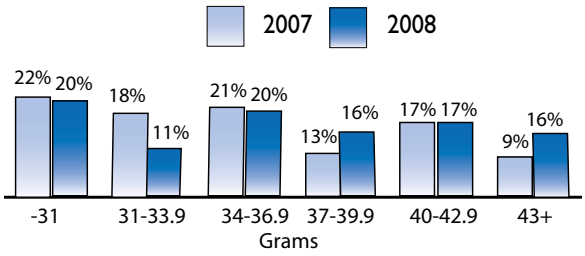
Sixty percent of 2008 samples have test weights of 60 lbs/bu (78.1 kg/hl) or greater. The regional average test weight is 60.2 lbs/bu (78.4 kg/hl).

REGIONAL VITREOUS KERNEL DISTRIBUTION



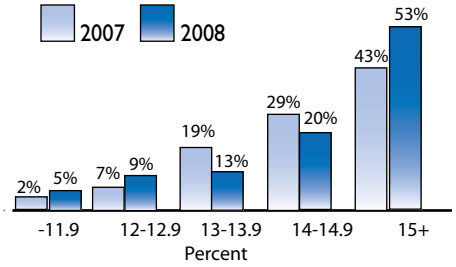
Seventy-seven percent of 2008 samples have 75 percent or greater vitreous kernels. The average percentage of vitreous kernels in the regional crop is 83 percent.

REGIONAL THOUSAND KERNEL WEIGHT DISTRIBUTION



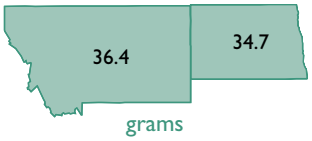
The 2008 crop has 69 percent of the crop with a thousand kernel weight of 34 grams or higher up from 60 percent in 2007.

REGIONAL PROTEIN DISTRIBUTION (12% moisture basis)

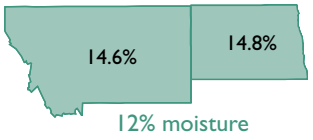


Eighty-six percent of 2008 samples have a protein content of 13.0 percent or greater.

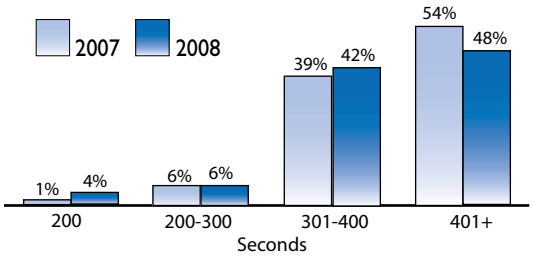
THOUSAND KERNEL WEIGHT BY STATE



AVERAGE PROTEIN BY STATE

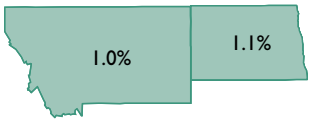


REGIONAL FALLING NUMBER DISTRIBUTION

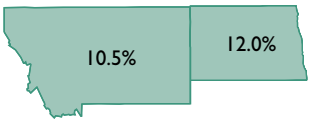


Ninety percent of the 2008 crop has a falling number of 300 seconds or better.

AVERAGE HARVEST DOCKAGE BY STATE



AVERAGE MOISTURE BY STATE

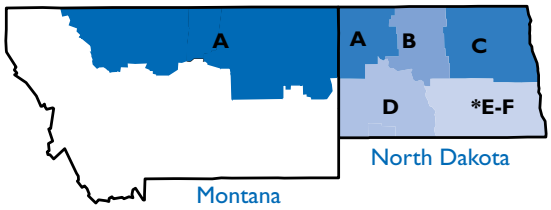


Other Kernel Quality Data

STATE AND CROP REPORTING AREA	DOCKAGE %	MOISTURE %	1000 KERNEL WEIGHT G	KERNEL DIST. MEDIUM %	KERNEL DIST. LARGE %	PROTEIN (DRY MATTER) %	PROTEIN (12% MOISTURE) %	WHEAT ASH %	FALLING NUMBER (SEC)	SEDIMENT-ATION (CC)
MONTANA										
State Avg. 2008	1.0	10.5	36.4	65	29	16.6	14.6	1.35	407	47
State Avg. 2007	1.7	11.0	31.7	76	14	17.6	15.5	1.70	380	50
NORTH DAKOTA										
Area A	1.0	12.1	34.6	58	35	16.7	14.7	1.51	283	46
Area B	1.2	12.0	36.6	52	44	16.4	14.4	1.48	313	54
Area C	1.2	13.2	41.3	35	63	14.6	12.9	1.50	341	47
Area D	1.4	11.3	30.7	63	20	18.7	16.5	1.71	334	56
State Avg. 2008	1.1	12.0	34.7	57	36	16.9	14.8	1.54	300	49
State Avg. 2007	1.6	12.1	34.4	59	33	17.0	14.9	1.67	363	52
TWO-STATE REGION										
Avg. 2008	1.1	11.7	35.0	58	34	16.8	14.8	1.50	322	49
Avg. 2007	1.6	11.8	33.8	63	29	17.1	15.1	1.67	367	52
5-Year Avg.	1.5	11.7	35.3	51	41	16.2	14.3	1.58	375	50

All state and regional averages have been adjusted to reflect production differences.

Photo credit: David Lipp, Fargo, N.D.



* E-F: No data was collected from this region due to limited production.

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.

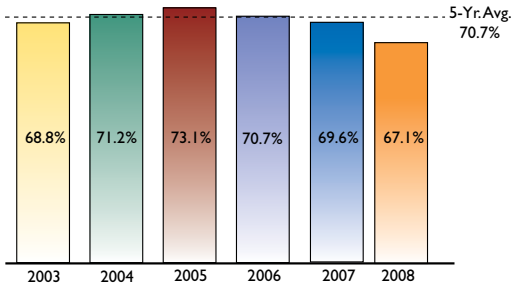
ASH CONTENT in the endosperm of durum is inherently higher than in the endosperm of other hard wheats, but can still be used as a relative measure of bran or mineral content in the flour and semolina.

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.

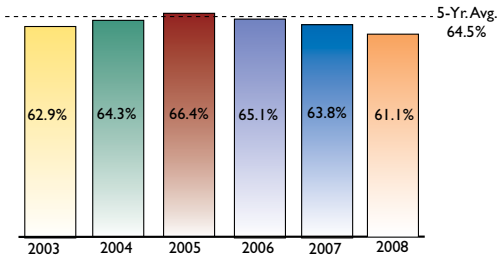
MIXOGRAM curves reveal important information about the gluten quality of semolina and ultimately about the potential cooked firmness of pasta. Mixograms are rated on a scale of 1 to 8, with the higher values indicating strong mixing characteristics.

REGIONAL AVERAGE: TOTAL EXTRACTION



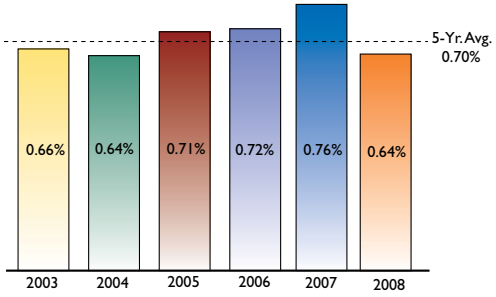
The regional average is 67.1 percent, down from last year's 69.6 percent.

REGIONAL AVERAGE: SEMOLINA EXTRACTION



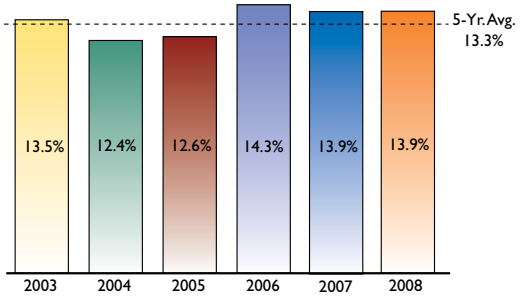
The regional average is 61.1 percent, down from last year's 63.8 percent and below the five year average.

REGIONAL AVERAGE: ASH CONTENT



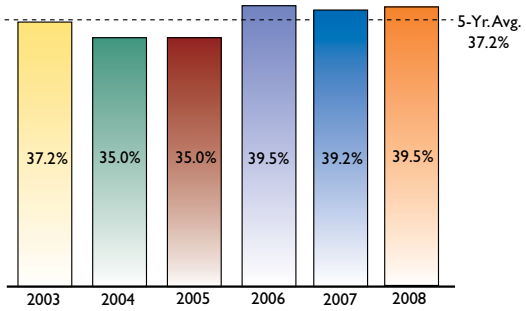
The 2008 crop produced semolina with an average ash content of 0.64 percent, lower than last year and the five-year average.

REGIONAL AVERAGE: SEMOLINA PROTEIN CONTENT



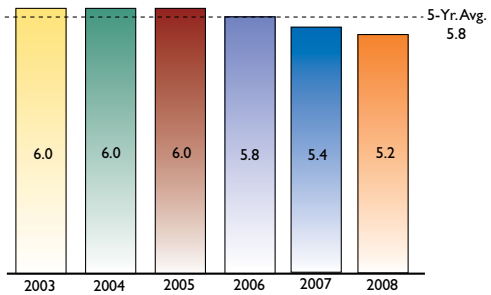
The 2008 crop produced semolina with an average protein content of 13.9 percent, the same as last year but higher than the five-year average.

REGIONAL AVERAGE: WET GLUTEN



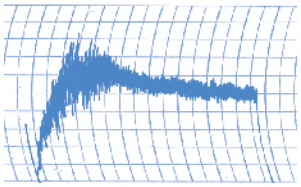
Average wet gluten content for the 2008 crop is 39.5 percent, slightly higher than last year and the five-year average.

REGIONAL AVERAGE: MIXOGRAM CLASSIFICATION



The regional average mixogram score is 5.2 (on a scale of 1 to 8), lower than last year and the five-year average.

REGIONAL AVERAGE MIXOGRAM



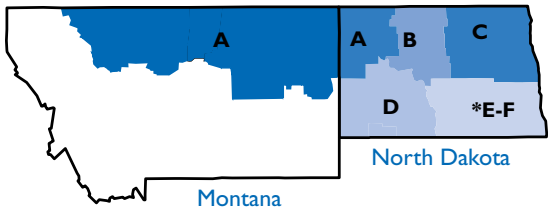
The 2008 crop has a 5.2 mixogram classification on a scale of 1 to 8. Reference on pg 15.

Semolina Quality Data

STATE AND CROP REPORTING AREA	TOTAL EXTRACTION %	SEMOLINA EXTRACTION %	ASH %	SPECKS NO/10 SQ IN	PROTEIN %	WET GLUTEN %	GLUTEN INDEX %	MIXOGRAM[1] CLASSIFICATION SCALE 1-8
MONTANA								
State Avg. 2008	65.5	60.5	0.63	17	13.8	39.2	34.0	6
State Avg. 2007	69.4	64.1	0.80	13	14.3	39.8	45.8	5
NORTH DAKOTA								
Area A	67.7	61.4	0.62	23	13.7	39.3	48.2	5
Area B	68.7	62.4	0.61	23	13.8	38.8	37.5	5
Area C	70.7	64.1	0.65	27	12.1	33.8	37.1	5
Area D	63.9	58.7	0.72	20	15.2	43.1	34.7	5
State Avg. 2008	67.4	61.3	0.64	23	13.9	39.6	43.3	5
State Avg. 2007	69.6	63.7	0.76	25	13.8	39.1	48.5	5.5
TWO-STATE REGION								
Average 2008	67.1	61.1	0.64	22	13.9	39.5	41.4	5.2
Average 2007	69.6	63.8	0.76	23	13.9	39.2	48.0	5.4
5-Year Average	70.7	64.5	0.70	19	13.3	37.2	42.7	5.8

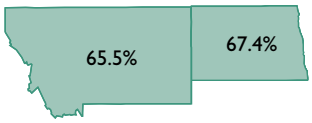
Note: All state and regional averages have been adjusted to reflect production differences.

[1]See reference mixograms for durum wheat on page 15.

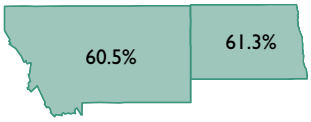


* E-F: No data was collected from this region due to limited production.

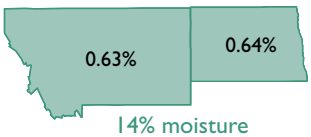
AVERAGE TOTAL EXTRACTION BY STATE



AVERAGE SEMOLINA EXTRACTION BY STATE

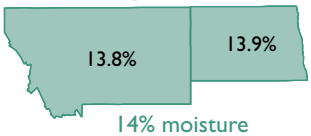


AVERAGE ASH CONTENT BY STATE



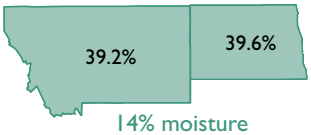
14% moisture

AVERAGE SEMOLINA PROTEIN CONTENT BY STATE



14% moisture

AVERAGE WET GLUTEN BY STATE



14% moisture

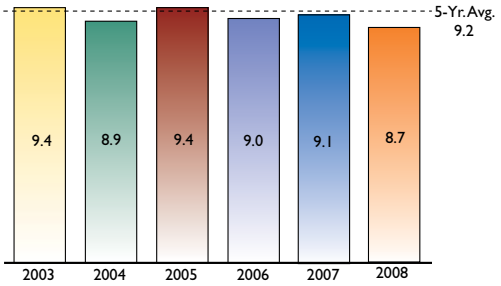
Pasta Characteristics

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.

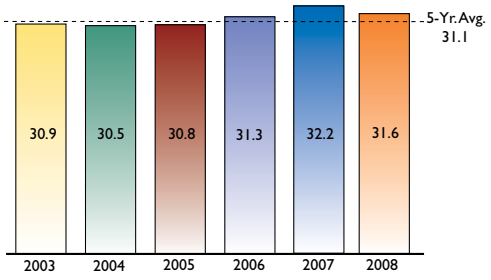
Most consumers prefer pasta that is **"AL DENTE,"** meaning it has some firmness to the bite. Good quality pasta that is cooked according to package directions should not be sticky or mushy when eaten.

REGIONAL AVERAGE: COLOR SCORE



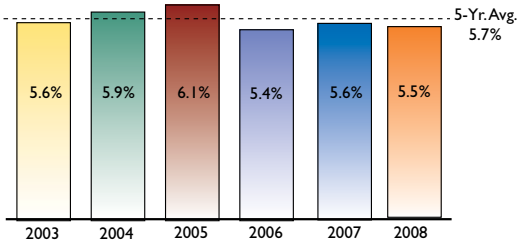
The regional average color score is 8.7 lower than last year and the five-year average. Pasta samples with scores of 8.0 or higher have good color.

REGIONAL AVERAGE: COOKED WEIGHT (grams)



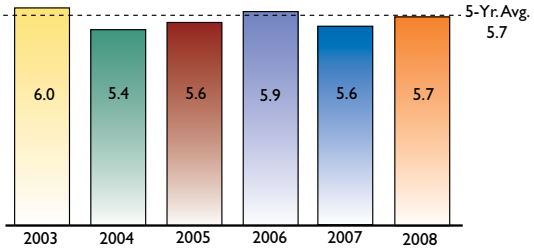
The regional average cooked weight is 31.6 grams, lower than last year, but higher than the five-year average.

REGIONAL AVERAGE: COOKING LOSS



The regional average cooking loss is 5.5 percent, lower than last year and the five-year average.

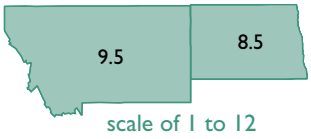
REGIONAL AVERAGE: COOKED FIRMNESS (g cm)



The regional average cooked firmness is 5.7 g cm, higher than last year, and the same as the five-year average.

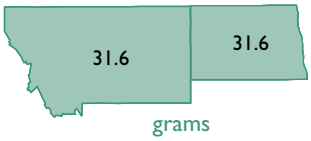
Photo credit: Wheat Foods Council

AVERAGE COLOR SCORE BY STATE



scale of 1 to 12

AVERAGE COOKED WEIGHT BY STATE



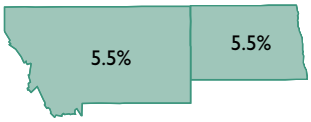
grams

Spaghetti Processing Properties

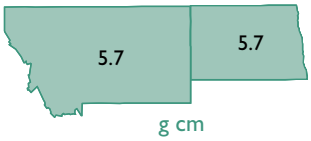
STATE AND CROP REPORTING AREA	COLOR SCORE (1-12)	COOKED WEIGHT G	COOKING LOSS %	COOKED FIRMNESS G CM
MONTANA				
State Avg. 2008	9.5	31.6	5.5	5.7
State Avg. 2007	9.0	32.2	5.6	5.4
NORTH DAKOTA				
Area A	8.5	31.9	5.6	5.3
Area B	8.5	30.9	5.3	6.1
Area C	8.5	31.6	6.1	5.3
Area D	8.5	31.2	5.3	6.4
State Avg. 2008	8.5	31.6	5.5	5.7
State Avg. 2007	9.2	32.1	5.6	5.6
TWO-STATE REGION				
Avg. 2008	8.7	31.6	5.5	5.7
Avg. 2007	9.1	32.2	5.6	5.6
Five-Year Avg.	9.2	31.1	5.7	5.7

Note: All state and regional averages have been adjusted to reflect production differences.

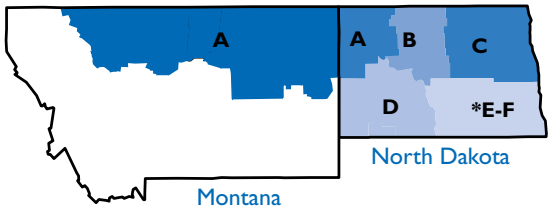
AVERAGE COOKING LOSS BY STATE



AVERAGE COOKED FIRMNESS BY STATE



g cm



* E-F: No data was collected from this region due to limited production.

Summary Information

Photo credit: David Lipp, Fargo, N.D.

Average Quality Factors for the Great Plains Durum Wheat Crop 2003-2008

	2003	2004	2005	2006	2007	FIVE-YEAR AVERAGE	2008
GRADING DATA							
Test Weight (lbs/bu)	61.0	61.7	60.8	59.9	59.9	60.7	60.2
(kg/hl)	79.4	80.3	79.2	78.0	78.0	79.0	78.4
Total Defects (%)	1.6	1.2	2.2	2.0	1.8	1.7	1.6
Vitreous Kernels (%)	92	89	91	90	95	91	83
Grade	1HAD	1HAD	1HAD	2HAD	2HAD	1HAD	1HAD
OTHER WHEAT DATA							
Dockage (%)	0.7	1.2	1.5	2.3	1.6	1.5	1.1
Protein: 12%	14.5	13.4	13.4	15.1	15.1	14.3	14.8
Moisture (%)	10.5	12.5	12.5	11.3	11.8	11.7	1.7
1000 Kernel Weight (gm)	33.8	40.2	35.5	33.2	33.8	35.3	35.0
Ash (%)	1.53	1.50	1.67	1.53	1.67	1.58	1.50
Falling Number (sec)	391	356	378	385	367	375	322
Sedimentation (mm)	51	49	45	55	52	50	49
SEMOLINA DATA							
Total Extraction (%)	68.8	71.2	73.1	70.7	69.6	70.7	67.1
Semolina Extraction (%)	62.9	64.3	66.4	65.1	63.8	64.5	61.1
Ash (%)	0.66	0.64	0.71	0.72	0.76	0.70	0.64
Specks (no/10 sq in)	12	20	19	21	23	19	22
Protein (%)	13.5	12.4	12.6	14.3	13.9	13.3	13.9
Wet Gluten (%)	37.2	35.0	35.0	39.5	39.2	37.2	39.5
Gluten Index (%)	42.7	43.7	45.4	56.7	48.0	42.7	41.4
Mixograph Classification	6.0	6.0	6.0	5.8	5.4	5.8	5.2
SPAGHETTI PROCESSING DATA							
Color Score (scale of 1-12)	9.4	8.9	9.4	9.0	9.1	9.2	8.7
Cooked Weight (gm)	30.9	30.5	30.8	31.3	32.2	31.1	31.6
Cooking Loss (%)	5.6	5.9	6.1	5.4	5.6	5.7	5.5
Cooked Firmness (g cm)	6.0	5.4	5.6	5.9	5.6	5.7	5.7

Export Cargo Sampling

Export Cargo Data

	2006	2007
SAMPLE COUNT	20	21
GRADING DATA		
Test Weight (lbs/bu)	61.1	61.0
Test Weight (kg/hl)	79.6	79.4
Damaged Kernels (%)	1.6	1.2
Foreign Material (%)	0.2	0.2
Shrunken & Broken (%)	1.5	1.7
Total Defects (%)	3.3	3.0
Vitreous Kernels (%)	83.2	85.8
Grade	2HAD	2HAD
OTHER WHEAT DATA		
Dockage (%)	0.5	0.5
Moisture (%)	11.9	11.9
Protein: 12% Moisture (%)	14.4	14.7
Protein: Dry (%)	16.4	16.7
Ash: 14% Moisture (%)	1.60	1.65
Ash: Dry (%)	1.86	1.92
1000 Kernel Weight (g)	34.7	34.7
Kernel Size (%) lg/md/sm	35/57/8	27/61/10
Falling Number (sec)	436	419
SEMOLINA DATA		
Total Extraction (%)	71.2	71.5
Semolina Extraction (%)	64.4	64.7
Ash: 14% Moisture (%)	0.69	0.71
Ash: Dry (%)	0.80	0.82
Specks (no/10 sq in)	26	25
Protein: 14% Moisture (%)	13.2	13.8
Protein: Dry (%)	15.4	16.0
Gluten Index (%)	50	50
Mixograph Classification (scale of 1-8)	5.7	5.4
Color: L (white-black)	85.2	84.7
a (red-green)	-2.5	-2.4
b (yellow-blue)	26.3	27.0
SPAGHETTI PROCESSING DATA		
Color Score (scale of 1-12)	8.8	8.5
Cooked Weight (gm)	32.2	32.6
Cooking Loss (%)	5.5	5.6
Cooked Firmness (g cm)	5.4	6.0

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 an 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. 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 sublot 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.

Photo credit: USDA Agricultural Research Service

Laboratory Analysis

Photo credit: North Dakota State University

All quality data contained in this report is the result of testing and analysis conducted by or under the supervision of Dr. Frank A. Manthey, associate professor and Reena Dash and Nancy Hillen, food technologists 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 the first week of August when approximately 5 percent of North Dakota's durum crop had been harvested and continued until mid-September when harvest was mostly complete. A total of 225 samples were collected during harvest from Montana (55) and North Dakota (170).

ANALYSIS • Half of the total wheat samples collected were analyzed for grade and other physical kernel characteristics. The data obtained from the analyses were 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 five areas in North Dakota and one composite 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 (AAC) 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.

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).

REFERENCE MIXOGRAMS FOR DURUM WHEAT

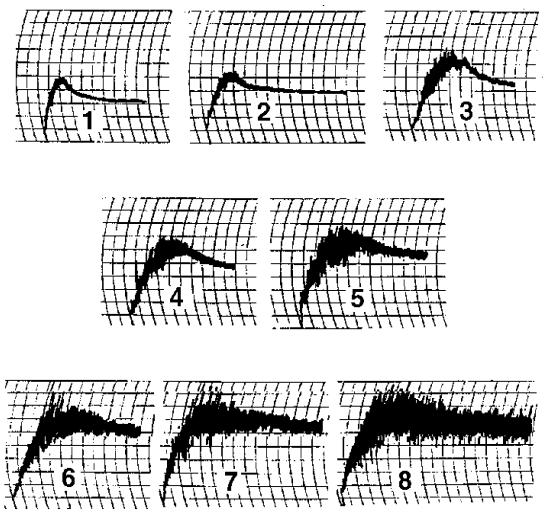


Photo credit: USDA Agricultural Research Service

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 plexiglass tooth attached to a Texture Analyzer (Model TA-XT2, Texture Technology Corp., Scarsdale, New York).

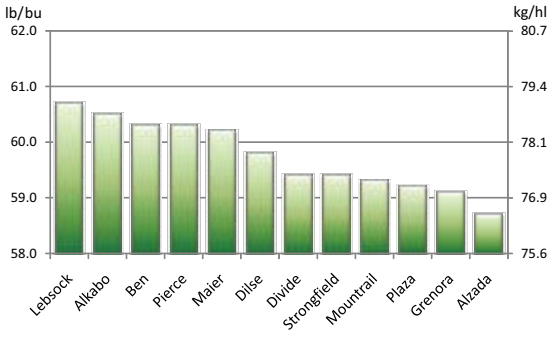
Varietal Information

Photo credit: Bernard Anderson, Warwick, N.D.

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. A public plant breeder 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, it must meet 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.

Traditionally, northern grown durum is known for its high protein content, good "yellow" color and high semolina extraction.

TEST WEIGHT COMPARISON



WHEAT PROTEIN CONTENT COMPARISON (12% MOISTURE CONTENT)

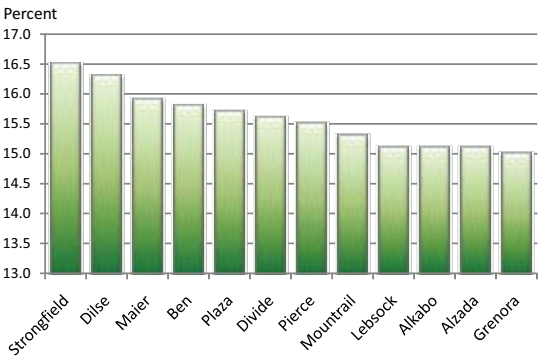


Photo credit: David Lipp, Fargo, N.D.

Varietal Information

Popular and New Durum Wheat Varieties

GROWN & TESTED IN NORTH DAKOTA • AGRONOMIC FACTORS											
			AGRONOMIC DESCRIPTION		REACTION TO DISEASE[2]			AVERAGE YIELD			
								EASTERN[3] NORTH DAKOTA		WESTERN[4] NORTH DAKOTA	
VARIETY	AGENT[1] OR ORIGIN	YEAR RELEASED	STRAW STENGTH	MATURITY	LEAF RUST	FOLIAR DISEASE	HEAD (SCAB)	BU/ACRE	MT/HA	BU/ACRE	MT/HA
Alkabo	ND	2005	v. strg.	med.	R	M	MS	68.5	4.61	36.0	2.42
Alzada	WB	2004	strg.	early	n/a	n/a	n/a	n/a	n/a	33.5	2.25
Ben	ND	1996	strg.	med.	R	MR	S*	67.4	4.53	32.6	2.19
Dilse	ND	2002	strg.	late	R	M	MS	70.4	4.73	30.0	2.02
Divide	ND	2005	strg.	med.	R	M	MR	71.5	4.81	33.6	2.26
Grenora	ND	2005	strg.	med.	R	M	MS	72.6	4.88	35.5	2.39
Lebsock	ND	1999	strg.	med.	R	M	MS	72.5	4.87	32.1	2.16
Maier	ND	1998	strg.	m-late	R	M	S*	71.5	4.81	32.2	2.16
Mountrail	ND	1998	strg.	late	R	M	S*	67.7	4.55	34.8	2.34
Pierce	ND	2001	m. strg.	med.	R	MS	S	65.0	4.37	31.1	2.09
Strongfield	CAN	2004	med.	med.	R	MS	n/a	60.8	4.09	31.1	2.09

Source: 2008 North Dakota Durum Wheat Variety Performance Descriptions

1 ND–North Dakota State University, WB–Westbred. CAN-Canada

2 Reaction to Disease: resistant (R), moderately resistant (MR), intermediate (M), moderately susceptible (MS), susceptible (S), very susceptible (VS). *Indicates yield and/or quality have often been higher than would be expected based on visual head blight symptoms alone.

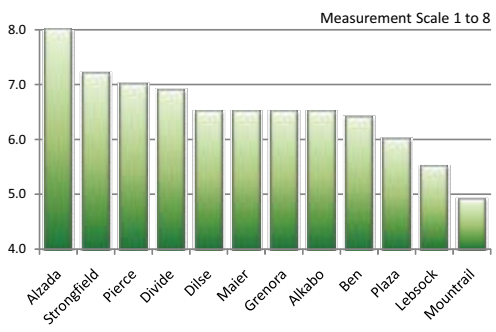
3 2006-08 data from Prosper, Carrington and Langdon locations in North Dakota.

4 2006-08 data from Williston, North Dakota.

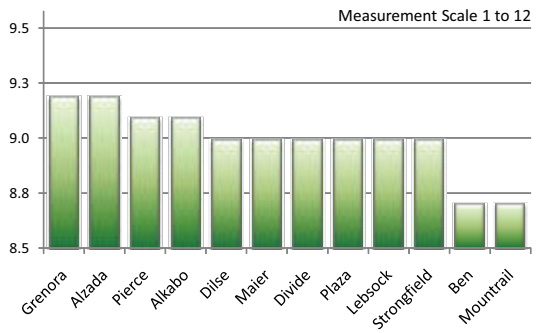
5 Based on NDSU Durum Quality Lab testing of samples grown at multiple North Dakota locations during 2006-2007.

6 Based on kernel attributes, milling and semolina processing, pasta color, and spaghetti cooking performance.

MIXOGRAPH COMPARISON



PASTA COLOR COMPARISON



Note: This data is based on testing from multiple North Dakota growing locations during the 2006-2007 seasons.

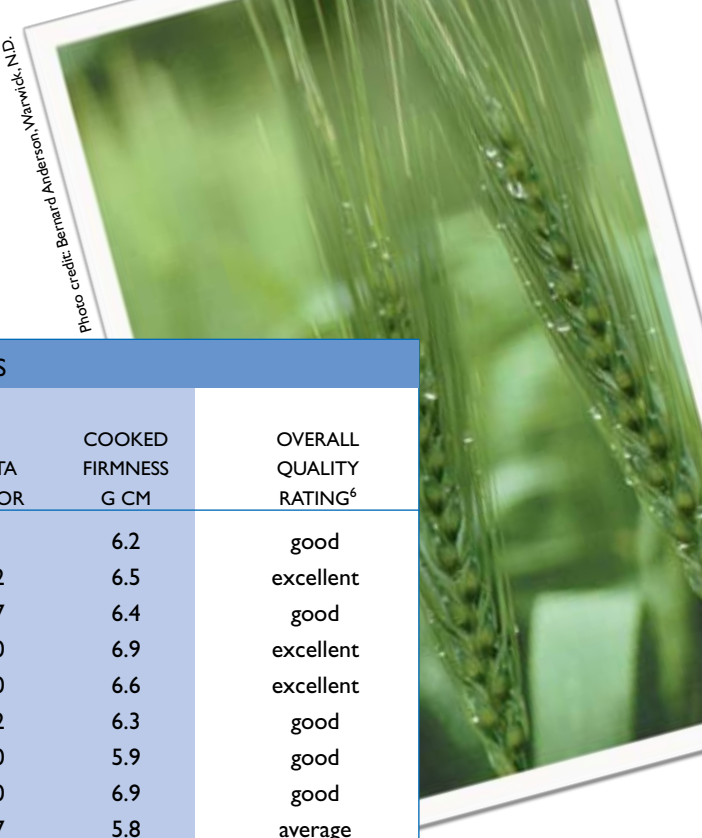


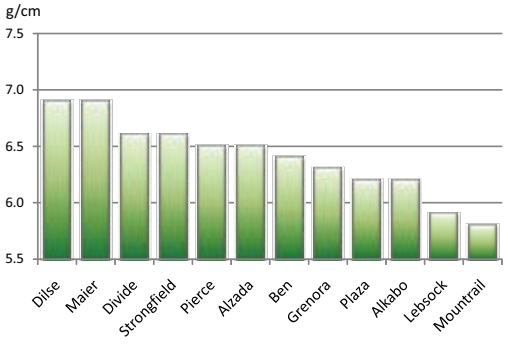
Photo credit: Bernard Anderson, Warwick, N.D.

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

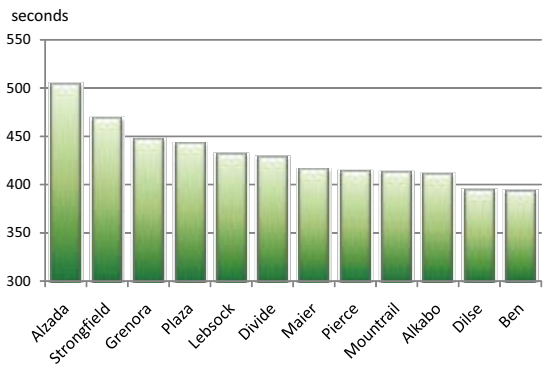
	QUALITY FACTORS[5]							
VARIETY	TEST WEIGHT LB/BU	TEST WEIGHT KG/HL	WHEAT PROTEIN %	WHEAT FALLING# SECONDS	MIXOGRAM SCORE (SCALE 1-8)	PASTA COLOR	COOKED FIRMNESS G CM	OVERALL QUALITY RATING[6]
Alkabo	60.5	78.8	14.8	410	6.5	9.1	6.2	good
Alzada	58.7	76.5	14.8	504	8.0	9.2	6.5	excellent
Ben	60.3	78.5	15.4	393	6.4	8.7	6.4	good
Dilse	59.8	77.9	15.9	394	6.5	9.0	6.9	excellent
Divide	59.4	77.4	15.2	428	6.9	9.0	6.6	excellent
Grenora	59.1	77.0	14.7	447	6.5	9.2	6.3	good
Lebsock	60.7	79.1	14.8	431	5.5	9.0	5.9	good
Maier	60.2	78.4	15.5	415	6.5	9.0	6.9	good
Mountrail	59.3	77.2	15.0	412	4.9	8.7	5.8	average
Pierce	60.3	78.5	15.1	413	7.0	9.1	6.5	excellent
Strongfield	59.4	77.4	16.1	468	7.2	9.0	6.6	excellent

Photo credit: David Lipp, Fargo, N.D.

COOKED FIRMNESS COMPARISON



WHEAT FALLING NUMBER COMPARISON



Environment influences the quailty 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 usually test and analyze quality data from multiple years and growing locations before a variety is released.

Breeders are working toward future varieties that have enhanced color and gluten strength, all important quality factors for end-users.

NORTH DAKOTA

Leading durum varieties planted in North Dakota in 2008 are Lebsock, Mountrail, Ben and Divide according to the June survey conducted by USDA's North Dakota Agricultural Statistics Service. The top three varieties lost acreage compared to last year, but combined still account for nearly 65 percent of acreage. Some of the newer released varieties made gains, taking away acreage from the top three.

LEBSOCK, a 1999 NDSU release remained the top variety in North Dakota for the fifth straight year with 27 percent of acres. It is also a top ten variety in Montana. Lebsock enjoys broad appeal across North Dakota due to its good disease tolerance, high test weights and high yields. Along with desirable agronomic traits, Lebsock has good end-use quality.

DIVIDE, a 2005 release, saw the biggest gain in acreage in North Dakota, increasing from 2 to 8 percent of acres, making it the number four variety. Divide has an excellent disease package, including some tolerance to scab, good test weights and yields and excellent end-use quality. Divide is also gaining popularity as a top variety in Montana.

PIERCE dropped in acreage this year, falling to the fifth place spot. It accounted for 7.5 percent of acres compared to 13 percent last year. It has excellent end-use quality and strong agronomic traits.

GRENORA another newer released variety, made the top ten this year, accounting for 4 percent of acres, up from less than one percent in 2007. It has good agronomic characteristics as well as good end-use quality.

DURUM WHEAT VARIETIES PLANTED ACRES IN NORTH DAKOTA

VARIETY	2007 %[1]	2008 %[1]	2008 ACRES (1,000)
Lebsock	28.3	26.7	454.2
Mountrail	23.8	21.0	357.7
Ben	11.7	10.3	174.6
Divide	1.7	7.6	129.6
Pierce	13.1	7.5	126.8
Grenora	0.4	3.9	65.8
Maier	2.3	3.8	64.3
Kyle	3.0	2.7	46.0
Dilse	3.8	2.6	43.7
Alkabo	0.7	2.2	36.9
Grande D'Oro	1.3	1.3	22.2
Plaza	1.4	1.3	21.8
Other[2]	8.5	9.2	156.4
All Varieties	100.0	100.0	1,700.0[3]

1/ Percentages may not add to 100 due to rounding.
2/ Other includes other varieties not listed and unknown varieties.
3/ Based on June 2008 survey. September 30, 2008 estimate remains 1.8 million acres.

NORTH DAKOTA AGRICULTURAL STATISTICS DISTRICTS 2008 PLANTED AREA (1,000 ACRES)

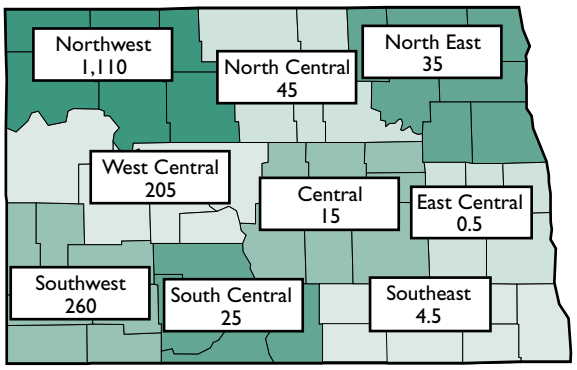


Photo credit: North Dakota Mill

Photo credit: David Lipp, Fargo, N.D.

DURUM WHEAT VARIETIES IN NORTH DAKOTA
SHARE OF 2008 PLANTINGS BY CROP DISTRICT

VARIETY	NORTH WEST	NORTH CENTRAL	NORTH EAST	WEST CENTRAL	CENTRAL	EAST CENTRAL	SOUTH WEST	SOUTH CENTRAL	SOUTH EAST	TOTAL STATE
					PERCENTAGE (%)[1]					
Lebsock	27.3	27.8	22.3	33.9	15.3	0.0	21.2	0.0	100.0	26.7
Mountrail	29.6	0.0	0.0	9.4	0.0	0.0	3.7	0.0	0.0	21.0
Ben	4.6	0.0	0.0	4.1	25.3	0.0	42.2	5.6	0.0	10.3
Divide	7.7	20.7	27.1	7.7	18.0	0.0	2.5	0.0	0.0	7.6
Pierce	6.1	3.3	3.1	21.8	0.0	0.0	3.5	10.4	0.0	7.5
Grenora	4.7	0.2	6.0	5.2	0.0	0.0	0.5	0.0	0.0	3.9
Maier	2.3	0.0	0.0	2.5	0.0	0.0	8.3	47.2	0.0	3.8
Kyle	4.1	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	2.7
Dilse	1.9	5.1	0.0	0.7	0.0	0.0	7.0	2.0	0.0	2.6
Alkabo	1.5	0.0	0.0	0.0	0.0	0.0	7.8	0.0	0.0	2.2
Grande D'Oro	1.1	13.8	3.1	0.0	6.0	0.0	0.0	5.6	0.0	1.3
Plaza	0.1	0.0	0.0	9.9	0.0	0.0	0.0	0.0	0.0	1.3
Other[2]	8.9	29.1	38.3	5.0	35.3	100.0	3.2	29.2	0.0	9.2
					1,000 ACRES					
All Varieties	1,110	45	35	205	15	0.5	260	25	4.5	1,700[3]

1/ Percentages may not add to 100 due to rounding.
2/ Other includes other varieties not listed and unknown varieties.
3/ Based on June 2008 survey for district level data. Total acres in September 30, 2008 small grains estimate are 1.8 million acres.

MONTANA

A survey conducted by USDA's Montana Agricultural Statistics Service shows the top planted varieties of durum wheat are Mountrail, Kyle, Strongfield and Alzada. The top four varieties account for 70 percent of acres.

MOUNTRAIL has been the most popular variety in Montana for the past five years. In 2008 it accounted for 39 percent of acres. The variety, a 1998 release, remains popular due to its high yields, especially in northeast Montana and northwest North Dakota. Mountrail is rated average for end-use quality.

KYLE remains the second ranked variety in Montana with 14 percent of acres, down from 15 percent in 2007. Kyle has good end-use quality with competitive yields, but is a tall variety with weak straw.

STRONGFIELD is the number three variety with just over 8 percent of acres, and it made the largest gain in acres on a percentage basis. Strongfield is a 2004 release from Canada that shows good disease tolerance and good overall quality, but is slightly lower yielding.

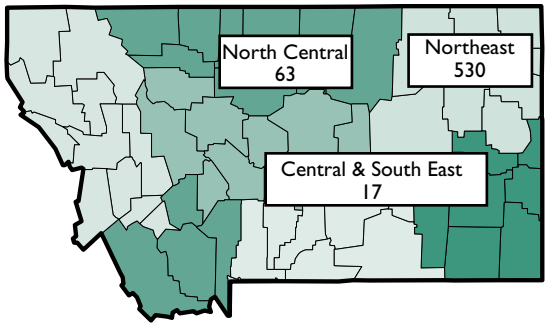
ALZADA remains the number four variety with 8 percent of acres. Alzada is a 2004 release from Westbred, LLC that is noted for its excellent quality which produces a bright yellow semolina.

DURUM WHEAT VARIETIES PLANTED ACRES IN MONTANA

VARIETY	2007 %[1]	2008 %[1]	2008 ACRES (1,000)
Mountrail	44.8	39.3	239.6
Kyle	15.4	14.1	86.0
Strongfield	1.2	8.4	51.1
Alzada	5.1	8.0	48.8
Lebsock	12.3	5.7	35.0
Grenora	0.6	3.8	23.3
Divide	0.7	3.7	22.4
Pierce	5.3	2.3	14.3
Grande D'Oro	1.9	2.1	12.7
Monroe	1.3	2.0	12.2
Alkabo	0.0	1.5	9.0
AC Avonlea	1.0	1.1	6.6
Other & Unknown[2]	10.4	8.0	49.0
All Varieties	100.0	100.0	610.0[3]

1/ Percentages may not add to 100 due to rounding.
2/ Other includes other varieties not listed and unknown varieties.
3/ June MASS estimates. Final September estimate is 590,000 acres.

MONTANA AGRICULTURAL STATISTICS DISTRICTS 2008 PLANTED AREA (1,000 ACRES)



DURUM WHEAT VARIETIES IN MONTANA SHARE OF 2008 PLANTED ACRES BY CROP DISTRICT

VARIETY	NORTH CENTRAL	NORTH EAST	CENTRAL & SOUTH EAST	TOTAL STATE
	PERCENTAGE (%)[1]			
Mountrail	0.0	45.2	0.0	39.3
Kyle	13.7	14.6	0.0	14.1
Strongfield	0.3	9.6	0.0	8.4
Alzada	62.6	1.3	14.7	8.0
Lebsock	0.0	6.6	0.0	5.7
Grenora	0.0	4.4	0.0	3.8
Divide	1.1	4.1	0.0	3.7
Pierce	0.0	2.7	0.0	2.3
Grand D'Oro	0.0	2.4	0.0	2.1
Monroe	0.0	1.8	16.1	2.0
Alkabo	0.0	1.7	0.0	1.5
AC Avonlea	1.3	1.1	0.0	1.1
Other[2]	21.0	4.5	69.2	8.0
	1,000 ACRES			
All Varieties	63	530	17	610[3]

1/ Percentages may not add to 100 due to rounding.
2/ Other includes other varieties not listed and unknown varieties.
3/ June MASS estimates. Final September 30, 2008 small grains estimate is 590,000 acres.

Handling & Transportation

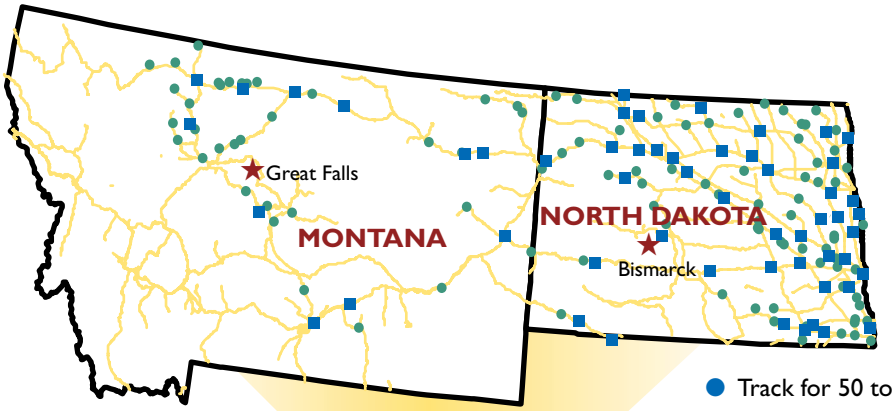
The durum wheat growing region in the Northern Plains has a vast network of country elevators to facilitate efficient and precise movement to domestic and export markets. On average, nearly 80 percent of the region's wheat moves to markets by rail. Duluth is the only export market easily serviced by 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.

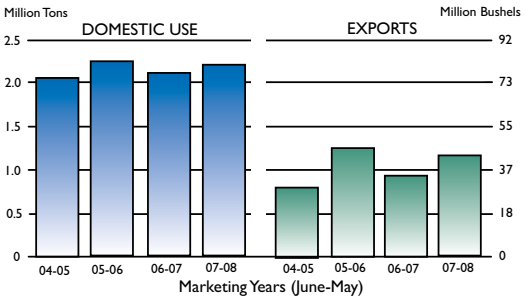
The diverse rail shipping capacities and widespread network of elevators are strengths buyers can capitalize on, especially as their demand heightens for more precise quality specifications and consistency between shipments. Buyers are increasingly exploring origin-specific shipments. Many international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

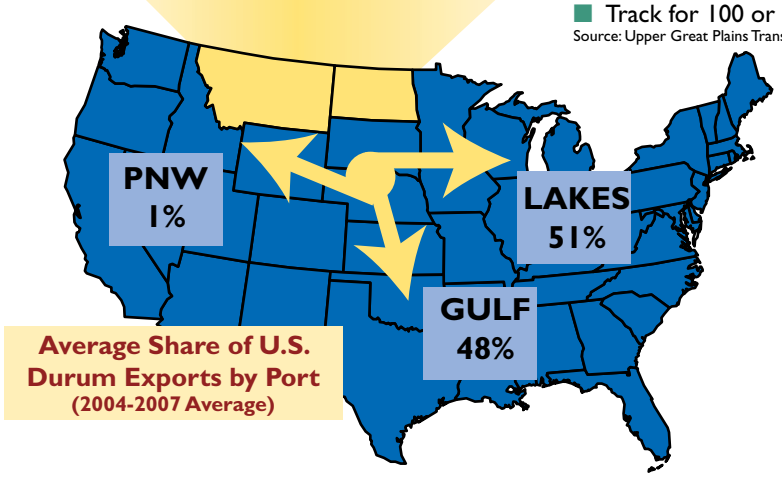
The rail and elevator network in the U.S. northern grown durum region is well suited for meeting the increasing quality demands of both domestic and international customers.

Grain Handling and Transportation Facilities in the U.S. Northern Grown Durum Region



2004-2007 U.S. DURUM DOMESTIC USE & EXPORTS





Average Share of U.S. Durum Exports by Port
(2004-2007 Average)

FUNDING & SUPPORT

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