



2025

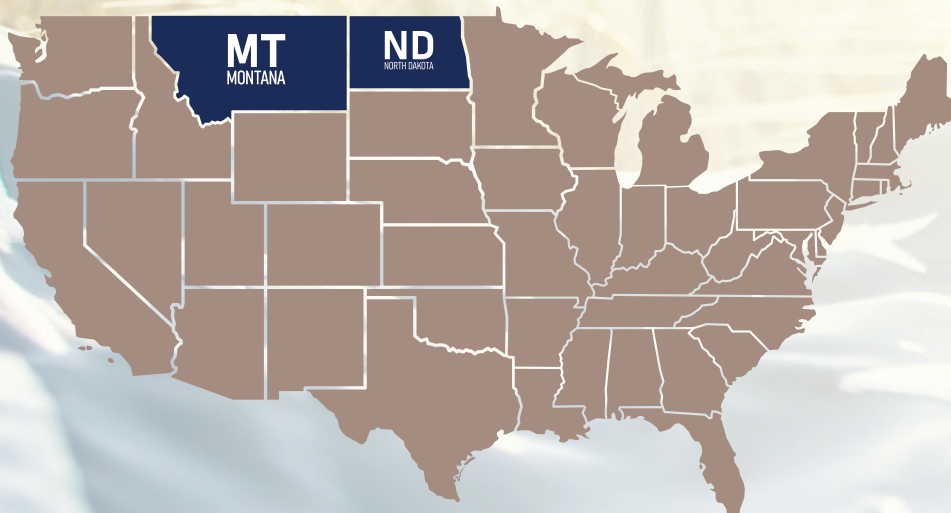
U.S. DURUM WHEAT

REGIONAL QUALITY REPORT

U.S. Durum

Wheat

MONTANA
NORTH DAKOTA



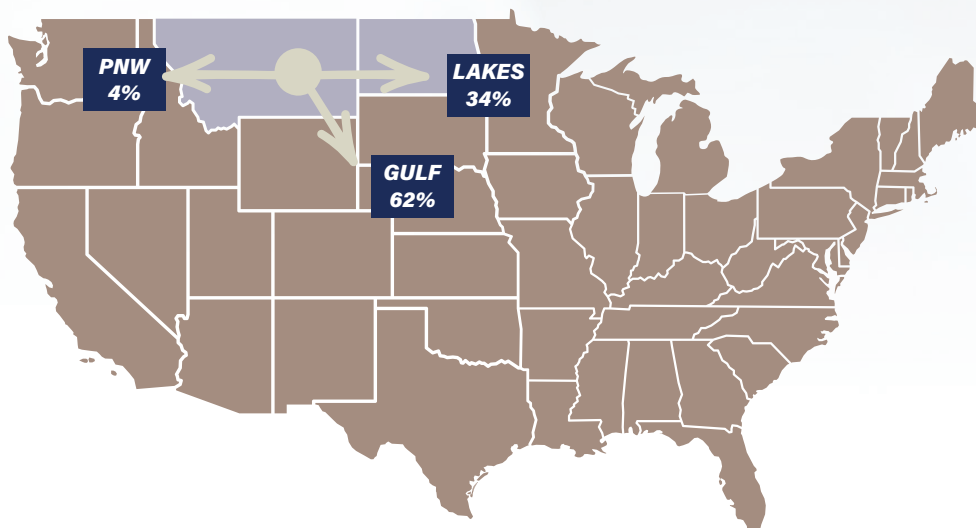
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MAKING PREMIUM PASTA

- 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. Du-
- rum 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. In most years, the states of North Dakota and
- Montana produce 80 percent of the U.S. durum crop.

AVERAGE SHARE OF U.S. DURUM EXPORTS BY PORT (2021-2024)



MONTANA | NORTH DAKOTA |

OVERVIEW

Production of the 2025 Northern Durum crop was up 11% due in large part to a 7% increase in acreage and above average yields. Despite dry conditions throughout most of the growing season, yields in Montana were better than expected and above both last year's value and the five-year average. Yields in North Dakota were above average, but did dip slightly below last year's record setting levels. Planting began early and continued at an average pace with a few delays from rainfall. The early season precipitation was extremely beneficial. While conditions remained drier than normal, prolonged periods of heat stress were not prevalent this growing season, which helped sustain the crop. Harvest was delayed off and on by rainfall. The last 15% or so of the durum crop is not represented in the crop quality data due to harvest delays.

2025 PRODUCTION DATA

	2025	2024	2020-24 AVERAGE
MILLION BUSHELS			
Montana	25.5	19.8	19.2
North Dakota	53.2	51.5	33.9
U.S. Total	86.2	80.1	61.5
MILLION METRIC TON			
Montana	0.69	0.54	0.52
North Dakota	1.45	1.40	0.92
U.S. Total	2.34	2.18	1.67

Source: USDA 2025 Small Grains Summary

The crop **GRADES** a No. 1 Hard Amber Durum with about 40% of the samples reaching the top grade. Distribution data shows a wider variance in grades this year due to weather impacts. Test weights were strong with the average at 61.9 pounds per bushel (80.2 kg/hl). Average damage of 1.8% is elevated compared to last year and a product of weather impacts. Vitreous kernel levels are similar to those last year at 84% with some samples showing much lower levels due to rainfall at maturity/harvest. Moisture, at 11.6% is lower than last year, but higher than average due to wetter conditions at harvest.

PROTEIN is similar to last year at 14.2% and distribution data shows a more even distribution of protein in the 13 to 15% range, with fewer samples having protein above 15%. Thousand kernel weight is substantially higher than last year at 43.6 grams, due to better growing conditions without extended heat stress. A notable change in this year's crop is the lower average falling number value of 325 seconds, compared to 427 on average. The wet harvest conditions produced lower falling number values in some samples. Distribution data shows the majority of the crop is above 300 seconds, but a smaller portion exceeds 400 seconds. About 21% of the crop has falling number values below 300 seconds. DON values are slightly higher this year, due to isolated areas that experienced disease pressure, primarily in eastern growing regions. The overall average of 0.56 ppm is well below commercial grade specifications.

MILLING for the 2025 survey samples was performed on a Quadromat Junior mill, similar to the last five years, and is not indicative of commercial milling performance. Semolina extraction at 58.8% is slightly lower than last year, but still above the five-year average. The semolina b-value shows lower than last year at 28.6. Ash is lower than last year at 0.61% and speck counts are higher. Protein in the semolina averaged 12.3%, the same as last year.

DOUGH STRENGTH parameters indicate strength very similar to last year and what is typical of an average durum crop. Dry spaghetti evaluations show improved characteristics compared to last year with increased cooked weight compared to last year and the average, lower cooking loss and increased cooked firmness. Dry spaghetti evaluations reveal a crop with slightly lower color scores.

The 2025 crop has many positive attributes including high protein, a high grade profile, strong test weights and thousand kernel weights, and a crop with good pasta quality performance. As is normal for most crop years, buyers should be aware of variance in all quality parameters, especially grades, falling numbers, vitreous kernel content, and damage and adjust contract specifications as needed. The performance of the crop is typical of an average Northern Durum crop and should meet buyers' specifications.

U.S. Durum

Wheat

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SEASONAL CONDITIONS

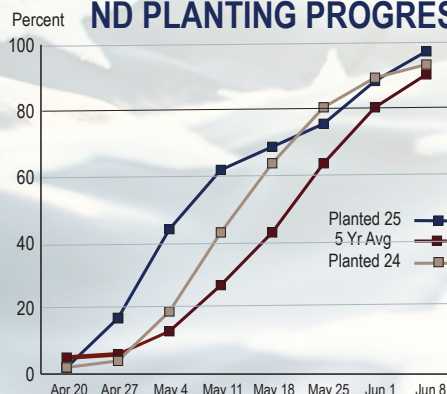
PLANTING of the Northern durum crop started earlier than normal due to lower than average winter snowfall and mostly dry conditions. Planting continued at a faster than average pace throughout the spring. Rainfall mid-planting did delay progress, but was appreciated as it replenished dry soils. The majority of the crop was planted by the first week of June.

Early **EMERGENCE** of the crop was delayed some due to a period of cooler conditions, but eventually progressed ahead of average. Dry conditions prevailed throughout much of the growing season. The rains during planting and the early growing season were instrumental in sustaining the crop, although crop conditions declined later in the growing season due to lack of moisture. In Montana, rainfall was absent much of the growing season leading to lower than average condition ratings. Disease pressure was minimal due to dry conditions.

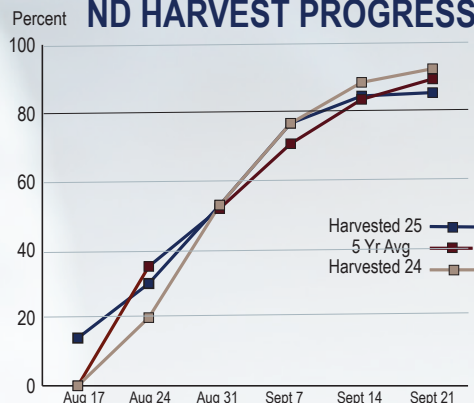
HARVEST of the durum crop was slow to start due to rainy weather and high humidity that delayed maturity of the crop and caused harvest delays. Drier conditions mid-August allowed the pace to pick up and producers had good harvest conditions for a few weeks. Wet conditions returned near the end of harvest and caused harvest delays on the last portion of the crop and impacted quality.

PRODUCTION of this year's crop is slightly higher than last year at 86 million bushels due to greater planted acreage and higher overall yields. Despite dry conditions, yields in Montana were generally higher than last year and slightly above average. Yields in North Dakota were marginally lower than the previous year's record yields, but still above the average.

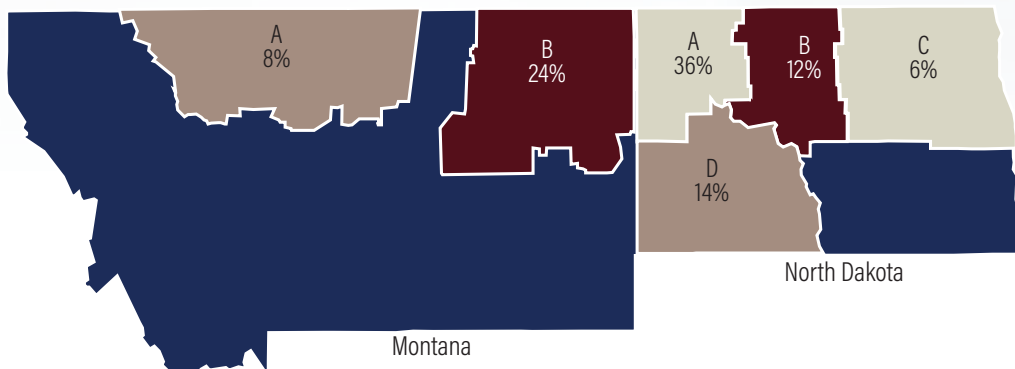
ND PLANTING PROGRESS



ND HARVEST PROGRESS



APPROXIMATE SHARE OF REGIONAL PRODUCTION



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 as separate marketing factor based on the number of kernels that are dark, hard and vitreous. 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.

2025 PRODUCTION DATA

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	0.0	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	3.0	5.0	8.0	12.0	20.0
Wheat of other class ²					
Contracting classes	1.0	2.0	3.0	10.0	20.0
Total ¹	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 ¹	4	4	4	4	4
Insect-damaged kernels	31	31	31	31	31

U.S. sample grade is wheat that:

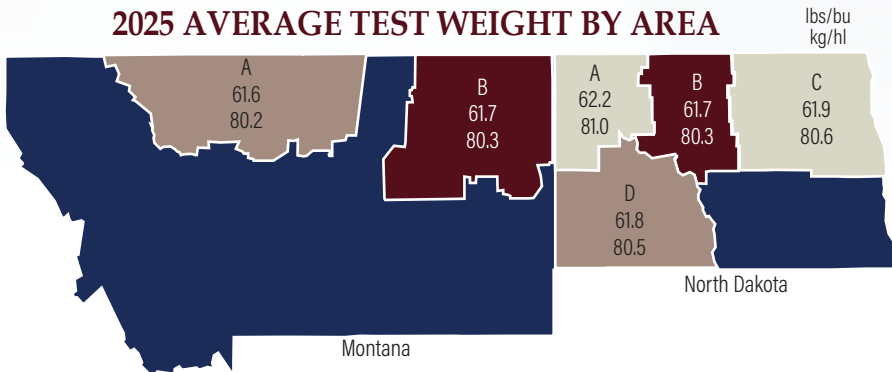
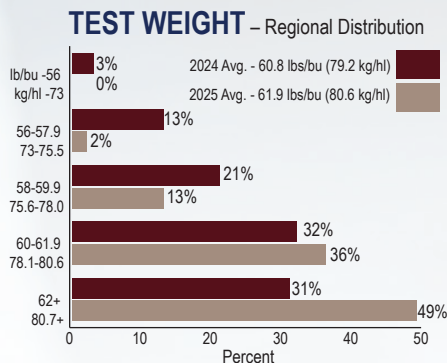
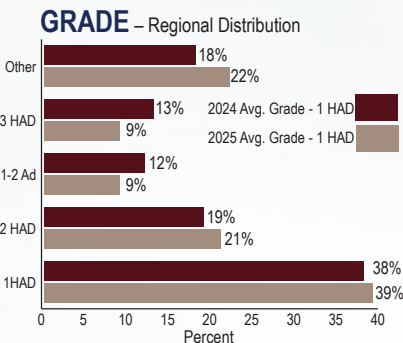
- Does not meet the requirements for U.S. Nos. 1, 2, 3, 4 or 5; or
- Has a musty, sour or commercially objectionable foreign odor (except smut or garlic odor); or
- Is heating or of distinctly low quality.
 - Includes damaged kernels (total), foreign material and shrunken and broken kernels.
 - Unclassed wheat of any grade may contain not more than 10.0 percent of wheat of other classes.
 - Includes contrasting classes.
 - Includes any combination of animal filth, castor beans, crotalaria seeds, glass, stones or unknown foreign substance.

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2025 WHEAT GRADING DATA								
	TEST WEIGHT			SHRUNKEN/BROKEN	TOTAL	CONTRASTING		VITREOUS
STATE AND CROP REPORTING AREA	LBS/BU	KG/HL	DAMAGE %	KERNELS %	DEFECTS %	CLASSES %	U.S. GRADE SUBCLASS	KERNELS %
MONTANA								
Area A	61.6	80.2	0.4	0.3	0.9	1.9	1 HAD	89
Area B	61.7	80.3	1.6	0.5	2.1	0.0	1 HAD	91
State Avg. 2025	61.7	80.3	1.3	0.5	1.8	0.5	1 HAD	91
State Avg. 2024	59.0	76.9	0.6	0.9	1.6	0.2	2 HAD	84
NORTH DAKOTA								
Area A	62.2	81.0	1.5	0.6	2.1	0.0	1 HAD	80
Area B	61.7	80.3	2.5	0.2	2.7	0.0	2 HAD	87
Area C	61.9	80.6	2.4	0.3	2.7	0.0	2 HAD	82
Area D	61.8	80.5	3.1	0.6	3.7	0.0	2 HAD	75
State Avg. 2025	62.0	80.7	2.1	0.5	2.6	0.0	2 HAD	80
State Avg. 2024	61.5	80.1	0.7	0.6	1.3	0.0	1 HAD	83
TWO-STATE AVERAGE								
Avg. 2025	61.9	80.6	1.8	0.5	2.3	0.2	1 HAD	84
Avg. 2024	60.8	79.2	0.6	0.7	1.4	0.1	1 HAD	83
Five-Year Avg	61.3	79.8	0.4	0.8	1.2	0.4	1 HAD	86



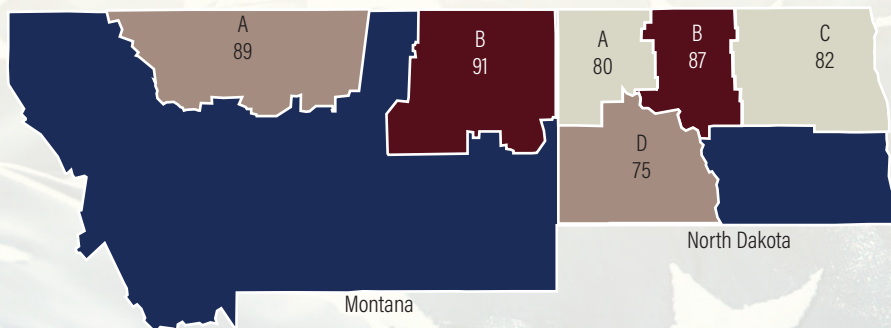
U.S. Durum

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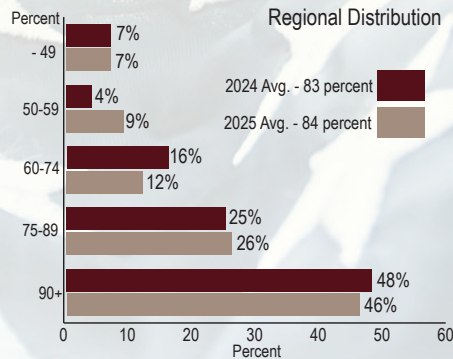
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2025 AVERAGE VITREOUS KERNEL BY AREA

Percent

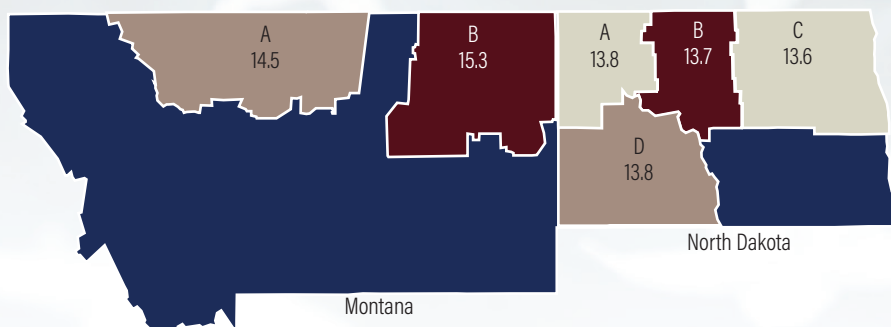


VITREOUS KERNEL



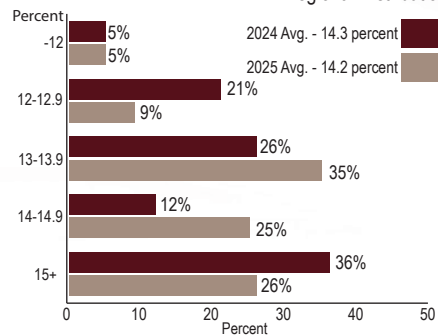
2025 AVERAGE PROTEIN BY AREA

12% Moisture Basis - Percent



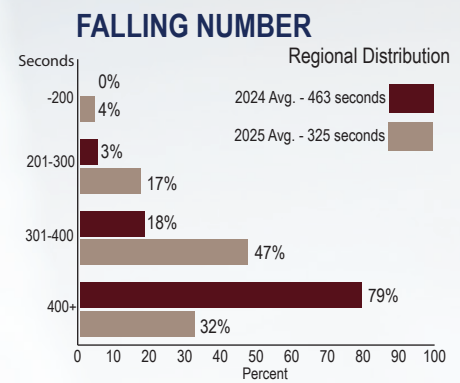
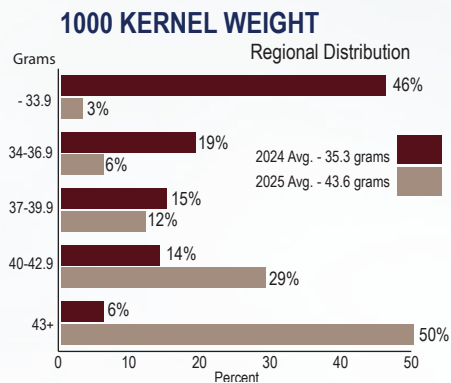
PROTEIN - 12% MOISTURE

Regional Distribution

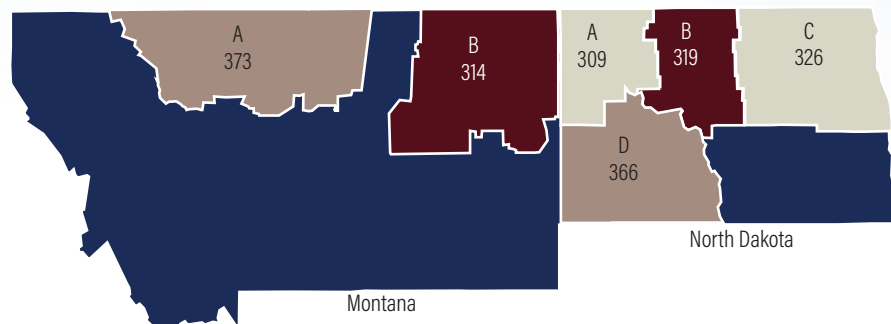


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2025 OTHER KERNEL QUALITY DATA									
STATE AND CROP REPORTING AREA	DOCKAGE %	MOISTURE %	1000 KERNEL WEIGHT G	KERNEL DIST. MED/LGE %	PROTEIN 12%/0% MOISTURE BASIS %	DON (PPM)	WHEAT ASH%	FALLING NUMBER (SEC)	MICRO SED (CC)
MONTANA									
Area A	0.7	10.1	470	25/73	14.5/16.5	0.12	1.45	373	96
Area B	0.9	11.1	41.2	41/57	15.3/17.4	0.07	1.53	314	84
State Avg. 2025	0.9	10.9	42.7	37/61	15.1/17.2	0.08	1.51	329	87
State Avg. 2024	0.9	11.6	30.8	66/25	16.5/18.8	0.13	1.60	506	82
NORTH DAKOTA									
Area A	0.1	11.9	45.3	30/68	13.8/15.7	0.65	1.57	309	75
Area B	0.7	12.2	43.9	32/67	13.7/15.6	0.81	1.52	319	79
Area C	1.1	12.2	43.7	38/60	13.6/15.5	1.10	1.52	326	77
Area D	0.8	11.5	41.0	39/59	13.8/15.7	0.96	1.63	366	75
State Avg. 2025	0.4	11.9	44.0	33/65	13.8/15.7	0.78	1.57	324	76
State Avg. 2024	0.8	12.4	37.1	48/48	13.5/15.3	0.32	1.58	447	78
REGION AVERAGE									
Avg. 2025	0.6	11.6	43.6	34/64	14.2/16.2	0.56	1.55	325	79
Avg. 2024	0.8	12.2	35.3	53/42	14.3/16.3	0.27	1.58	463	79
Five-Year Avg	0.9	11.2	40.9	49/47	14.2/16.2	0.10	1.58	427	72



2025 AVERAGE FALLING NUMBER BY AREA (Seconds)



MILLING CHARACTERISTICS

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 spec 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.

2025 SEMOLINA QUALITY DATA

SEMOLINA EXTRACTION & GLUTEN INDEX							GLUTOPEAK	
STATE AND CROP REPORTING AREA	SEMOLINA EXTRACTION %	ASH %	SPECKS NO/10 SQ IN %	PROTEIN (14% MOISTURE) %	WET GLUTEN %	GLUTEN INDEX	PEAK TIME SEC	MAX TORQUE BE
MONTANA								
Area A	58.5	0.63	25	12.6	35.4	94	207	48
Area B	57.2	0.61	35	13.2	37.6	76	120	55
State Avg. 2025	57.5	0.62	33	13.1	37.1	81	142	53
State Avg. 2024	56.8	0.72	18	14.0	35.9	86	136	54
NORTH DAKOTA								
Area A	59.3	0.61	33	11.9	34.4	78	164	43
Area B	59.4	0.56	35	11.9	32.5	87	158	42
Area C	59.1	0.60	33	11.8	31.5	91	141	39
Area D	59.7	0.63	35	11.9	32.1	85	180	44
State Avg. 2025	59.4	0.60	34	11.9	33.3	82	164	43
State Avg. 2024	62.2	0.66	28	11.7	30.1	90	164	43
REGION AVERAGE								
Avg. 2025	58.8	0.61	33	12.3	34.5	82	157	46
Avg. 2024	60.7	0.68	25	12.3	31.7	89	156	46
Five-Year Avg	55.9	0.65	26	12.6	33.5	81	168	43

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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.

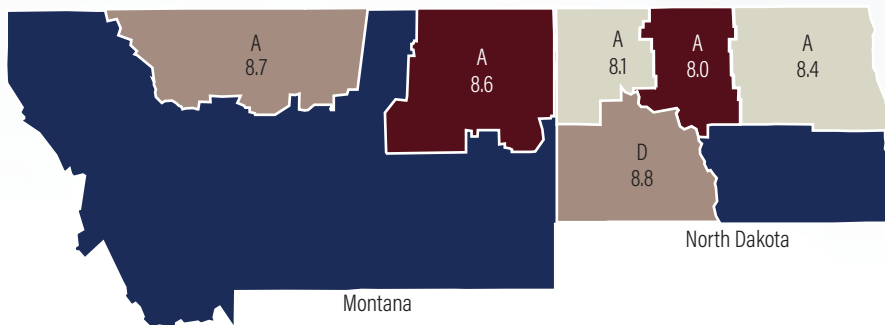
Yellow color in semolina and pasta is a traditional, rather than functional, mark of quality. In the early days of the pasta industry, before sophisticated testing evolved, consumers assumed that a yellow pasta was made from durum wheat, which is known to make pasta with superior cooking quality compared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

2025 SEMOLINA & SPAGHETTI DATA

STATE AND CROP REPORTING AREA	SEMOLINA COLOR L (BLACK-WHITE)	SEMOLINA COLOR A (GREEN-RED)	SEMOLINA COLOR B (BLUE-YELLOW)	SPAGHETTI COLOR L (BLACK-WHITE)	SPAGHETTI COLOR A (GREEN-RED)	SPAGHETTI COLOR B (BLUE-YELLOW)	SPAGHETTI COOKED WEIGHT G	SPAGHETTI COOKING LOSS %	SPAGHETTI COOKED FIRMNESS G CM
MONTANA									
Area A	80.8	-2.9	30.2	51.5	3.7	24.7	32.1	6.4	8.7
Area B	80.2	-2.7	28.8	49.8	3.8	22.8	32.0	6.6	8.6
State Avg. 2025	80.3	-2.7	29.2	50.2	3.8	23.2	32.0	6.6	8.6
State Avg. 2024	80.8	-2.8	30.4	51.1	3.6	23.5	29.9	6.8	75
NORTH DAKOTA									
Area A	81.3	-3.1	28.4	50.3	4.0	22.9	32.5	7.2	8.1
Area B	81.0	-3.0	28.0	51.3	3.9	23.2	32.3	7.3	8.0
Area C	81.3	-3.1	28.7	51.6	3.8	23.7	31.5	7.1	8.4
Area D	81.3	-3.1	28.9	51.5	3.8	23.1	31.1	6.8	8.8
State Avg. 2025	81.2	-3.1	28.5	50.9	3.9	23.1	32.1	7.1	8.2
State Avg. 2024	81.3	-3.2	29.9	52.2	3.0	23.9	30.1	7.3	6.3
REGION AVERAGE									
Avg. 2025	80.9	-3.0	28.7	50.7	3.9	23.1	32.1	6.9	8.4
Avg. 2024	81.1	-3.1	30.0	51.9	3.1	23.8	30.1	7.2	6.7
Five-Year Avg	83.0	-2.6	30.4	53.3	3.0	25.4	31.0	7.3	4.7

2025 AVERAGE COOKED FIRMNESS BY AREA (G CM)



2025 RECENT QUALITY TRENDS						
CROP YEAR	2025	2024	2023	2022	2021	FIVE-YEAR AVERAGE
GRADING AND WHEAT DATA						
Test Weight (lbs/bu)	61.9	60.8	61.3	61.8	60.5	61.3
Test Weight (kg/hl)	80.6	79.2	79.8	80.4	78.8	79.8
Total Defects (%)	2.3	1.4	1.0	1.1	1.2	1.2
Vitreous Kernels (%)	84	83	79	92	86	86
Grades	1 HAD	1 HAD	1 HAD	1 HAD	1 HAD	1 HAD
OTHER WHEAT DATA						
Dockage (%)	0.6	0.8	1.1	1.1	0.5	0.9
Protein: 12% moisture	14.2	14.3	14.2	13.7	15.5	14.2
1000 Kernel Weight (gm)	43.6	35.3	40.9	40.4	41.2	40.9
Moisture (%)	11.6	12.2	11.5	11.0	10.9	11.2
DON	0.56	0.27	0.0	<0.1	<0.1	0.10
Ash (%)	1.55	1.58	1.43	1.64	1.69	1.58
Falling Number (sec)	325	463	394	433	428	427
Sedimentation (cc)	79	79	81	61	79	72
Semolina Data						
**Semolina Extraction (%)	58.8	60.7	52.0	53.9	54.6	55.9
Ash (%)	0.61	0.68	0.63	0.64	0.65	0.65
Wet Gluten (%)	34.5	31.7	32.1	33.4	37.1	33.5
Gluten Index	82	89	91	72	81	81
Specks (no/10 sq in)	33	25	27	27	21	26
*Color: L (Black-white)	80.9	81.1	83.4	83.3	83.3	83.0
*a (green-red)	-3.0	-3.1	-2.5	-2.5	-2.3	-2.6
*b (blue-yellow)	28.7	30.0	30.1	31.2	30.4	30.4
Glutopeak						
Peak Time (sec)	157	156	179	180	165	168
Max Torque (be)	46	46	41	43	47	43
SPAGHETTI PROCESSING DATA						
Color: L (black-white)	50.7	51.9	53.3	53.8	53.1	53.3
a (green-red)	3.9	2.9	3.2	2.9	3.0	3.0
b (blue-yellow)	23.1	23.8	25.5	25.9	25.1	25.4
Cooked Weight (gm)	32.1	30.1	31.6	29.7	32.4	31.0
Cooking Loss (%)	6.9	7.2	7.3	6.7	8.0	7.3
Cooked Firmness (g cm)	8.4	6.7	3.9	4.5	4.8	4.7

* 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.

U.S.
Durum

Wheat

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NORTH DAKOTA

VARIETAL SUMMARY

Durum wheat production in the northern United States is concentrated in northwest North Dakota and northeast Montana, but also sees notable levels of production in north central Montana and southwest North Dakota. These are the primary target areas for durum breeding programs that develop varieties for growers, but focus is also given to the more fringe production areas in the two-state region, as on occasion, central and eastern areas of North Dakota also grow durum.

The public durum breeding program at North Dakota State University in Fargo, North Dakota is the largest in the U.S., and varieties developed in that program account for the majority of durum acres in the northern United States. Montana State University also has a major durum breeding program, and has begun to release varieties to growers. A few private breeding programs are involved in durum variety development, but the scope of those programs remains relatively small, especially when compared to other classes of wheat in the United States.

Top priorities for durum breeders in the northern United States are high yield potential, high protein content, high vitreous kernel levels, strong straw, drought tolerance, and resistance to leaf and head diseases. Resistance to Fusarium Head blight is a major focus for the main durum production areas in Montana and North Dakota, as well as for more fringe area production zones in central and eastern North Dakota. Wheat stem sawfly tolerance is a major focus for all of the Montana production region, and is becoming a more significant focus across western North Dakota production areas.

End-use quality traits have long been important in the varieties of durum developed for growers in the northern parts of the United States. Varieties that produce high semolina yields, high quality gluten and starch characteristics, and bright yellow color, are critical to meet the needs of both pasta and couscous customers. Extensive testing prior to commercial release, as well as evaluation of promising lines in field test plots, are undertaken to ensure varieties grown by producers have the potential, under favorable environments, to produce excellent end-use quality.



NORTH DAKOTA

U.S.
Durum

Wheat

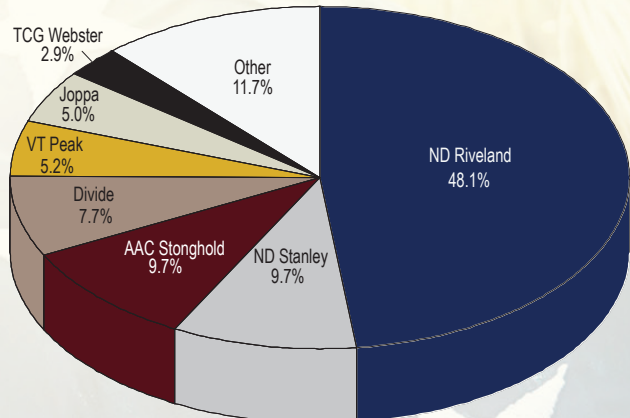
MONTANA
NORTH DAKOTA

ND RIVELAND is the top durum variety planted in North Dakota accounting for nearly half of the acreage. ND Riveland has been the top variety planted in the state for four years. It is also the second most popular variety in Montana with 18% of the acreage. A 2017 NDSU release, it has very good yield potential and strong agronomic characteristics, including good straw strength. Similar to other NDSU releases, it has low cadmium (Cd) uptake traits. ND Riveland possesses very good end-use quality characteristics.

ND STANLEY moved into the third place position this year, accounting for just under 10% of durum acreage in North Dakota. Developed by NDSU in 2021, ND Stanley has strong straw strength with excellent disease tolerance, high test weight, low grain cadmium and good overall end-use quality.

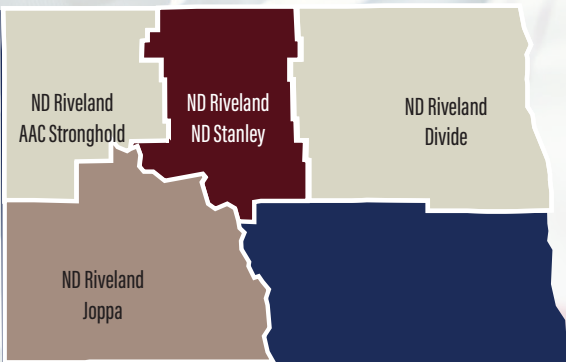
AAC STRONGHOLD is the second most popular variety planted in North Dakota for the second year, with about 10% of the acres, a slight increase from last year. The variety has gained some market share since it is a solid stem variety that has excellent wheat stem sawfly tolerance, an issue that has impacted producers in some areas. Released in Canada in 2019, the variety has strong straw, good disease resistance and is rated good for overall quality.

DIVIDE saw its acreage share increase this year to 7.7%, moving back up to the fourth position after years of declining acreage. It also accounts for 5% of acreage in Montana. Divide is a 2005 release from NDSU with strong straw strength and good overall quality.



1. Percentage may not add to 100 due to rounding.
2. Includes varieties with less than 1% of acreage and unknown varieties.
3. 1,000 acres (1 acre = 0.405 hectares)
2025 - 1,230,000 acres
2024 - 1,110,000 acres

TOP NORTH DAKOTA VARIETIES BY CROP DISTRICT

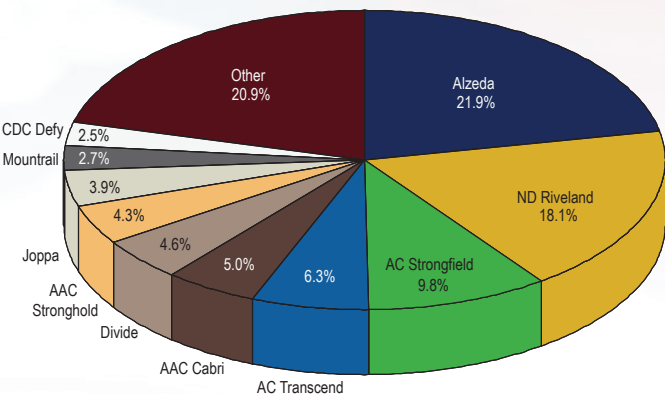
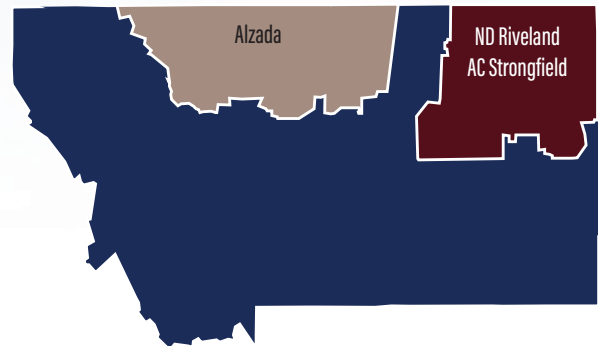


MONTANA

ALZADA remains the top planted variety in Montana with 22% of total acreage, down slightly from last year. It is the dominant variety planted in the north central part of the state where it is primarily grown under contracted production. It is a 2004 release from Westbred with competitive yields, excellent straw strength, and good sawfly tolerance. Alzada is known for its strong gluten properties and excellent color scores.

AC STRONGFIELD is the third most common durum variety this year in Montana with a 10% acreage share. It is a 2004 out of Canada and is known for its high grain yield potential, strong straw strength and good resistance to lodging and high protein.

TOP MONTANA VARIETIES BY CROP DISTRICT



1. Percentage may not add to 100 due to rounding.
2. Includes varieties with less than 1% of acreage and unknown varieties.
3. 1,000 acres (1 acre = 0.405 hectares)
2025 - 890,000 acres
2024 - 880,000 acres

U.S.
Durum

Wheat

MONTANA

NORTH DAKOTA

All quality data contained in this report is the result of testing and analysis conducted by or under the supervision of Dr. Frank Manthey, Wheat Quality Specialist and assisted by Cerly Rini Yeruva, Food Technologist Specialist, and James Perleberg, chemist 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 mid August and continued through the end of September. A total of 251 samples were collected from Montana (83) and North Dakota (168).

LABORATORY ANALYSIS

ANALYSIS - Half of the total wheat samples collected were analyzed for grad 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 the 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 AND 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, Devils Lake, 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).

TEST WEIGHT - American Association of Cereal Chemists Method 55-10.01 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: 46-30.01 (Combustion Method), expressed on dry basis and 12 percent moisture basis.

ASH - American Association of Cereal Chemists Method 08-01.01, 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 56-81.03, approved November 1972, revised September 1999; unites 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 38-12.01, approved October 1999; expressed on a 14 percent moisture basis deter-

mined with the glutomatic instrument.

GLUTEN INDEX • American Association of Cereal Chemists Method 38-12-02, approved October 1999; determined with the glutomatic instrument as an indication of gluten strength.

SEMOLINA

EXTRACTION • Durum tempered to 15.5% moisture and milled on a Brabender Quadrumat Jr mill configured to mill semolina.

ASH • AACC Method 08-01.01, approved April 1961, revised October 1999; expressed on a 14 percent moisture basis.

PROTEIN • AACC Method 46-30.01 (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.

GLUTOPEAK • Glutoppeak is a shear-based device that measures the aggregation behavior of gluten. Flour and solvent are mixed at a constant speed with a rotating paddle, resulting in the separation of gluten and aggregation. The gluten aggregate mass exerts a resistance force on the paddle, and creates a torque curve. The curve records the complexity of aggregation and gluten breakdown, measured as Peak Maximum Time (PMT, in seconds), and the Maximum Torque (MT, in Brabender equivalents (BE)).

NDSU laboratory procedure: The semolina sample (8.5 g, 14% mb) was placed in 9.5 g solution of 0.5mol L⁻¹ CaCl₂. e temperature at 350C. The mixing paddle was set to rotate at 2,750 rpm and the test was run for 5 min at 35C.

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

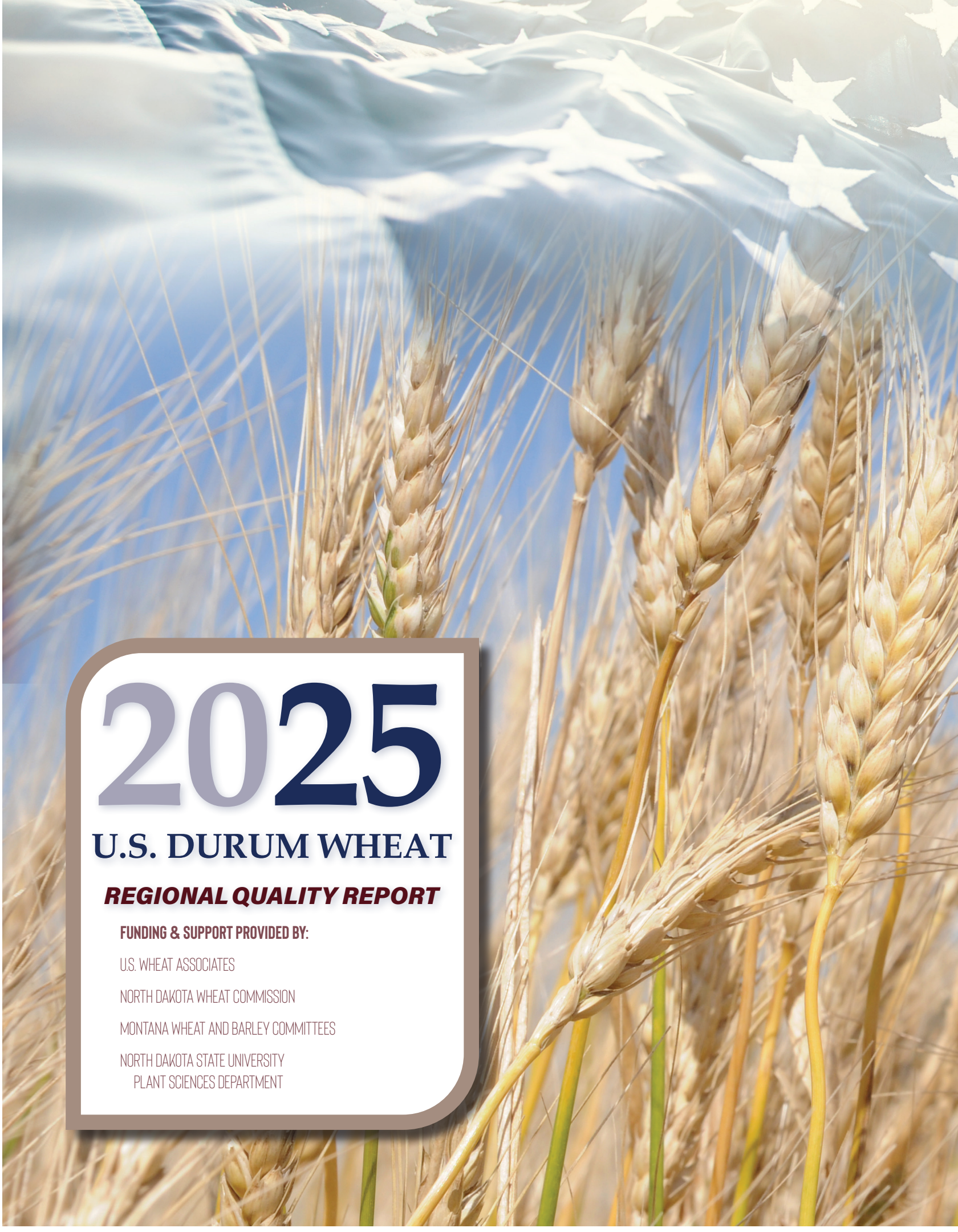
conditions used were: Water temperature, 40 C, extruder shaft speed, 25 rpm and vacuum, 18 in. HG; the dough was pressed through an 84-strand teflon-coated spaghetti die with 0.157 cm openings. The extruded spaghetti samples were dried at high temperature for 12 hrs, using maximum temperature and relative humidity of 73 C and 83 percent, respectively.

COLOR • Color scores were determined by light reflectance (AACC Method 14-22.01, 1983), using a Minolta Color Difference Meter (Model CR 410, 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 • 10 g of dry spaghetti were palced 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 66-50.01. Solids lost to the cooking water. After drying the residue was weighed and reported as percentage of the original dry sample.

FIRMNESS • AACC Method 66-50.01 with a Plexiglass tooth attached to a Texture Analyzer (Model TA-XT2, Texture Technology Corp., Scarsdale, New York).



2025

U.S. DURUM WHEAT

REGIONAL QUALITY REPORT

FUNDING & SUPPORT PROVIDED BY:

U.S. WHEAT ASSOCIATES

NORTH DAKOTA WHEAT COMMISSION

MONTANA WHEAT AND BARLEY COMMITTEES

NORTH DAKOTA STATE UNIVERSITY
PLANT SCIENCES DEPARTMENT