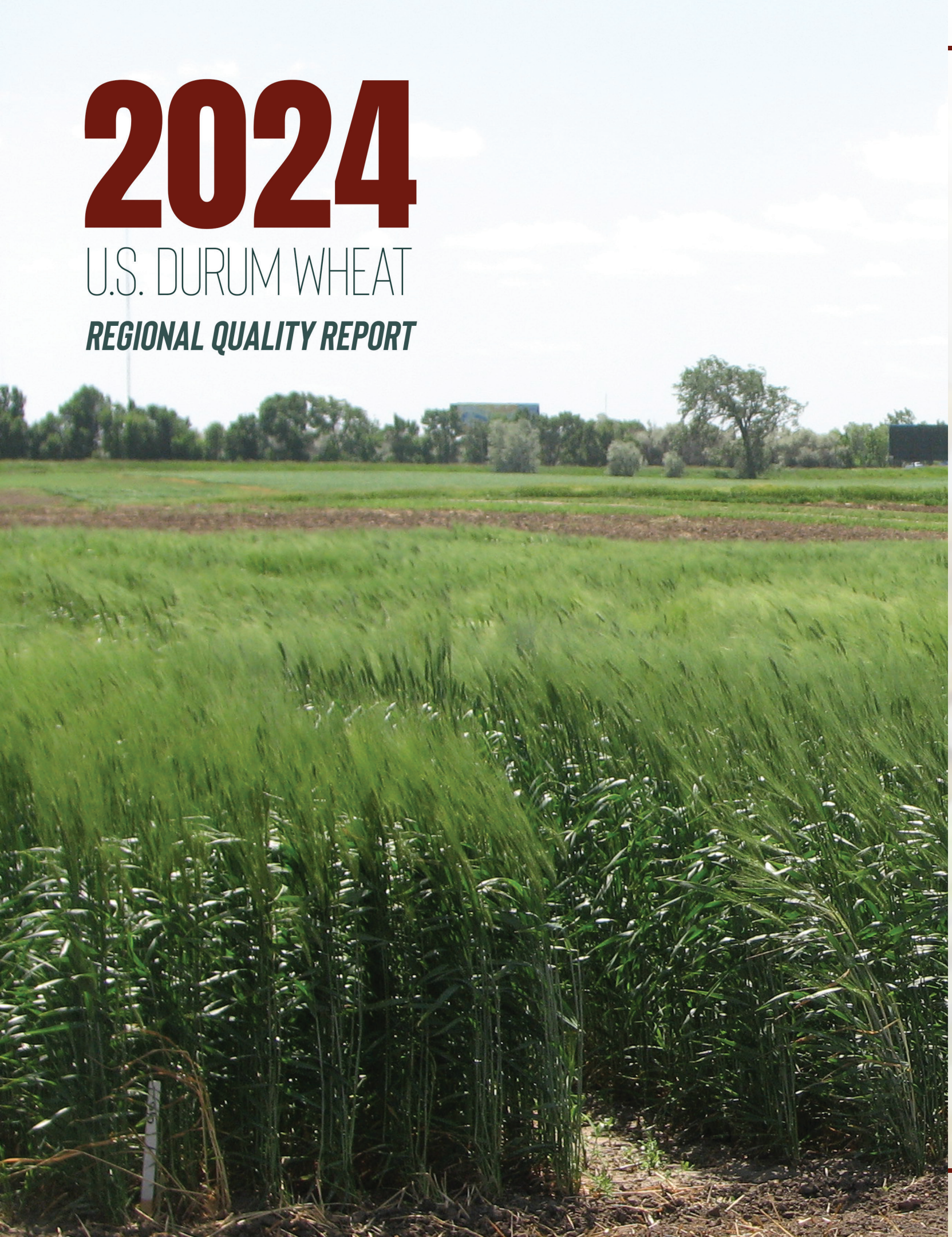
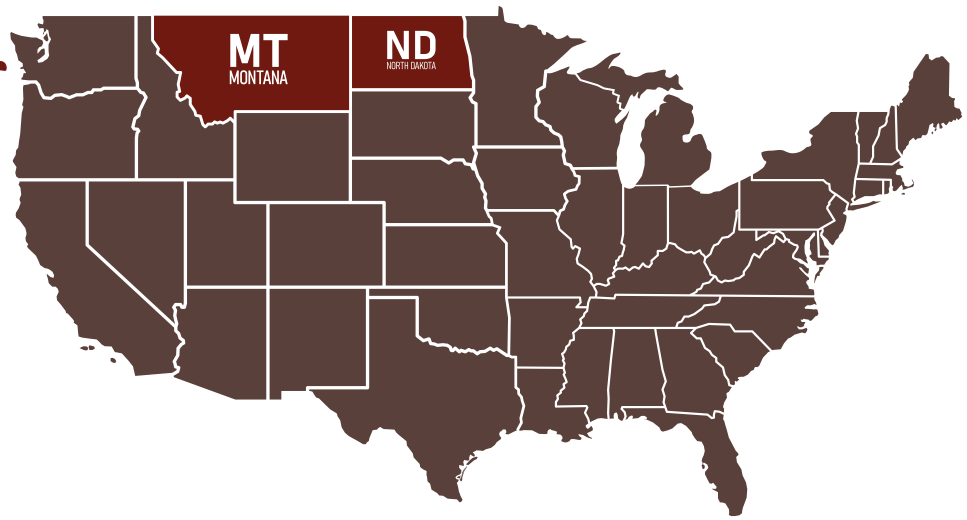
2024

U.S. DURUM WHEAT

REGIONAL QUALITY REPORT



U.S. DURUM Wheat



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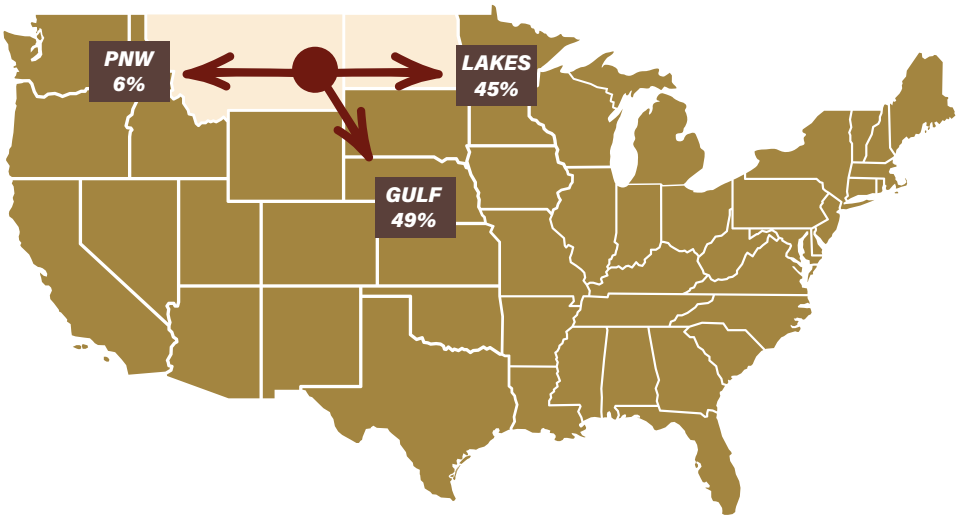
MAKING PREMIUM PASTA

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. In most years, the states of North Dakota and Montana produce 90 percent of the U.S. durum crop.

AVERAGE SHARE OF U.S. DURUM EXPORTS BY PORT (2020-2023)



| MONTANA | NORTH DAKOTA |

OVERVIEW

THE 2024 Northern Durum production was 23% higher than last year at 71 million bushels (1.9 MMT). Planted area was 35% higher than last year and average yields reached record levels in North Dakota, but were reduced in Montana due to hot, dry conditions Field conditions were mostly good at planting time with decent moisture. Cool weather at the beginning of the growing season promoted plant growth and yield potential. The latter part of the growing season produced hotter, drier conditions which stressed the crop in western areas. Disease pressure was minimal to non-existent in the major production areas. Harvest was done under mostly dry conditions with few quality issues. Spotty rains in parts of the region did cause some color loss. Growing season weather differed by region, causing greater than typical variance in yields and some crop quality parameters.

2024 PRODUCTION DATA

	2024	2023	2019-23 AVERAGE
MILLION BUSHELS			
Montana	19.8	20.9	19.6
North Dakota	51.5	32.0	28.8
U.S. Total	80.1	59.3	56.1
MILLION METRIC TON			
Montana	0.54	0.57	0.53
North Dakota	1.40	0.85	0.78
U.S. Total	2.18	1.61	1.53

Source: USDA 2024 Small Grains Summary

This year's crop **GRADES** a No. 1 Hard Amber Durum with 38% of the crop making that top grade. This crop shows a bit wider grade distribution due to some samples with lower test weight or higher damage. Vitreous kernel content at 83% is higher than last year and the same as the five-year average. Average test weight in this year's crop trended slightly lower at 60.8 lbs./bu. (79.2 kg/hl). While nearly two-thirds of the crop has test weight of 60 lbs./bu. or higher, there is a larger percent of the crop with some lower test weights due to late season heat and drought stress. Damage, at 0.6% is slightly higher than 2023, but lower than the five-year average. Average moisture of the crop is 12.2%, higher than last year and average due to wetter growing and harvest conditions in some areas of the production region.

PROTEIN in this year's crop is notably higher at a 14.3% average, with exceptionally high protein in Montana, where growing conditions were more stressful to the crop. There is still quite a bit of variability in the protein, with larger percentages of this year's crop in both the very high and very low ranges. The majority of the crop has protein that is 13.0% or higher.

THOUSAND KERNEL WEIGHTS are lower this year at 35.5 grams, versus 40.9 in 2023. Smaller kernels are the result of hot, dry growing conditions in western areas. Falling number values are very sound in this year's crop with an average 463 seconds. DON levels are once again generally low at <0.5 ppm for a crop average, but a small portion of samples did show above average levels, primarily in the lower production eastern areas. MILLING for the 2024 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 is significantly higher at 60.7%, nearly 5% above the average.

Semolina color values are similar to last year and the five-year average with the b-value at 30.0. Ash is higher than last year at 0.68% and speck counts are lower. Protein in the flour average 12.3%, similar to last year. Protein loss in the milling process was slightly higher at 2%, likely due to more of the protein being stored in the bran and some areas of small, thin kernels.

DOUGH STRENGTH parameters indicated strength very similar to last year and what is typical of an average durum crop. Dry spaghetti evaluations reveal a crop with slightly lower color scores, lower cooked weight, but improved cooked firmness.

The 2024 crop has many positive attributes including high protein, a high grade profile, low damage, sound kernels, high vitreous kernel content, 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, test weight and protein, and adjust contract specifications as needed. The performance of the crop is typical of an average Northern Durum crop and should meet buyers' specifications.

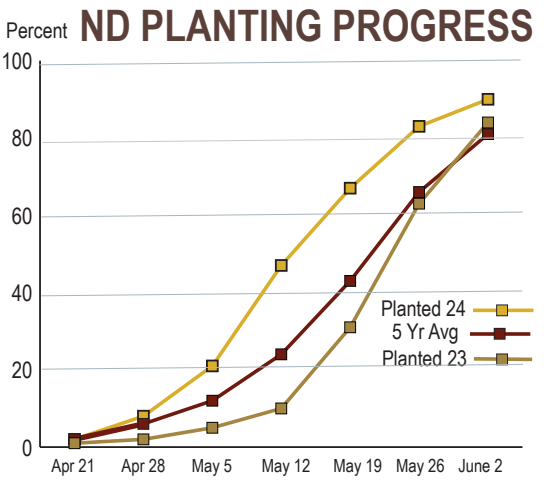
SEASONAL CONDITIONS - 2024

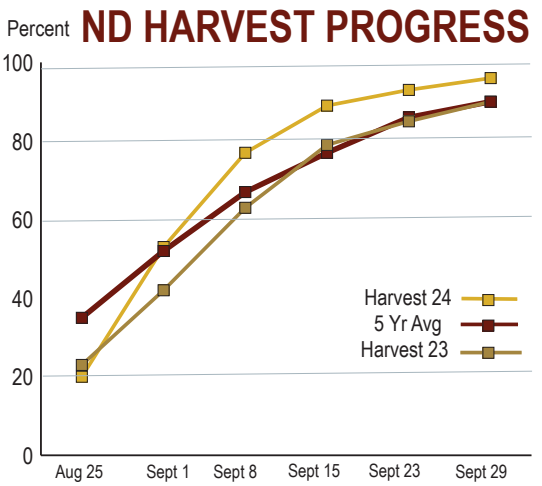
PLANTING of the Northern Durum crop started well ahead of average due to milder weather and limited snowfall over the winter. While some drier conditions persisted in early spring, moisture conditions at planting were much improved from previous years and some spring rain helped improved soil moisture conditions. There were very few planting delays and the majority of the crop was planted by early June.

The crop **EMERGED** under mostly favorable conditions. Early development benefited from precipitation and cooler temperatures and strong yield potential was predicted. As the growing season progressed, precipitation became more limited. Conditions became drier, and combined with hot temperatures, the crop was stressed in portions of western North Dakota and Montana. These conditions adversely affected yield potential. Production areas further east saw more adequate moisture which helped maintain overall good yield potential. Disease pressure was low.

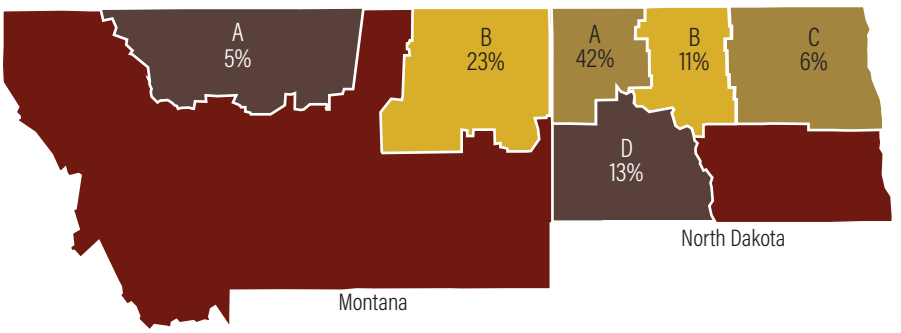
HARVEST began in early August, ahead of average. Conditions were mostly dry, with minimal delays. There were spotty areas of rainfall at harvest, which did cause some quality impacts, but overall harvest progress was fairly smooth. North Dakota saw good yields, while Montana had lower yields due to hotter, drier growing conditions. Harvest progress was slightly ahead of average and mostly finished by the end of September.

PRODUCTION of this year's crop is estimated at 80 million bushels, an increase of over 35% from the previous year due to a sizeable increase in planted acreage and higher yields in eastern production regions.





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.

2024 PRODUCTION DATA

	U.S. GRADES				
GRADING FACTORS	**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[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	31	31	31	31	31

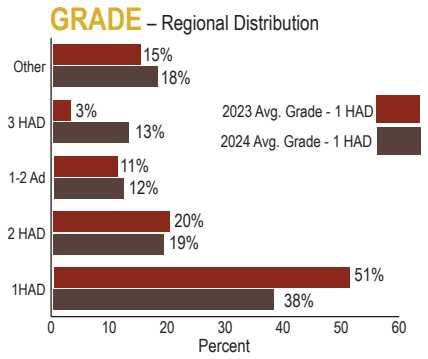
U.S. sample grade is wheat that:

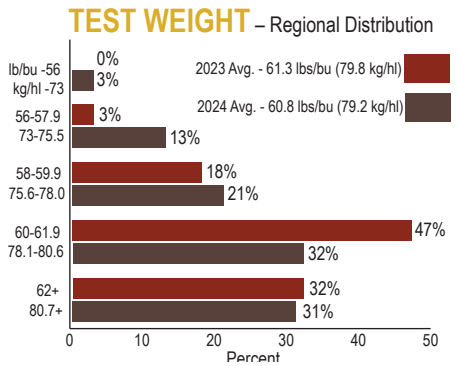
a. Does not meet the requirements for U.S. Nos. 1, 2, 3, 4 or 5; or
b. Has a musty, sour or commercially objectionable foreign odor (except smut or garlic odor); or
c. Is heating or of distinctly low quality.

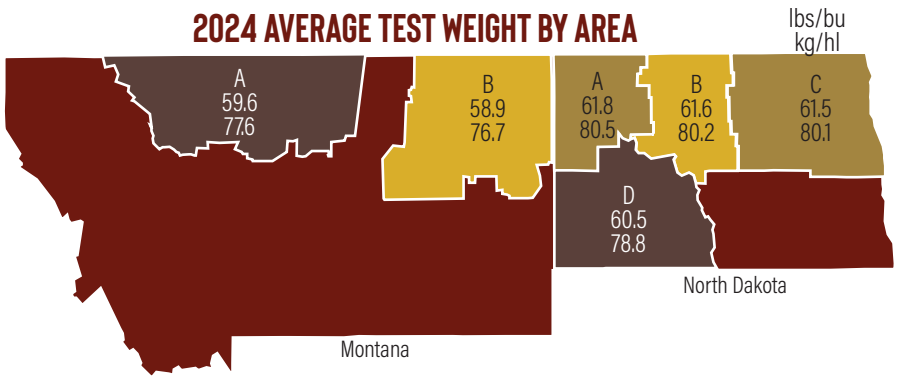
1. Includes damaged kernels (total), foreign material and shrunken and broken kernels.
2. Unclassed wheat of any grade may contain not more than 10.0 percent of wheat of other classes.
3. Includes contrasting classes.
4. Includes any combination of animal filth, castor beans, crotalaria seeds, glass,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

2024 WHEAT GRADING DATA

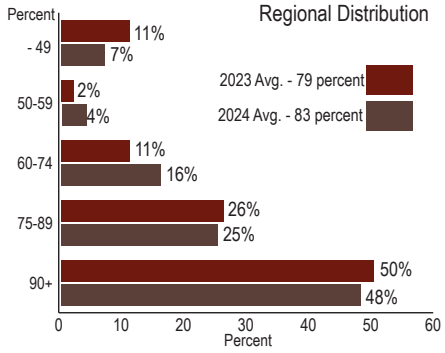
STATE AND CROP REPORTING AREA	TEST WEIGHT LBS/BU	TEST WEIGHT KG/HL	DAMAGE %	SHRUNKEN/BROKEN KERNELS %	TOTAL DEFECTS %	CONTRASTING CLASSES %	U.S. GRADE SUBCLASS	VITREOUS KERNELS %
MONTANA								
Area A	59.6	77.6	0.4	0.7	1.1	1.1	2 HAD	85
Area B	58.9	76.7	0.6	1.0	1.7	0.0	2 HAD	84
State Avg. 2024	59.0	76.9	0.6	0.9	1.6	0.2	2 HAD	84
State Avg. 2023	60.6	79.0	0.5	0.7	1.2	0.6	1 HAD	82
NORTH DAKOTA								
Area A	61.8	80.5	0.8	0.6	1.5	0.0	1 HAD	86
Area B	61.6	80.2	0.4	0.4	0.8	0.0	1 HAD	75
Area C	61.5	80.1	1.2	0.4	1.6	0.0	1 HAD	76
Area D	60.5	78.8	0.3	0.9	1.2	0.0	1 HAD	84
State Avg. 2024	61.5	80.1	0.7	0.6	1.3	0.0	1 HAD	83
State Avg. 2023	61.7	80.3	0.3	0.6	1.0	0.0	1 HAD	78
TWO-STATE AVERAGE								
Avg. 2024	60.8	79.2	0.6	0.7	1.4	0.1	1 HAD	83
Avg. 2023	61.3	79.8	0.4	0.6	1.0	0.2	1 HAD	79
Five-Year Avg	61.3	79.8	0.8	0.8	1.6	0.3	1 HAD	83





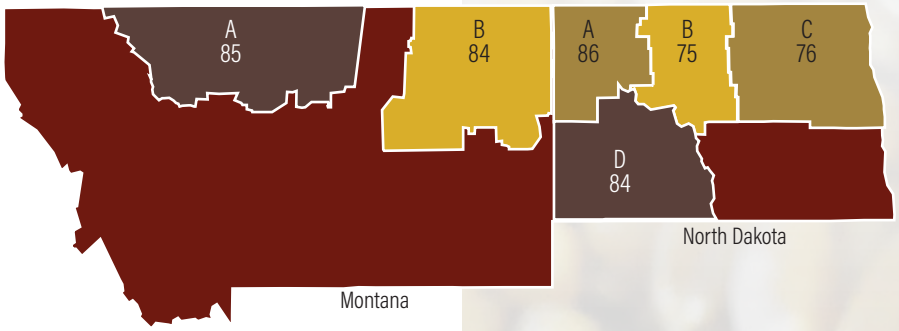


VITREOUS KERNEL

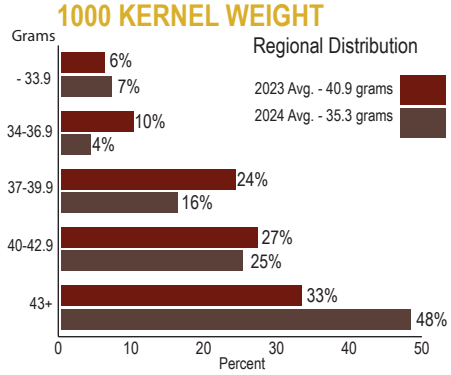


2024 AVERAGE VITREOUS KERNEL BY AREA

Percent

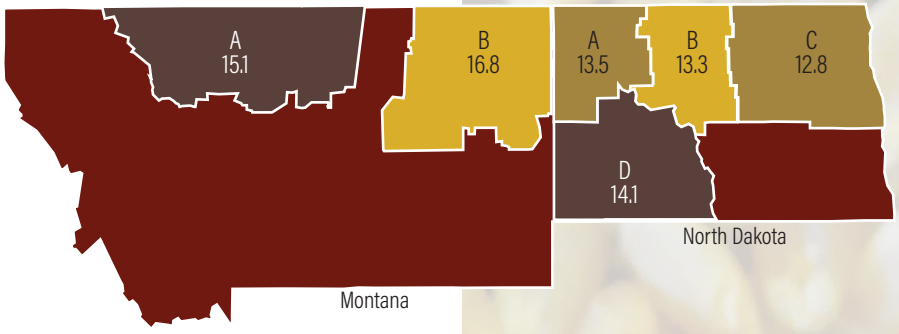


1000 KERNEL WEIGHT

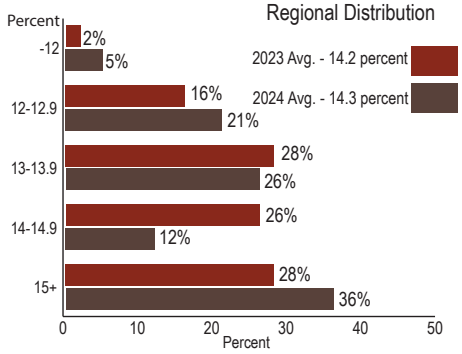


2024 AVERAGE PROTEIN BY AREA

12% Moisture Basis - Percent



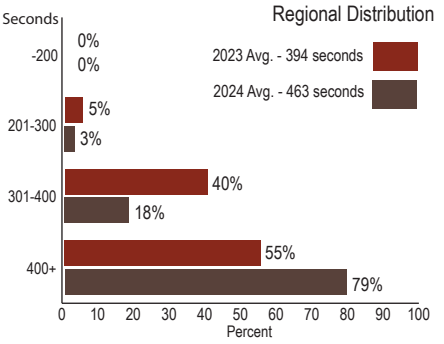
PROTEIN - 12% MOISTURE



2024 OTHER KERNEL QUALITY DATA

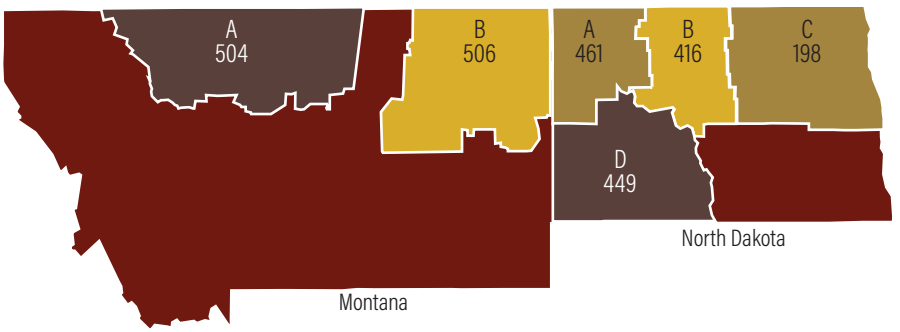
STATE AND CROP REPORTING AREA	DOCKAGE %	MOISTURE %	1000 KERNEL WEIGHT G	KERNEL DIST. MED/LGE %	PROTEIN 12%/0% MOISTURE BASIS %	DON (PPM)	WHEAT ASH%	FALLING NUMBER (SEC)	MICRO SED (CC)
MONTANA									
Area A	0.8	10.9	37.2	43/54	15.1/17.1	0.08	1.53	504	84
Area B	0.9	11.7	29.4	72/19	16.8/19.1	0.14	1.61	506	82
State Avg. 2024	0.9	11.6	30.8	66/25	16.5/18.7	0.10	1.60	506	82
State Avg. 2023	0.7	10.8	38.4	51/48	14.5/16.5	0.00	1.35	392	79
NORTH DAKOTA									
Area A	0.5	12.4	37.2	50/47	13.5/15.3	0.17	1.60	461	78
Area B	0.9	12.7	39.5	37/61	13.3/15.1	0.50	1.53	416	74
Area C	0.5	13.0	39.4	35/64	12.8/14.5	1.01	1.56	398	75
Area D	1.7	11.8	33.9	58/35	14.1/16.0	0.36	1.55	449	81
State Avg. 2024	0.8	12.4	37.1	48/48	13.5/15.3	0.32	1.58	447	78
State Avg. 2023	1.4	11.9	42.6	36/62	14.0/15.9	0.00	1.48	395	83
REGION AVERAGE									
Avg. 2024	0.8	12.2	35.3	53/42	14.3/16.3	0.27	1.58	463	79
Avg. 2023	1.1	11.5	40.9	42/56	14.2/16.1	0.00	1.43	394	81
Five-Year Avg	1.0	11.2	42.7	46/50	14.1/16.1	0.17	1.57	404	69

FALLING NUMBER



2024 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.

2024 SEMOLINA QUALITY DATA

STATE AND CROP REPORTING AREA	SEMOLINA EXTRACTION %	ASH %	SPECKS NO/10 SQ IN %	PROTEIN (14% MOISTURE) %	WET GLUTEN %	GLUTEN INDEX %	GLUTOPEAK PEAK TIME SEC	GLUTOPEAK MAX TORQUE BE
MONTANA								
Area A	60.9	0.72	20	13.2	35.0	97	207	48
Area B	55.9	0.72	17	14.1	36.1	84	120	55
State Avg. 2024	56.8	0.72	18	14.0	35.9	86	136	54
State Avg. 2023	50.1	0.67	24	12.9	34.1	88	174	41
NORTH DAKOTA								
Area A	62.4	0.65	27	11.6	30.2	89	164	43
Area B	63.6	0.72	30	11.2	29.9	90	158	42
Area C	62.3	0.70	35	11.0	27.7	96	141	39
Area D	60.2	0.65	25	12.4	31.3	89	180	44
State Avg. 2024	62.2	0.66	28	11.7	30.1	90	164	43
State Avg. 2023	53.4	0.61	28	12.1	30.7	93	183	41
REGION AVERAGE								
Avg. 2024	60.7	0.68	25	12.3	31.7	89	156	46
Avg. 2023	52.0	0.63	27	12.4	32.1	91	179	41
Five-Year Avg	55.3	0.63	27	12.6	33.8	77	175	41

2024 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	80.5	-2.7	30.8	50.5	3.7	24.1	30.5	7.1	7.2
Area B	80.8	-2.8	30.3	51.2	3.6	23.4	29.8	6.7	7.6
State Avg. 2024	80.8	-2.8	30.4	51.1	3.6	23.5	29.9	6.8	7.5
State Avg. 2023	83.3	-2.5	30.6	52.9	2.9	25.8	31.8	7.3	4.1
NORTH DAKOTA									
Area A	81.4	-3.2	30.5	52.3	2.9	24.1	30.2	7.5	6.4
Area B	80.8	-3.1	29.1	52.0	2.8	23.4	30.9	8.2	6.0
Area C	81.2	-3.1	27.4	52.8	2.9	23.1	31.0	6.6	6.0
Area D	81.5	-3.2	29.4	51.9	3.3	24.2	28.8	6.4	6.6
State Avg. 2024	81.3	-3.2	29.9	52.2	3.0	23.9	30.1	7.3	6.3
State Avg. 2023	83.4	-2.6	29.7	53.7	2.9	25.3	31.6	7.4	3.8
REGION AVERAGE									
Avg. 2024	81.1	-3.1	30.0	51.9	3.1	23.8	30.1	7.2	6.7
Avg. 2023	83.4	-2.5	30.1	53.3	2.9	25.5	31.6	7.3	3.9
Five-Year Avg	83.3	-2.4	30.2	53.3	3.1	25.4	31.4	7.3	4.1

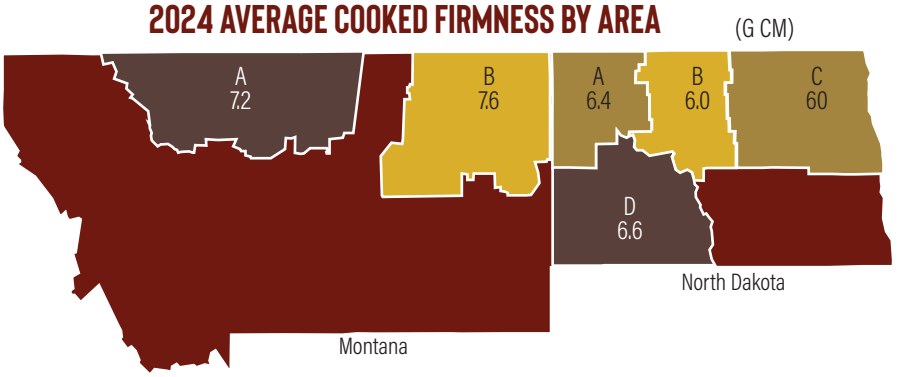
DRY PASTA PROCESSORS want a finished product that is visually appealing, elastic and strong enough to resist breakage during cutting, packaging, handling and shipping, able to withstand the rigors of cooking, and satisfying to the consumer palate.

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.

2024 AVERAGE COOKED FIRMNESS BY AREA

(G CM)



RECENT QUALITY TRENDS

CROP YEAR	2024	2023	2022	2021	2020	2019	FIVE-YEAR AVERAGE
GRADING AND WHEAT DATA							
Test Weight (lbs/bu)	60.8	61.3	61.8	60.5	62.2	61.1	61.3
Test Weight (kg/hl)	79.2	79.8	80.4	78.8	80.9	79.6	79.8
Total Defects (%)	1.4	1.0	1.1	1.2	1.5	3.0	1.6
Vitreous Kernels (%)	83	79	92	86	88	64	83
Grades	1 HAD	1 HAD	1 HAD	1 HAD	1 HAD	2 AD	1 HAD
OTHER WHEAT DATA							
Dockage (%)	0.8	1.1	1.1	0.5	0.8	1.3	1.0
Protein: 12% moisture	14.3	14.2	13.7	15.5	13.4	13.9	14.1
1000 Kernel Weight (gm)	35.3	40.9	40.4	41.2	46.7	44.2	42.7
Moisture (%)	12.2	11.5	11.0	10.9	10.7	12.2	11.2
DON	0.27	0.0	<0.1	<0.1	0.6	0.2	0.2
Ash (%)	1.58	1.43	1.64	1.69	1.57	1.51	1.57
Falling Number (sec)	463	394	433	428	419	345	404
Sedimentation (cc)	79	81	61	79	62	61	69
Semolina Data							
Semolina Extraction (%)	60.7	52.0	53.9	54.6	58.5	57.5	55.3
Ash (%)	0.68	0.63	0.64	0.65	0.64	0.60	0.63
Wet Gluten (%)	31.7	32.1	33.4	37.1	33.2	33.1	33.8
Gluten Index (%)	89	91	72	81	74	67	77
Specks (no/10 sq in)	25	27	27	21	30	31	27
**Color: L (Black-white)*	81.1	83.4	83.3	83.3	83.7	82.9	83.3
**a (green-red)*	-3.1	-2.5	-2.5	-2.3	-2.4	-2.4	-2.4
**b (blue-yellow)*	30.0	30.1	31.2	30.2	30.4	29.3	30.2
Glutopeak							
Peak Time (sec)	156	179	180	165	160	190	175
Max Torque (be)	46	41	43	47	36	40	41
SPAGHETTI PROCESSING DATA							
Color: L (black-white)	51.9	53.3	53.8	53.1	54.4	51.8	53.3
a (green-red)	3.1	2.9	3.2	2.9	3.0	3.3	3.1
b (blue-yellow)	23.8	25.5	25.9	25.1	26.5	24.2	25.4
Cooked Weight (gm)	30.1	31.6	29.7	32.4	31.0	32.2	31.4
Cooking Loss (%)	7.2	7.3	6.7	8.0	7.2	7.1	7.3
Cooked Firmness (g cm)	6.7	3.9	4.5	4.8	3.6	3.8	4.1

* 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.

2024 MAJOR VARIETIES PRODUCED IN REGION

AGRONOMIC FACTORS							
	AGRONOMIC DESCRIPTION		STRAW	PLANT	FOLIAR	AVERAGE YIELD[3]	
VARIETY	AGENT OR ORIGIN[1]	YEAR RELEASED	STRENGTH (1-9)	HEIGHT INCHES	DIEASE[2] (1-9)	BU/ACRE	MT/HECT
Alkabo	ND	2005	2	33	5	56.0	3.8
Divide	ND	2005	4	34	5	52.2	3.5
Joppa	ND	2013	5	33	5	55.7	3.7
ND Grano*	ND	2017	5	32	7	56.6	3.8
ND Riveland*	ND	2017	4	33	5	55.5	3.7
ND Stanley*	ND	2021	3	33	5	58.0	3.9
AAC Stronghold	CAN	2016	3	32	n/a	55.7	3.7

2024 GROWN AND TESTED ACROSS NORTH DAKOTA

QUALITY AND END-USE FACTORS[4]									
VARIETY	TEST WEIGHT LB/BU	TEST WEIGHT KG/HL	WHEAT PROTEIN %	WHEAT FALLING # SECONDS	SEMOLINA COLOR L (BLACK-WHITE)	SEMOLINA COLOR B (BLUE-YELLOW)	GLUTEN INDEX%	COOKED FIRMNESS G CM	OVERALL PASTA QUALITY RATING[5]
Alkabo	61.9	80.6	14.0	480	84.0	29.6	54	3.7	good
Divide	61.3	79.8	14.2	527	83.8	28.1	83	4.0	good
Joppa	62.1	80.9	13.7	521	84.0	30.9	93	3.5	good
ND Grano*	62.6	81.5	14.1	557	83.9	30.4	75	4.1	good
ND Riveland*	61.8	80.6	13.8	567	84.0	29.8	91	3.9	good
ND Stanley*	62.7	81.7	14.1	567	83.8	29.5	82	3.9	good

* Low Cadmium

Source: 2023 North Dakota Durum Wheat Variety Performance Descriptions

1. ND - North Dakota State University, and CAN -Canada.
2. Foliar Disease includes tan spot and septoria: 1 to 9 scale, with 1 = resistant and 9 very susceptible
3. Yield trials 2023 crop grown in North Dakota.
4. Based on NDSU Durum Quality Lab testing of samples grown across North Dakota.
5. Based on kernel attributes, milling and semolina processing, pasta color and spaghetti cooking performance. Ratings can be excellent, good, average, fair and poor.

NORTH DAKOTA

THE TOP four durum varieties planted in North Dakota in 2024 are ND Riveland, AAC Stronghold, Joppa, Divide and ND Stanley, accounting for nearly two-thirds of the acres. In Montana, the top three varieties are Alzada, ND Riveland and Divide, accounting for nearly 60 percent of the acres.

ND RIVELAND continues to dominate North Dakota acres with 44 percent of the acres, although down from the peak last year of 53 percent. It has been the leading variety for three straight years. It is the second most popular in Montana, account for a 20.9 percent share of the acres, up from 15 percent in 2023. Released from NDSU in 2017, ND Riveland is a variety with elite yield potential and strong agronomic characteristics. It also has low cadmium (cd) uptake traits, and possesses very good end-use quality characteristics.

AAC STRONGHOLD moved into second position in North Dakota in 2024 with a 9.1 share of the acres, up from 1.6 percent in 2023. It is a 2019 release developed in Canada. AAC Stronghold is a solid stemmed with excellent wheat stem sawfly tolerance, and has strong straw, very good disease resistance and low cadmium (cd) uptake traits. It is rated good for overall quality.

JOPPA accounts for 6.9 percent of the acres in North Dakota, and 4.7 percent of the acres in Montana, ranking it third and fifth, respectively. It saw slight declines in its share of acres in both states. Released from NDSU in 2013, Joppa is popular with producers for its high-end yield potential and positive agronomic characteristics. It has very good end-use quality traits with especially high pasta color scores and a high gluten index value.

ND STANLEY saw some notable gains in planted acres in North Dakota in 2024, moving into fourth place with 4.9 percent of the acres, up from 0.6 percent in 2023. It is a 2021 release from NDSU. ND Stanley has strong straw, excellent disease tolerance, high test weight and high yield potential. It has low cadmium (cd) uptake traits and good overall quality.

NORTH DAKOTA VARIETY SHARE OF 2024 PLANTED ACRES BY CROP DISTRICT

VARIETY	NORTH WEST	WEST CENTRAL	SOUTH WEST	COMBINED DISTRICTS	TOTAL STATE
	Percentage (%)[2]				
ND Riveland	39.7	59.6	51.3	43.0	44.0
AAC Stronghold	15.8	5.4	1.3	0.0	9.1
Joppa	1.5	15.8	19.3	7.6	6.9
ND Stanley	1.4	3.0	12.6	8.9	4.9
AAC Cabri	7.7	0.0	0.0	0.0	4.1
AAC Stongfield	7.6	0.0	0.0	0.0	4.0
Divide	4.8	0.0	0.0	5.8	3.8
Other[3]	21.6	16.1	15.5	34.8	23.2

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 and unknown varieties.
4. September 30, 2024 small grain summary 1,100,000 acres.

2024 NORTH DAKOTA VARIETY SHARE OF PLANTED ACRES[3]

VARIETY	2024%	2023%
ND Riveland	44.0	52.7
AAC Stronghold	9.1	1.6
Joppa	6.9	12.5
ND Stanley	4.9	0.6
AAC Cabri	4.1	5.1
Other[2]	31.0	27.5

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)
   2024 – 1,100,000 acres
   2023 – 905,000 acres

MONTANA

ALZADA remains the top variety in Montana in 202 4with 24.1 percent of the acres, up from 18.5 percent a year ago. It is the dominant variety produced in the North Central region where it is primarily grown under contracted production. Alzada is a 2004 release from Westbred. It has competitive yields, excellent straw strength, and good sawfly tolerance. Alzada has uniquely strong gluten properties and excellent color scores.

DIVIDE is the third most popular variety in Montana with a 12.8 percent acreage share, down from 16.8 percent in 2023. It is the seventh most popular in North Dakota with 3.8 percent of the acres. Divide was released in 2005 from NDSU, and remains popular with producers for its high yield potential and higher relative ratings for disease tolerance. Divide is rated good for end-use quality.

2024 MONTANA VARIETY SHARE OF PLANTED ACRES[3]

VARIETY	2024%	2023%
Alzada	24.1	20.4
ND Riveland	20.9	12.6
Divide	12.6	11.8
AC Transcend	7.9	10.4
Joppa	4.7	8.7
Other[2]	29.8	36.1

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)
   2024 – 880,000 acres
   2023 – 705,000 acres

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, 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 (86) and North Dakota (165).

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 Mothod 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 determined 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 - Glutopeak 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).

2024

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