2021 Montana Barley Crop Quality Report

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This is the twelfth annual crop quality report for barley grown in Montana. Collection of barley samples was coordinated by the U.S. Department of Agriculture (USDA) National Agriculture Statistics Services (NASS) in Montana and North Dakota. Grain quality evaluations were performed by the Department of Plant Sciences at North Dakota State University and grade information was determined by the North Dakota Grain Inspection Service Inc. The Montana Wheat and Barley Committee provided financial support.

Production

According to the USDA – NASS September 2021 Small Grains Summary, 940 thousand acres of barley were planted in Montana. Of these barley acres, 625 thousand acres were harvested. This is down twenty-one percent from the 790 thousand acres harvested in 2020.

The USDA reported an average yield of 38 bushels per acre (bu/acre) (2.0 metric tons per hectare (mt/ha)). This was down 25 bu/acre (1.3 mt/ha) from the 2020 average yield of 63 bu/acre (3.4 mt/ha).

Reduced acreage and lower yield resulted in a fifty-two percent drop in production from the previous year. The 2021 barley production was estimated by the USDA to be 23.75 million bushels (517 thousand metric tons).

Materials and Methods

The 2021 Montana barley crop survey region consists of four districts within the state (Table 1). The objective of the crop quality survey was to collect a representative number of samples from each district within the survey region. The number of barley samples collected was determined by previous and projected barley production in the counties of each district.

During harvest, a total of 87 two-rowed barley samples weighing between 1 and 2 pounds were collected from farms and grain elevators in selected counties in Montana. The variety of individual barley samples was provided by the grower.

Montana Two-Rowed Malting Barley Quality Snapshot

- A total of eighty-seven two-rowed malting barley samples from 14 counties in Montana were collected at harvest
- Harvested acreage, yield and production were down from the previous year
- District average protein levels ranged from 11.9% in southern Montana to 13.7% in central Montana
- District average test weight ranged from 46.0 lb/bu in central Montana to 49.5 lb/bu in southern Montana
- Three out of four district composite samples were graded at or above U.S. No. 2 Two-Rowed Malting Barley

Table 1. 2021 Barley Survey Districts in Montana

District	Barley Varieties Collected, Mode of Farming	Counties
Northwest	Two-rowed malting, dryland	Glacier, Pondera, Toole
West	Two-rowed malting, dryland and irrigated	Cascade, Lewis and Clark, Teton
Central	Two-rowed malting, dryland and irrigated	Chouteau, Fergus, Hill, Judith Basin
South	Two-rowed malting, dryland and irrigated	Big Horn, Gallatin, Treasure, Yellowstone

Table 2. Montana Sample Collection by Two-Rowed Barley Variety

State	AC Metcalfe	Hockett	Bill Coors 100	ABI Voyager	Merit 57	Moravian 165	Other or Unidentified
Number of Samples Collected	28	19	14	4	3	3	6
Percentage of Samples Collected	32%	22%	16%	5%	3.5%	3.5%	18%

Table 3. Montana State and District Two-Rowed Barley Crop Quality

State and District	Number of Samples	Moisture Content (%)	Test Weight (lb/bu)	Test Weight (kg/hl)	1000 Kernel Weight (g)	Protein Content (%)	Color*	Kernel Assortment % Plump	Kernel Assortment % Thin
Northwest	37	11.5	47.3	60.9	42.0	12.9	2	84.4	1.9
West	20	11.4	48.3	62.2	42.7	12.5	2	84.6	2.0
Central	16	10.6	46.0	59.2	37.6	13.7	1	74.8	1.9
South	14	10.3	49.5	63.7	45.2	11.9	2	88.2	1.9
State	**87**	**11.1**	**47.6**	**61.3**	**41.9**	**12.8**	**2**	**83.3**	**1.9**

Table 4. Montana Barley Grades

District	Dockage (%)	Grade**	Test Weight (lb/bu)	Test Weight (kg/hl)	Suitable Malting Types (%)	Sound Barley*** (%)	Skinned and Broken Kernels (%)	Thin Barley (%)
Northwest	0.5	U.S. No. 2 Two-Rowed Malting Barley	48.3	62.2	100.0	100.0	0.8	0.2
West	0.4	U.S. No. 2 Two-Rowed Malting Barley	49.3	63.5	100.0	100.0	1.0	0.1
Central	0.6	U.S. No. 2 Barley	46.2	59.5	100.0	100.0	1.1	0.1
South	0.6	U.S. No. 1 Two-Rowed Malting Barley	50.1	64.5	100.0	100.0	1.4	0.2

**Color is based on a scale of 1 to 10, with a lower score indicating brighter barley.*
***Grade specifications provided in United States Department of Agriculture, Marketing and Regulatory Programs, Agricultural Marketing Service, Federal Grain Inspection Service, Washington, D.C., Grain Inspection Handbook, Book II, Grain Grading Procedures, Chapter 2: Barley, October 2020.*
****Injured-by-frost kernels and injured-by-mold kernels are not considered damaged or considered against sound barley.*

Upon receipt, the initial barley moisture content was recorded and samples in excess of 13.5 percent were allowed to air-dry prior to subsequent analyses. A portion of each sample was removed and bulked to create regional composite samples. All samples collected were cleaned on a Carter dockage tester prior to further analysis. Dockage content was determined for each district composite sample.

Test weight, protein, kernel assortment, 1,000 kernel weight, and kernel color were determined for each of the dockage free samples. Percent total protein, reported on a dry-matter basis, was determined by near infrared transmittance on a Foss Infratec 1241 grain analyzer. Color (brightness) was determined with a HunterLab ColorFlex Model CFLX-45 spectrophotometer. Color was ranked on a scale of 1 to 10, with 1 being bright barley. Scores of 3 and higher indicate progressively darker, more weathered grain.

The values for state and district averages represent the average of all individual sample results for the respective quality parameters. The district composite samples were submitted to the North Dakota Grain Inspection Service Inc. for determination of grade.

Varieties

The majority of barley acreage in Montana was planted to malting varieties. AC Metcalfe, Hockett, Bill Coors 100, ABI Voyager and Moravian 165 have been the among the most commonly planted two-rowed malting varieties in Montana. The most collected barley variety in 2021 was AC Metcalfe. It comprised thirty-two percent of the samples (Table 2). Hockett and Bill Coors 100 were the next most collected varieties, at twenty-two and sixteen percent, respectively. They were followed by ABI Voyager at five percent.

Quality of Two-Rowed Malting Barley Varieties

State and district averages of individual two-rowed malting barley samples are presented in Table 3. The average moisture of the 87 two-rowed barley samples was 11.1 percent. The average two-rowed barley test weight was 47.6 lb/bu (61.3 kg/hl) and average one thousand kernel weight was 41.9 grams. Barley protein content was 12.8 percent and a kernel color score of 2 was observed. The average kernel assortment was 83.3 percent plump with 1.9 percent thin kernels.

Northwest District

The northwest district average test weight was 47.3 lb/bu (60.9 kg/hl). The average one thousand kernel weight was 42.0 grams. Barley protein content was 12.9 percent and an average kernel color score of 2 was observed. The average kernel plumpness was 84.4 percent with 1.9 percent thin kernels.

West District

The west district average test weight was 48.3 lb/bu (62.2 kg/hl). The average one thousand kernel weight was 42.7 grams. Barley protein content was 12.5 percent and an average kernel color score of 2 was observed. The average kernel plumpness was 84.6 percent with 2.0 percent thin kernels.

Central District

The central district had the lowest average test weight at 46.0 lb/bu (59.2 kg/hl) and the lowest average one thousand kernel weight at 37.6 grams. This district had the highest average barley protein content at 13.7 percent and the brightest average kernel color score of 1 was observed. This district had the lowest average kernel plumpness at 74.8 percent with 1.9 percent thin kernels.

South District

The south district average test weight of 49.5 lb/bu (63.7 kg/hl) was the highest observed. The district had the highest average one thousand kernel weight at 45.2 grams. This district had the lowest average barley protein content at 11.9 percent. A kernel color score of 2 was observed. The south district had the highest average kernel plumpness at 88.2 percent plump with 1.9 percent thin kernels.

Barley Grades

Montana district composite samples were inspected for an official grade (Table 4). The south district composite sample had the highest test weight at 50.1 lb/bu (64.5 kg/hl) and received the grade of U.S. No. 1 Two-Rowed Malting Barley. The northwest and west district composite samples had test weight below 50 lb/bu (64.4 kg/hl) and graded as U.S. No. 2 Two-Rowed Malting Barley. The central district composite test weight of 46.2 lb/bu (59.5 kg/hl) resulted in the grade of U.S. No. 2 Barley. All district composite samples graded at 100% suitable malting types and 100% sound barley. Low values for skinned and broken kernels and thin barley were observed in all composite samples.

References

Small Grains 2021 Summary (September 2021)
USDA, National Agricultural Statistics Service.

United States Department of Agriculture, Marketing and Regulatory Programs, Agricultural Marketing Service, Federal Grain Inspection Service, Washington, D.C.
Grain Inspection Handbook, Book II, Grain Grading Procedures, Chapter 2: Barley, October 2020.