

Montana Wheat & Barley Survey Results Summary

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Montana Wheat & Barley Survey Results Summary

The following tables summarize survey responses from the 2020 Montana Wheat and Barley Survey. This survey was administered by Anton Bekkerman, Kate Fuller and the Montana State University HELPS Lab with funding from the Montana Wheat and Barley Committee. Contacts were acquired from a Freedom of Information Act request submitted by the PIs.

We mailed 3,000 surveys, targeted proportionately to the total wheat and barley acres planted in each Montana county over the past five years. We mailed an initial round of surveys on April 8, and a reminder round on May 22 (2,639 surveys) to those who did not respond initially. Addresses were obtained through a USDA FOIA request for addresses of Montana farmers who had received Market Facilitation Program payments. We received a total of 439 completed surveys, and 108 surveys could not be delivered as addressed. After accounting for the non-deliverable surveys, our overall response rate was 15.18%.

Any questions can be addressed to Kate Fuller (kate.fuller@montana.edu).

Table 1.

Winter Wheat		Spring Wheat		Durum Wheat		Barley	
Warhorse	47.8%	Vida	31.5%	Alzada	35.2%	Metcalfe	41.5%
Keldin	9.8%	SY Ingmar	8.6%	Joppa	22.5%	Hockett	25.6%
Yellowstone	9.7%	SY Soren	6.1%	Tioga	10.9%	Haybet	6.6%
Judee	6.7%	Corbin	6.1%	Divide	8.8%	Lavina	5.7%
Brawl CL Plus	3.7%	Reeder	6.1%	Kyle	6.1%	Haxby	4.1%
Decade	2.9%	Brennan	4.9%	Mountrail	4.7%	Bill Coors 100	3.6%
Northern	2.8%	WB Gunnison	4.4%	Other	7.3%	Other	12.9%
Loma	2.2%	Duclair	4.1%				
CDC Falcon	2.2%	Lanning	3.9%				
SY Clearstone	1.3%	Mott	1.7%				
Other	10.9%	Other	22.6%				

Table 1 shows the proportion of acres planted in Montana for winter wheat, spring wheat, durum wheat, and barley, by variety. Warhorse represents the largest proportion of winter wheat planted (47.8%), Vida for Spring Wheat (31.5%), Alzada for durum wheat (35.2%), and Metcalfe for barley (41.5%). Most prominent changes from 2019 to 2020 are in winter wheat and durum wheat varieties. Warhorse winter wheat planting increased from 28.0% in 2019 to 47.8% in 2020. Alzada durum wheat planting also increased from 22.8% in 2019 to 35.2% in 2020. (See Appendix A.1 for detail on calculations.)

Table 2.

	Winter Wheat							
	<i>Northwest</i>	<i>North Central</i>	<i>Northeast</i>	<i>Central</i>	<i>Southwest</i>	<i>South Central</i>	<i>Southeast</i>	<i>State</i>
Warhorse	—	51.0%	—	28.9%	80.2%	4.0%	—	47.8%
Keldin	—	9.5%	67.4%	15.2%	19.8%	3.8%	—	9.8%
Yellowstone	—	9.4%	—	10.4%	—	—	—	9.7%
Judee	—	7.5%	—	—	—	—	—	6.7%
Brawl CL Plus	—	1.9%	—	19.0%	—	21.0%	—	3.7%
Decade	—	2.5%	—	7.1%	—	3.7%	—	2.9%
Northern	—	2.9%	5.4%	2.5%	—	—	—	2.8%
Loma	—	2.3%	—	2.6%	—	—	—	2.2%
CDC Falcon	—	2.2%	—	2.5%	—	1.1%	—	2.2%
SY Clearstone	—	1.3%	—	1.9%	—	—	—	1.3%
Other	—	9.5%	11.5%	9.1%	—	50.8%	—	10.9%
Unknown/Unreported	100.0%	0.0%	16.2%	0.9%	0.0%	15.7%	100.0%	0.0%
Observations	1	219	19	54	6	14	1	314

Table 2 offers estimates for the proportion of planted winter wheat varieties within NASS Agricultural Districts, as well as total state proportions planted. Of the 314 observations, the North Central Agriculture District provided the most observations (219) followed distantly by the Central Agriculture District with 54 observations. Between the two districts, they show the most diversity in varieties planted. (See Appendix A.2 for detail on calculations.)

Table 3.

	Spring Wheat							
	<i>Northwest</i>	<i>North Central</i>	<i>Northeast</i>	<i>Central</i>	<i>Southwest</i>	<i>South Central</i>	<i>Southeast</i>	<i>State</i>
Vida	—	40.9%	18.5%	26.6%	—	35.8%	—	31.5%
SY Ingmar	—	6.2%	12.3%	5.4%	—	—	—	8.6%
SY Soren	—	—	15.2%	—	—	—	—	6.1%
Corbin	—	10.7%	—	—	—	—	—	6.1%
Reeder	—	—	14.9%	4.1%	—	—	—	6.1%
Brennan	—	—	12.1%	—	—	—	—	4.9%
WB Gunnison	—	7.5%	0.2%	—	—	10.3%	—	4.4%
Duclair	—	7.0%	—	7.0%	—	—	—	4.1%
Lanning	—	5.5%	0.9%	17.8%	—	16.4%	—	3.9%
Mott	—	0.7%	3.2%	—	—	—	—	1.7%
Other	—	20.5%	22.4%	38.0%	100.0%	35.9%	—	22.6%
Unknown/Unreported	100.0%	0.0%	0.3%	1.0%	0.0%	1.7%	100.0%	0.0%
Observations	2	197	127	45	6	13	0	390

Table 3 shows estimates for the proportion of planted spring wheat varieties within Agricultural Districts, as well as total state proportions planted. Of the 390 observations, the North Central and Northeast Agriculture Districts provided the most observations—197 and 127, respectively. Both districts reported a variety of spring wheat varieties planted and both primarily planted Vida. (See Appendix A.2 for detail on calculations.)

Table 4.

Durum Wheat								
	<i>Northwest</i>	<i>North Central</i>	<i>Northeast</i>	<i>Central</i>	<i>Southwest</i>	<i>South Central</i>	<i>Southeast</i>	<i>State</i>
Alzada	—	82.4%	12.2%	—	—	—	—	35.2%
Joppa	—	—	33.5%	—	—	—	—	22.5%
Tioga	—	3.4%	14.5%	—	—	—	—	10.9%
Divide	—	—	13.1%	—	—	—	—	8.8%
Kyle	—	—	9.1%	—	—	—	—	6.1%
Mountrail	—	—	7.0%	—	—	—	—	4.7%
Other	—	0.7%	10.6%	—	—	—	—	7.3%
Unknown/Unreported	100.0%	0.0%	0.0%	100.0%	100.0%	100.0%	100.0%	4.4%
Observations	0	184	87	0	0	0	0	271

Table 4 provides estimates for the proportion of planted durum wheat varieties within Agricultural Districts, as well as total state proportions planted. Observations were only reported from the North Central and Northeast Agriculture Districts with North Central Montana planting mainly Alzada (82.4%) and the Northeast primarily planting Joppa (33.5%) along with an assortment of other durum wheat varieties. (See Appendix A.2 for detail on calculations.)

Table 5.

Barley								
	Northwest	North Central	Northeast	Central	Southwest	South Central	Southeast	State
Metcalfe	—	45.6%	—	50.9%	—	—	—	41.5%
Hockett	—	31.0%	—	11.3%	—	—	—	25.6%
Haybet	—	1.6%	68.5%	5.4%	—	9.3%	—	6.6%
Lavina	—	3.6%	16.0%	4.0%	80.0%	6.0%	—	5.7%
Haxby	—	4.6%	5.5%	0.9%	—	—	—	4.1%
Bill Coors 100	—	2.9%	—	5.4%	—	39.4%	—	3.6%
Other	—	10.8%	9.9%	20.0%	20.0%	45.3%	—	12.9%
Unknown/Unreported	100.0%	0.0%	0.0%	2.2%	0.0%	0.0%	100.0%	0.0%
Observations	2	219	50	50	6	13	2	342

Table 5 displays estimates for the proportion of planted barley varieties within Agricultural Districts, as well as for total state proportions planted. Of the 342 observations, the majority came from the North Central Montana Agriculture District (219) with Central and Northeast Agriculture Districts following distantly both with 50 observations. The North Central and Central observations report the greatest diversity of barley varieties, with Metcalfe representing the largest proportion of acreage planted in North Central (45.6%) and in Central Montana (50.9%). (See Appendix A.2 for detail on calculations.)

Table 6.

Decisions in Selecting Seed Varieties					
Factor in making seed variety decision	Responses	Average Importance	Standard Deviation	Median Importance	Most Common Response
Overall yield potential	361	8.99	0.32	9	10
Overall protein content potential	357	8.55	0.35	9	10
Your past experience with variety	344	8.30	0.39	9	8
Disease resistance	357	8.18	0.41	8	10
Market conditions/prices	352	8.13	0.51	9	8
Final product quality characteristics	346	8.08	0.42	8	10
Resistance to WSS	354	7.89	0.57	9	10
Other pest resistance	348	7.19	0.51	8	8
Cost of CSO seed	352	7.11	0.58	8	10
Planting CSO vs saved seed	352	5.42	0.58	5	5
Other reasons	29	8.70	0.47	9	10

Table 6 shows responses about the importance of different factors in making the decision to use a particular seed variety. Respondents were asked to rank importance of each factor on a scale of 1 to 10. Overall yield potential and protein content potential were the top two factors, with the lowest variability in those choosing the two production factors as being most important. Past experience, disease resistance, and market prices represent the second tier of factors influencing seed variety choice. Quality characteristics, pest resistance, and cost of the seed represent the next set of factors.

Table 7.

Price for Standing Hay Crop Within County

Price per Acre					
	N	Mean	SD	Min	Max
Dryland	41	49.39	35.02	15	165
Irrigated	16	109.88	79.28	40	300
Price per Ton					
	N	Mean	SD	Min	Max
Dryland	70	69.19	26.47	0	135
Irrigated	36	79.46	26.21	0	125

Table 7 shows the average reported price of hay acres planted by irrigation practice. Respondents were asked, “What is the going price or share for standing hay crop (“hay on the stump”) in your county?”. The top two rows of data show prices reported on a per acre basis and the bottom two rows of data show prices reported on a per ton basis. The majority of respondents had non-irrigated (dryland) hay production. Responses reported as ranges were not counted in these statistics. To address very high values reported in the prices per acre, we winsorized (replaced) the highest reported value with the next highest reported value.

Table 8.

Number of Hay Cuttings

	N	Mean	SD	Min	Max
Hay Cuttings	203	1.52	.71	1	3

Table 8 presents the average amount of hay cuttings Montana farmers estimate their county had in the last year. Specifically, Montana farmers were asked “How many cuttings are typical in your county?”. On average Montana farmers estimate their county has 2.73 cuttings with a high of 250 and a low of 1. Responses reported as ranges were not counted in these statistics. To address one very high value reported, we winsorized (replaced) the highest value with the next highest value.

Table 9.

Types of Hay Produced			
	Freq.	Percent	Cum.
Alfalfa	114	48.31	48.31
Other	122	51.69	100.00
Total	236	100.00	

Table 9 shows the typical types of hay Montana farmers estimate are produced within their county in the last year, with a majority reporting other (51.69%).

Table 10.

Trade Dispute Impacts			
	Freq.	Percent	Cum.
More than 25% decrease	92	27.22	27.22
11-25% decrease	144	42.60	69.82
1-10% decrease	79	23.37	93.19
0-10% increase	18	5.33	98.52
More than 10% increase	5	1.48	100.00
Total	338	100	

Table 10 shows Montana farmers' perceptions of the trade disputes on farm income, excluding Market Facilitation Payments. Specifically, they were asked "In the past year, what was the impact of trade disputes on your farm income (excludes Market Facilitation Payments)?" Of the 338 respondents, 93.19% believe that their farm income decreased due to the trade disputes while only 6.81% believe their income increased.

Table 11.

Losses Offset by Market Facilitation Payments			
	Freq.	Percent	Cum.
More than 25%	14	4.07	4.07
11-25%	49	14.24	18.31
6-10%	92	26.74	45.05
0-5%	166	48.26	93.31
My income was unaffected by trade disputes	23	6.69	100.00
Total	344	100	

Table 11 shows Montana farmers’ perceptions of how Market Facilitations Program payments helped offset their farm income losses due to the trade dispute. Of the 344 respondents, 93.31% believe that the payments helped offset some losses, with 48.26% of respondents believing the payments only offset 0-5% of losses.

Table 12.

Years Farming			
	Freq.	Percent	Cum.
Less than 5 years	20	5.17	5.17
5-10 years	39	10.08	15.25
11-15 years	29	7.49	22.74
16-20 years	30	7.75	30.49
21+ years	269	69.51	100.00
Total	387	100	

Table 12 shows the farming experience of respondents as indicated by years spent farming. Of the 387 respondents, the majority have been farming for 21+ years (69.51%) while very few have been farming for less than 5 years (5.17%).

Table 13.

In the next 12 months, do you think Montana farmers' profitability will:

	Freq.	Percent	Cum.
Improve	53	13.84	13.84
Diminish	179	46.74	60.58
Stay the same	151	39.43	100.00
Total	383	100	

Table 13 shows the percent of Montana farmers that believe their profitability will improve, diminish, or stay the same within the next 12 months. Out of the 383 respondents, 13.84% believe their profitability will improve, 46.74% thought it would diminish, and 39.43% believe it will stay the same. While still the largest group, compared to last year, fewer farmers believe their profitability will diminish, decreasing from 51.54% in 2019 to 46.74% in 2020.

Table 14.

In the next 12 months, do you think Montana farmers' profitability will:

Years Farming	Improve	Diminish	Stay the same	Total
Less than 5 years	4 (22.22%)	4 (22.22%)	10 (55.56%)	18 (100%)
5-10 years	4 (10.26%)	17 (43.59%)	18 (46.15%)	39 (100%)
11-15 years	2 (6.90%)	15 (51.72%)	12 (41.38%)	29 (100%)
16-20 years	5 (17.86%)	13 (46.43%)	10 (35.71%)	28 (100%)
21+ years	38 (14.62%)	126 (48.46%)	96 (36.92%)	260 (100%)
Total	53	175	146	374

Table 14 shows Montana farmers' sentiment about expected profitability in the next year separated by years spent farming. Frequency of response is reported, and percentages represent the percent of respondents by profitability sentiment out of the total for each category of farming experience. Farmers with less experience were more likely to think that profitability would remain the same than farmers with more experience, who were more likely to expect profits to fall in the coming year.

Table 15.

Compared to one year ago, your operation is financially...			
	Freq.	Percent	Cum.
Better off	21	5.44	5.44
Worse off	162	41.97	47.41
About the same	203	52.59	100.00
Total	386	100	

Table 15 shows the percentage of Montana farmers that think their operation is financially better off, worse off, or roughly the same as it was a year ago. Of 386 respondents, 5.44% think they are better off, 41.97% are worse off, and 52.59% believe they are about the same financially. Compared to last year, more farmers believe they are better off than they were in the previous year (up slightly from 3.75% in 2019) and more believe that they are about the same as they were in the previous year (up from 42.15% in 2019).

Table 16.

Compared to one year ago, your operation is financially...				
Years farming	Better Off	Worse Off	About the same	Total
Less than 5 years	3 (16.67%)	7 (38.89%)	8 (44.44%)	18 (100%)
5-10 years	3 (7.69%)	13 (33.33%)	23 (58.97%)	39 (100%)
11-15 years	0 (0.00%)	12 (41.38%)	17 (58.62%)	29 (100%)
16-20 years	3 (10.34%)	8 (27.59%)	18 (62.07%)	29 (100%)
21+ years	12 (4.58%)	118 (45.04%)	132 (50.38%)	262 (100%)
Total	21	158	198	377

Table 16 shows Montana farmers' perceptions of their financial situation compared to a year ago broken down by years spent farming. Frequency of response is reported, and percentages represent the percent of respondents by profitability sentiment out of the total for each category of farming experience. Across all categories of farming experience, respondents were mostly likely to select that their operation was financially about the same as last year.

Table 17.

Changes in Crop Rotation					
	N	Mean	SD	Min	Max
Crop rotation change	378	23.54%	42.48	0	100%

Table 17 presents the average amount of Montana farmers who made a major crop rotation change in the last year. If answering yes to making a crop rotation change, respondents were listed as a 1, if no they were listed as a 0. Out of the 378 respondents 23.54% said yes to making a major crop rotation change.

Table 18.

If Yes to Change in Crop Rotation			
Main Reason for Change?	Freq.	Percent	Cum.
Changes in the 2018 farm bill/farm progress	0	0.00	0.00
Disease/pest management	8	8.99	8.99
Market prices	31	34.83	43.82
Production conditions	6	6.74	50.56
Trade/marketing uncertainty	3	3.37	53.93
Other	41	46.07	100.00

Table 18 shows the primary reasons why Montana farmers made a crop rotation switch in the last year. If answering yes to the question from Table 14 respondents were asked to list their primary reason for the change. Market prices was the most prevalent reason listed for making the change (34.83%), however 46.07% respondents listed “Other” as their reason. Many of the “other” responses indicated some combination of the listed main reasons for change.

APPENDIX

A.1 State Estimates:

To estimate a state-level proportion of acres planted to a particular variety of wheat or barley, we combine responses from producers across Montana counties with county-level planted acres reported by the USDA National Agricultural Statistical Service. Specifically, we use the following weighting procedure separately for winter wheat, spring wheat (excluding durum), durum wheat, and barley.

First, for each county, we aggregate the total acreage planted to a particular variety in that county, as reported by survey respondents. We then calculate the proportion of acreage planted to a particular variety in the county by dividing acres in a variety by the sum of acres for all planted varieties. For example, if in county A producers reported that the total number of acres planted to variety 1 was 2,000 acres and the total number acres planted to all varieties in county A was 10,000 acres, then the proportion of acreage planted to variety 1 was 20%. This calculation was repeated for all varieties.

Second, we calculate the proportion of total acres planted in a county relative to the total acres planted in Montana as estimated by USDA NASS. For example, if county A reported to have planted 100,000 winter wheat acres and the total planted acres in Montana was 1.5 million, then county A represented 6.7% of total state winter wheat acres. This proportion is used as the state-level weight for determining state-level variety plantings.

Third, the proportion of a planted variety in a county was then multiplied by the proportion of planted acres that the county had relative to the state-level total acres. That is, if producers in county A planted 20% of winter wheat using variety 1, and county A represented 6.7% of total winter wheat acres planted in Montana, then variety 1 in county A is estimated to represent $(20\% \times 6.7\%) = 1.34\%$ of total winter wheat acres planted in Montana.

Fourth, the county weights were adjusted by the number of responses observed in each county, to account for a greater amount of information coming from those responses.

Lastly, when the above calculations were completed for all each variety in all counties, the weighted county-level planted acres for each variety were summed together across all Montana counties with production of the particular wheat or barley (i.e., this was done separately for winter wheat, spring wheat, durum, and barley).

A.3 Agricultural District estimates:

To estimate the proportion of acres planted to a particular variety of wheat or barley in a USDA NASS Agricultural District that planted each of these crops, we combine responses from producers across those counties with county-level planted acres reported by the USDA National Agricultural Statistical Service. Specifically, we use the following weighting procedure separately for winter wheat, spring wheat (excluding durum), durum wheat, and barley.

First, for each of the counties in a particular agricultural district, we aggregate the total acreage planted to a particular variety in that county as reported by survey respondents. We then calculate the proportion of acreage planted to a particular variety in the county by dividing acres in a variety by the sum of acres for all planted varieties. For example, if in county A producers reported that the total number of acres planted to variety 1 was 2,000 acres and the total number acres planted to all varieties in county A was 10,000 acres, then the proportion of acreage planted to variety 1 was 20%. This calculation was repeated for all varieties.

Second, we calculate the proportion of total acres planted in a county relative to the total acres planted in the counties producing that crop within an agricultural district as estimated by USDA NASS. For example, if county A reported to have planted 100,000 winter wheat acres and the total planted acres in the counties within the agricultural district was 200,000, then county A represented 50% of total winter wheat acres planted in the agricultural district. This proportion is used as the agricultural district weight for determining district-level variety plantings.

Third, the proportion of a planted variety in a county was then multiplied by the proportion of planted acres that the county had relative to the total acres in the agricultural district. That is, if producers in county A planted 20% of winter wheat using variety 1, and county A represented 50% of total winter wheat acres planted in the agricultural district, then variety 1 in county A is estimated to represent $(20\% \times 50\%) = 10\%$ of total winter wheat acres planted in the agricultural district.

Fourth, the county weights were adjusted by the number of responses observed in each county, to account for a greater amount of information coming from those responses. This re-weighting is a new addition in 2020 to address concerns regarding very few responses from some high production counties.

Lastly, when the above calculations were completed for all each variety in all counties, the weighted district-level planted acres for each variety were summed together across all of the planted acres within the agricultural district with production of the particular wheat or barley (i.e., this was done separately for winter wheat, spring wheat, durum, and barley)

Why unknown/unreported percentages can be positive at the district but not the state level:

Our county and district weights are based on published NASS acreage. However, in some cases, we receive responses from counties that are not listed in NASS as having any acreage. As such, those particular observations are not included in the aggregated, weighted results. The reported acreage from those counties represents a very small amount of acreage relative to the large producing counties; when we aggregate to the state level, these types of observations basically represent approximately 0.05% of the acreage. Thus they do not show up in the state table or state-aggregated numbers in the other tables. For the top 5 counties, this issue is not present because the top five counties have NASS report planted acres.