



2024 Barley Field Crop Trials Results

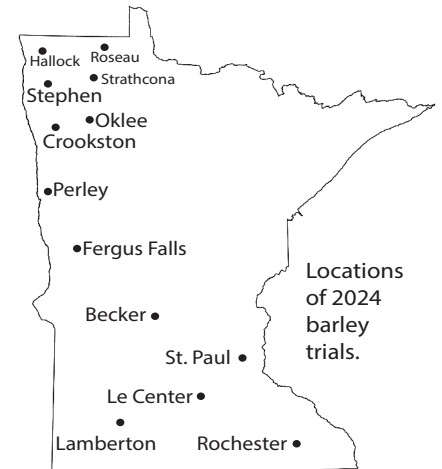
Minnesota Agricultural Experiment Station and the College of Food, Agricultural and Natural Resource Sciences

Spring barley varieties were evaluated in 2024 in replicated trials at Crookston, Hallock, Oklee, Perley, Rosseau, Stephen, and Strathcona in the northern part of the state and Becker, Lamberton, Le Center, Rochester and St. Paul in the south. Yield is reported for 2024 and multi-year averages as percent of the mean of the trial. Data collected from these trials should be used to make comparisons only among those varieties included in the trials. The average yield across the 11 testing locations was 102 bu/acre in 2024. The highest yields this year were recorded in Hallock (152 bu/A) while the lowest grain yields were recorded in Lamberton (58 bu/A). LSD numbers beneath the yield columns indicate whether the difference

between yields is due to genetics or to other factors, such as variations in environment. If the yield difference between two entries equals or exceeds the LSD value, the higher-yielding entry probably was superior in yield. A difference less than the LSD value was probably due to environmental factors.

Variety Selection Criteria

Most barley producers in the region grow barley for malt and select varieties approved by the American Malting Barley Association (AMBA). The most important industry specifications for making malting grade are low grain protein (11.5% - 13.5%), kernel plumpness (>80%) and low deoxynivalenol or DON content (<2



ppm). DON is the toxin produced by the Fusarium Head Blight (FHB) pathogen. Additional information about FHB can be found at www.scabsmart.org. Please consult the AMBA recommended varieties for the most current information about industry acceptance of malting barley varieties at www.ambainc.org. Variety selection will also be influenced by contracts made available by malting and brewing companies and these vary from year to year.

In addition to yield and acceptable malt quality, disease resistance plays an important role in variety selection. Disease evaluations are carried out in inoculated field and/or greenhouse experiments. Disease ratings are based on the results of two or more experiments and are scored on a 1–9 scale where 1 = most resistant and 9 = most susceptible. For most producers the disease FHB and the presence of DON in harvested grain are the two most important factors limiting production of malting barley in the region. The six rows, with the exception of Quest, are generally more susceptible to Fusarium head blight expressed as higher concentrations of vomitoxin or DON.

Table 1. Agronomic characteristics of malting barley varieties, 2022-2024.

Variety	Origin ¹	Year of Release	PVP Status	Heading (DAP)	Height (inches)	Lodging (0-9)	Protein (%)
2-row							
AAC Connect	AAFC	2017	Yes	58	30	3	12.7
AAC Synergy	AAFC	2012	Yes	57	31	3	12.7
ABI Cardinal	ABI	2021	Yes	58	29	3	13.0
Excelsior Gold	NY	2020	-	55	33	2	12.8
Explorer	AS	2020	-	57	27	2	12.5
ND Genesis	ND	2015	Yes	56	32	2	11.8
6-row							
Lacey	MN	2000	Expired	53	32	2	13.2
ND Treasure ²	ND	2023	Pending	55	30	2	12.4
Quest	MN	2010	Yes	53	33	4	13.3
Rasmusson	MN	2008	Yes	53	30	2	12.8
Robust	MN	1984	Expired	53	33	2	13.3
Tradition	ABI	2003	Yes	53	31	2	12.9
No. of Environments				10	9	11	21

¹Agriculture and Agri-Food Canada (AAFC), Anheuser-Busch InBev (ABI), North Dakota State University (ND), University of Minnesota (MN), Cornell University (NY), Agrii (Secobra)

²ND Treasure evaluated in 2023 and 2024.

Table 2. Disease reactions of barley varieties in multiple-year comparisons.

Variety	DON ^{1,2,3}	NB ¹	Stem Rust ^{1,4}	Bacterial Leaf Streak ¹	Powdery Mildew ¹
2-row					
AAC Connect	3	0	3	4	4
AAC Synergy	4	0	4	3	4
ABI Cardinal	4	1	6	5	2
Excelsior Gold	2	1	6	4	4
Explorer	4	2	5	4	0
ND Genesis	4	1	6	5	5
6-row					
Lacey	5	1	4	6	6
ND Treasure ⁶	5	1	0	5	6
Quest	3	1	2	5	6
Rasmusson	4	1	4	5	6
Robust	6	0	5	6	6
Tradition	5	1	4	6	5
No. of Environments	4	3	3	3	2

¹All traits measured on a scale from 0-9 where 0=resistant and 9=susceptible.

²Deoxynivalenol (DON) is the mycotoxin produced by the Fusarium head blight pathogen.

³Data is for 2022 and 2023.

⁴Data is for stem rust pathogen QCCJ. All lines were resistant to stem rust pathogen MCCF in years tested.

⁵Data from two trials with natural Powdery Mildew infection in 2024 only.

⁶ND Treasure only evaluated in 2023.

The other diseases listed in the disease reactions table are leaf diseases that can be a problem in Minnesota. All the varieties tested are generally susceptible (ratings from 3-8) to the QCCJ race of stem rust which has not been identified as a threat in the Midwest yet. All listed varieties carry stem rust resistance to the predominate *Puccinia graminis* f. sp. *tritici* race (MCCF). Most varieties possess pre-heading resistance to stem rust; thus, they will not likely incur much damage unless the disease epidemic is severe. Bacterial Leaf Streak (BLS) cannot be controlled by fungicides and there are some modest differences (ratings from 3-6) in resistance among the tested two row varieties.

PVP Status

The varieties covered by the Protection Act, PVP (94) are indicated in the table. Growers can save seed of PVP protected varieties for their own planting only; it cannot be sold to anyone else, not even a relative or a neighbor without specific permission of the applicant for protection.

Table 3. Relative grain yield (percent of the mean of the trial) of barley varieties in northern Minnesota locations in single-year (2024) and multiple year comparisons (2022-2024).

Variety	Crookston		Hallock		Oklee		Perley		Roseau		Stephen		Strathcona	
	2024	3yr	2024	3yr	2024	3yr	2024	3yr	2024	3yr ¹	2024	3yr	2024	2yr ²
2-row														
AAC Connect	106	104	97	102	104	99	116	107	98	99	104	105	101	94
AAC Synergy	108	105	102	104	99	99	103	107	96	97	97	107	82	93
ABI Cardinal	106	100	98	99	114	105	109	106	90	94	101	105	77	88
Excelsior Gold	89	94	108	105	106	104	117	110	100	105	100	100	90	89
Explorer	105	102	94	96	108	100	98	90	99	102	98	98	87	91
ND Genesis	101	102	109	106	95	98	104	103	102	105	100	106	122	109
6-row														
Lacey	98	102	108	99	109	104	97	97	101	100	96	91	119	108
ND Treasure ³	119	-	112	-	106	-	105	-	115	-	117	-	111	104
Quest	86	95	73	89	75	93	66	85	98	95	101	96	-	118
Rasmusson	102	107	99	101	102	104	93	101	105	105	100	101	107	106
Robust	89	92	98	96	91	94	94	93	96	97	88	95	97	98
Tradition	91	96	102	103	91	99	99	100	100	99	99	95	109	104
Mean (Bu/Acre)	131	117	152	144	135	116	106	114	143	136	135	121	90	111
LSD (0.10)	7.1	4.7	7.3	3.6	8.2	4.7	9.9	4.6	4.6	3.7	6.3	4.2	12.1	5.7

¹Trial data for Roseau is from 2022 and 2024.

²Trial data for Strathcona is from 2023 and 2024.

³ND Treasure evaluated in 2023 and 2024.

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Table 4. Relative grain yield (percent of the mean of the trial) of barley varieties in southern Minnesota locations in single-year (2024) and multiple year comparisons (2022-2024).

Variety	Becker		Fergus Falls	Lamberton		Le Center		Rochester		St. Paul	
	2024	3yr	3yr ¹	2024	3yr	2024	3yr	2024	3yr ²	2024	3yr
2-row											
AAC Connect	104	102	102	110	98	111	103	101	100	80	96
AAC Synergy	94	99	102	98	97	100	97	99	106	92	102
ABI Cardinal	98	104	97	95	91	108	106	105	89	89	102
Excelsior Gold	100	96	104	92	95	99	95	103	97	79	84
Explorer	103	99	96	95	100	95	95	83	87	101	117
ND Genesis	86	92	110	93	100	104	104	91	101	82	95
6-row											
Lacey	96	101	95	109	106	118	106	96	104	128	111
ND Treasure ³	129	-	-	112	-	110	-	120	-	121	-
Quest	106	103	96	108	115	72	94	73	94	99	87
Rasmusson	110	118	107	100	103	111	108	121	118	128	114
Robust	84	87	88	98	96	95	96	114	106	108	91
Tradition	90	100	102	88	97	75	97	93	98	93	101
Mean (Bu/Acre)	65	77	118	58	62	85	98	60	70	64	64
LSD (0.10)	11.6	6.6	4.8	8.0	5.5	10.8	5.0	11.0	7.5	12.3	7.9

¹Trial data for Fergus Falls is from 2022 and 2023; 2024 trial was lost to hail

²Trial data for Rochester is from 2022 and 2024.

³ND Treasure evaluated in 2023 and 2024.

Table 5. Relative grain yield (percent of the mean of the trial) of barley varieties in a single-year (2024) and multiple year comparisons (2022-2024).

Variety	State			North			South		
	2024	2yr	3yr	2024	2yr	3yr	2024	2yr	3yr
2-row									
AAC Connect	103	101	101	103	101	101	102	101	101
AAC Synergy	98	100	101	99	100	102	97	101	100
ABI Cardinal	100	101	99	100	99	99	100	104	99
Excelsior Gold	100	98	100	102	99	102	95	96	96
Explorer	98	98	98	99	98	97	96	98	98
ND Genesis	101	101	103	104	102	104	92	100	102
6-row									
Lacey	105	103	101	103	103	100	110	104	103
ND Treasure ¹	114	107	.	112	108	.	118	107	.
Quest	87	93	96	88	93	96	90	91	98
Rasmusson	105	105	106	101	103	104	114	109	111
Robust	95	95	95	93	94	95	99	95	93
Tradition	95	97	100	98	99	100	87	94	99
Mean (Bu/Acre)	102	104	104	128	128	123	66	76	81
LSD (0.10)	2.5	0.9	1.0	2.9	1.0	1.3	4.9	1.9	1.7
No. of Environments	12	23	35	7	13	19	5	10	16

¹ND Treasure evaluated in 2023 and 2024.

Barley

Planting Rate and Date

Bushel Weight, Pounds.....48

Seeds/Pound.....14,300

Planting Rate, Pounds/Acre.....85

Planting Rate, Seeds/Sq. Ft.....28

Planting Date.....Early Spring