



2024 Oat Field Crop Trials Results

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

Oat varieties were sown in trials plots in 2024 at Becker, Lamberton, Le Center, Rochester, St. Paul and Waseca in Southern Minnesota (south of I-94). In Northern Minnesota (north of I-94), trials were conducted in Crookston, Roseau and Stephen. Yield performance from single years should be viewed cautiously as environmental variability may significantly affect the yields in single locations or years. Maturity, height, and test weight data are presented as statewide averages from 2022-2024 except where noted. Straw strength data is also a statewide average from the same period, but only from locations where lodging was present. Grain protein is presented based on data from at least eight trials from 2022-2024. In addition, entries were evaluated for disease resistance to crown rust, barley yellow dwarf virus (BYDV), and loose smut in specific inoculated nurseries. Crown rust ratings are based on data from 2022-2024.

Variety Selection

While yield is an important selection criterion, grain quality and disease resistance should also be considered. Millers have grain quality and variety preferences which can be considered if that is the intended target. Crown rust continues to be a major limiting factor to oat production in Minnesota that must be managed to achieve optimal yield. Rust in all yield trials was managed through treatment with a propiconazole-based fungicide when the flag

leaf was fully extended (Feekes 9) to evaluate the yield potential without disease infection. All disease scores are on a "1-9" scale where "1" is very resistant and "9" is very susceptible. Crown rust resistance was evaluated in the Buckthorn Nursery in St. Paul by the USDA-ARS using an exceptionally aggressive crown rust population. The most economical way of controlling crown rust is through resistant varieties; however, application of fungicide to a variety with rating of "4" or greater is prudent if crown rust is present in the lower canopy at Feekes 9.

Other important diseases include BYDV and smut, which were evaluated in inoculated nurseries at the University of Illinois and the University of Minnesota, respectively. Varieties susceptible to BYDV (rating > 3) should be selected with caution particularly in Southern Minnesota, where aphid disease transmitters are more common early in the season. A seed treatment and certified seed should be used to manage smut. Disease resistance may be a driving factor if pesticides are not economical or if the intended production system is organic.

PVP Status

The U.S. Plant Variety Protection Act (PVP) status is listed for all varieties tested. PVP(94) notation indicates that seed of that variety may not be sold by a grower without the permission of the variety's owner. If the PVP is pending, consider the variety as having PVP(94) protection.



Authors

Kevin Smith, Ruth Dill-Macky, Nicholas Metz, Karen Beaubien, Jochum Wiersma

Researchers

Mike Leiseth, Travis Vollmer, Danielle Fiebelkorn Wrucke and Donn Vellekson supervised and carried out test plot establishment and management.

Oat	
Planting Rate and Date	
Bushel Weight, Pounds.....	32
Seeds/Pound.....	16,200
Planting Rate, Pounds/Acre.....	80
Planting Rate, Seeds/Sq. Ft.....	28
Planting Date.....	Early Spring

Table 1. Origin and agronomic characteristics of oat varieties in Minnesota in multiple-year comparisons (2022-2024).

Variety	Origin ¹	Year of Release	Legal Status	Seed Color	Heading (days)	Height (inches)	Straw Strength ² (0-9)	Test Weight (lbs/bu)	Grain Protein (%)
Antigo	WI	2017	PVP(94)	Yellow	53.0	35.0	2.6	38.7	13.8
CS Camden	LS	2013	PVP(94)	White	58.9	37.2	2.4	34.3	12.7
Deon	MN	2014	PVP(94)	Yellow	59.6	41.0	3.5	37.3	12.7
Esker2020	WI	2020	PVP(94)	Yellow	55.8	36.7	2.7	34.4	12.9
Hayden	SD	2015	PVP(94)	White	58.1	39.7	3.4	37.9	12.6
Mink	WI	2022	PVP(94)	Yellow	61.8	39.2	2.7	35.1	12.7
MN-Pearl	MN	2018	PVP(94)	White	58.4	40.0	3.9	35.3	12.0
ND Carson ³	ND	2023	Pending	White	61.2	39.5	2.1	36.2	12.1
ND Heart	ND	2020	PVP(94)	White	58.2	39.2	3.7	36.8	13.5
ND Spilde ³	ND	2023	Pending	White	59.9	41.2	3.5	35.2	12.2
Reins	IL	2016	PVP(94)	White	52.8	30.8	1.5	37.3	13.4
Rushmore	SD	2020	PVP(94)	White	56.1	38.2	2.8	37.7	12.5
Saddle	SD	2018	PVP(94)	White	52.9	36.1	1.8	36.2	12.5
SD Buffalo	SD	2021	PVP(94)	White	57.3	39.7	3.5	36.9	12.5
SD Momentum ⁴	SD	2024	na	White	64.1	53.7	4.7	39.9	11.9
SD Titan ⁴	SD	2024	na	White	62.3	50.9	4.7	38.5	12.2
Streaker ⁵	SD	2016	PVP(94)	Hulless	55.6	37.6	4.2	42.1	14.9
Sumo	SD	2017	PVP(94)	White	52.3	37.1	2.3	37.7	13.7
Warrior	SD	2019	PVP(94)	White	56.1	36.7	2.5	36.6	12.9
No. of Trials					9	9	12	17	10

¹ Lantmannen Seed (LS), North Dakota State University (ND), South Dakota State University (SD), University of Illinois Urbana-Champaign (IL), University of Minnesota (MN), University of Wisconsin (WI).

² 0-9 Scale where 0=most resistant, 9=most susceptible

³ Line tested in 2023 and 2024.

⁴ Line tested in 2024 only.

⁵ Hulless oat

Table 2. Disease characteristics of oat varieties.

Variety	Crown Rust ¹	Loose Smut ¹	BYDV ^{1,2}	
Antigo	3	4	4	
CS Camden	5	3	4	
Deon	5	1	4	
Esker2020	2	2	3	
Hayden	5	1	3	
Mink	2	2	-	
MN-Pearl	5	1	4	
ND Carson ³	5	1	-	
ND Heart	4	6	4	
ND Spilde ³	3	1	-	
Reins	6	1	4	
Rushmore	5	3	4	
Saddle	5	1	4	
SD Buffalo	4	2	-	
SD Momentum ⁴	3	1	-	
SD Titan ⁴	2	1	-	
Streaker ⁵	5	2	4	
Sumo	3	1	4	
Warrior	4	2	4	
No. of Trials		3	3	1

¹ Disease scored on a 1-9 scale where 1 = most resistant, 9 = most susceptible.

² BYDV tested in 2021.

³ Line tested in 2023 and 2024.

⁴ Line tested in 2024 only.

⁵ Hulless oat

Table 3. Relative grain yield of oat varieties in Minnesota in single-year (2024) and multiple-year comparisons (2022-2024).

Variety	North			South			Statewide		
	2024	2yr	3yr	2024	2yr	3yr	2024	2yr	3yr
Antigo	93	91	87	102	100	99	98	95	93
CS Camden	98	104	107	102	106	105	100	105	106
Deon	107	107	108	105	109	108	106	108	108
Esker2020	103	103	103	113	111	111	108	107	107
Hayden	101	102	106	95	99	103	98	101	104
Mink	118	120	114	116	113	116	117	117	115
MN-Pearl	102	104	108	89	94	97	95	99	102
ND Carson ¹	104	104	-	93	97	-	98	101	-
ND Heart	97	98	95	91	91	90	94	94	92
ND Spilde ¹	101	105	-	110	112	-	106	109	-
Reins	96	92	93	95	96	94	95	94	93
Rushmore	100	99	103	102	102	104	101	100	103
Saddle	105	101	101	109	109	107	107	105	104
SD Buffalo	105	106	108	93	98	102	99	102	105
SD Momentum ²	101	-	-	109	-	-	106	-	-
SD Titan ²	100	-	-	111	-	-	106	-	-
Streaker ³	71	72	75	73	73	72	72	72	73
Sumo	95	90	89	94	92	92	94	91	91
Warrior	101	100	103	98	100	101	100	100	102
Mean (Bu/Acre)	209	191	183	116	116	120	147	146	145
LSD (0.1)	3.7	2.1	1.8	4.1	2.5	2.3	2.8	1.6	1.5
# of Environments	3	6	10	6	9	14	9	15	24

¹ Line tested in 2023 and 2024.² Line tested in 2024 only.³ Hulless Oat

Table 4. Relative grain yield of oat varieties in Northern Minnesota locations in single-year (2024) and multiple-year comparisons (2022-2024).

Variety	Crookston		Fergus Falls	Roseau		Stephen	
	2024	3yr	3yr ¹	2024	3yr ²	2024	3yr
Antigo	89	88	76	95	88	95	93
CS Camden	100	105	112	103	108	92	105
Deon	108	109	105	106	108	108	109
Esker2020	105	107	93	103	106	102	103
Hayden	99	105	109	102	106	102	104
Mink	106	110	108	133	121	113	115
MN-Pearl	94	105	113	102	107	109	109
ND Carson ³	111	-	-	99	-	104	-
ND Heart	100	100	100	92	89	100	91
ND Spilde ³	100	-	-	100	-	103	-
Reins	95	95	85	98	96	95	95
Rushmore	104	101	101	97	103	100	104
Saddle	103	104	93	107	103	105	103
SD Buffalo	95	104	108	110	109	108	110
SD Momentum ⁴	106	-	-	100	-	99	-
SD Titan ⁴	106	-	-	94	-	101	-
Streaker ⁵	78	76	84	66	71	70	71
Sumo	99	87	95	91	87	94	91
Warrior	104	105	118	101	98	99	96
Mean (Bu/Acre)	197	184	143	211	202	219	204
LSD (0.10)	5.6	4.5	6.9	7.4	5.9	5.7	4.6

¹Trial data is from 2022 and 2023; 2024 trial was lost to hail.

²Trial data is from 2022 and 2024.

³Line tested in 2023 and 2024.

⁴Line tested in 2024 only.

⁵Hulless oat

Table 5. Relative grain yield of oat varieties in Southern Minnesota locations in single-year (2024) and multiple-year comparisons (2022-2024).

Variety	Becker		Lamberton		Le Center		Rochester		St. Paul	Waseca
	2024	3yr ¹	2024	3yr	2024	3yr	2024	3yr ¹	2024 ²	3yr ³
Antigo	106	109	131	99	94	97	90	89	110	87
CS Camden	109	117	123	119	100	106	102	94	102	120
Deon	106	96	125	128	107	109	108	114	106	101
Esker2020	103	105	133	117	109	104	118	118	113	111
Hayden	86	96	116	114	96	109	99	105	103	96
Mink	109	112	115	121	120	110	136	132	107	131
MN-Pearl	77	84	116	105	79	95	94	101	100	106
ND Carson ⁴	97	-	98	-	97	-	97	-	98	-
ND Heart	100	94	101	101	90	93	101	93	82	88
ND Spilde ⁴	113	-	115	-	117	-	118	-	94	-
Reins	83	92	126	106	96	98	81	76	103	94
Rushmore	88	89	133	106	97	103	93	102	118	108
Saddle	109	109	134	111	100	99	106	107	125	93
SD Buffalo	99	108	120	115	95	103	89	112	91	107
SD Momentum ⁵	112	-	128	-	121	-	118	-	96	-
SD Titan ⁵	108	-	138	-	116	-	102	-	104	-
Streaker ⁶	80	73	106	83	78	82	69	70	65	72
Sumo	101	100	137	107	89	90	85	90	92	79
Warrior	114	116	127	112	98	102	94	99	91	105
Mean (Bu/A)	95	97	122	110	139	138	123	134	171	86
LSD (0.10)	9.8	8.0	7.3	5.9	7.8	4.3	10.8	8.5	9.8	8.6

¹ Trial data is from 2022 and 2024.² Trial data is from 2024 only.³ Trial data is from 2022 and 2023; 2024 trial was lost to excessive rain.⁴ Line tested in 2023 and 2024.⁵ Line tested in 2024 only.⁶ Hulless oat