

2020 South Dakota Oat Variety Trial Results Regional Summaries

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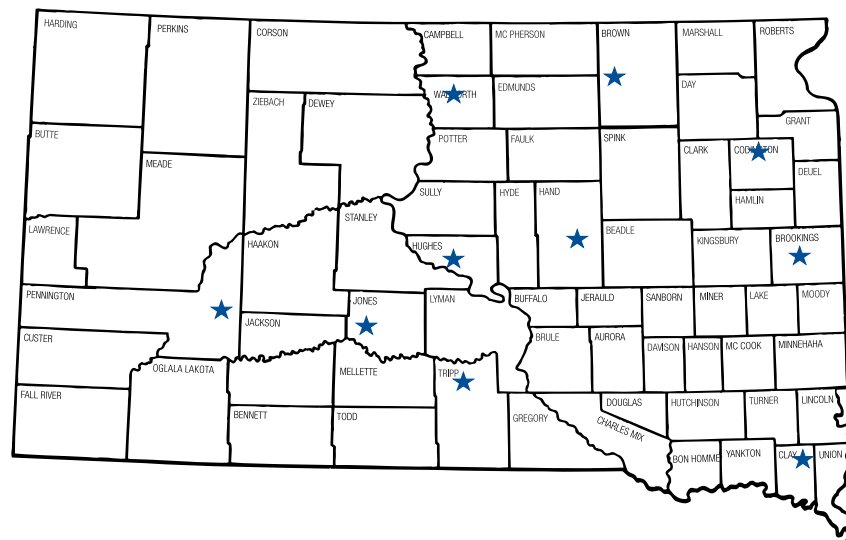
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Eastern trial locations: Beresford, South Shore, Volga

Central trial locations: Aberdeen, Miller, Pierre, Selby

Western trial locations: Okaton, Wall, Winner

Individual trial location results can be accessed online at:

<https://extension.sdstate.edu/oat-variety-trial-results>

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The 2020 oat growing season in South Dakota was characterized by a relatively early spring planting followed by good growing conditions in many areas of the state. Yields at some testing locations, especially Volga, were negatively impacted by heat during flowering and grain fill. Harvest progressed fairly rapidly and produced average to above-average yields in most areas of the state. There were no significant disease outbreaks in the spring wheat crop. Crown rust continued to be a problem in oats, especially in the eastern portions of the state.

Oat yields from the South Dakota State University Crop Performance Testing program averaged 113 bu/acre in the eastern trial locations, ranging from 100 bu/acre at Beresford to 130 bu/acre at South Shore. The top yielding varieties over three years in the east were **Deon**, **Rushmore**, and **Warrior**. A promising new variety with a good two-year yield average is **MN-Pearl**. Yields in the central part of South Dakota averaged 141 bu/acre, ranging from 126 bu/acre at Selby to 170 bu/acre at Aberdeen. The top performing varieties over three years in the central region were **CS Camden**, **Hayden**, and **Deon**. **MN-Pearl** also had a good two-year average yield in central SD. Yields in western South Dakota averaged 87 bu/acre, ranging from 65 bu/acre at Wall to 116 bu/acre at Winner. The best performers over three years in the western part of the state were **Goliath**, **Deon**, and **Hayden**. **MN-Pearl** also looked promising in western SD. The Volga location was set up as a split plot with fungicide-treated versus no fungicide. In areas where crown rust is a concern, producers should be aware that a fungicide treatment can provide a 50 bu/acre or more yield response. Even varieties that are rated as resistant to crown rust showed a response to fungicide in 2020. Detailed results for each trial location in South Dakota are available at: <https://extension.sdstate.edu/oat-variety-trial-results>.

Consider as much performance information as possible when selecting a variety, and give more weight to information from trials close to home, as some varieties may be better suited to certain geographic areas. Also pay close attention to relative performance over many locations. This type of performance is an indication of "yield stability." Good yield stability refers to the ability of a variety exhibit high yield potential at many locations over years. For example, a variety that ranks in the upper 40% at all locations exhibits better yield stability than a variety that is number one for yield at one location but ranks in the lower 40% at some other locations. Performance over multiple years is also very important. Growing conditions in a single season may favor certain varieties, providing a poor representation of yield potential over time. For example, growing conditions in 2020 again favored varieties with good crown rust resistance. A good rule of thumb is to plant 65%-75% of your acres to varieties with a proven track record (i.e. a good multi-year average) and plant the remaining 25%-35% to a promising new variety.

It is important to remember that varieties may differ by 5 bu/acre or even more and still be statistically similar. This is due to inherent variability in the environment and the yield testing process. Varieties that are statistically similar to the top performing variety at each location can be calculated by subtracting the least significant difference (LSD) value from the top performing variety. The LSD is a statistic used to determine if varieties are truly different from one another.

The coefficient of variation (CV) listed at the bottom of each data column, which is often expressed as a percentage of a given trait mean, is a relative measure of the amount of test variation for that trait. Generally, in yield trials, a CV of 15% is considered acceptable and a CV of 10% or less indicates good quality data. Higher variability (and thus higher CVs) can be caused by several environmental factors, such as stand loss due to residue cover or heavy precipitation, and reduces the ability to detect true varietal differences.

Table 1. List of oat varieties tested in 2020 along with origin, agronomic, and grain quality characteristics.

Variety	Testing and Origin		Agronomic Characteristics			Grain Quality			Disease Ratings#			
	Years tested in SD trials	Origin†-Year	Rel. Hdg.‡ (days)	Rel. Height (inches)	2019 Lodging Score§	Grain Color	Rel. Test Wt. (lb/bu)	Rel. Protein (%)	Smut	Stem Rust	2020 Crown Rust	2020 BYDV score
Antigo	4	WI-17	0	0	2.4	Yellow	2.4	1.5	S	-	8	3
CS Camden	5+	MS-16	7	2	2.4	White	-3.6	-0.8	MR	(S)*	7	4
Deon	5+	MN-13	7	6	2.6	Yellow	0.3	-0.2	R	MR	6	4
Esker2020	new	WI-19	2	2	2.3	Yellow	-2.2	-0.4	-	-	7	4
GM2015Y3232	new	GM-exp	2	4	2.3	White	-1.2	0.5	(R)	(MS)	6	4
Goliath	5+	SD-12	7	13	3.6	White	0.6	0.0	MR	R	9	4
Hayden	5+	SD-14	6	4	3.3	White	0.6	-0.3	R	MS	9	4
MN Pearl	2	MN-18	6	5	2.6	White	0.3	-1.1	R	-	6	4
Natty	5+	SD-14	2	4	3.4	White	1.0	0.8	R	MS	8	3
Rushmore	4	SD-19	3	4	2.2	White	1.6	-0.3	R	-	6	3
Saddle	5+	SD-17	0	0	1.6	White	-0.4	0.2	R	S	6	3
Shelby427	5+	SD-09	1	5	2.9	White	1.0	0.2	R	MS	9	3
Warrior	5+	SD-18	2	2	1.6	White	-0.4	-0.1	R	-	4	4

† GM, General Mills; MN, Minnesota; MS, Meridian Seeds; SD, South Dakota; WI, Wisconsin; - (Year of Release)

‡ Days to heading and height as compared to Saddle (169 days Julian & 31 inches) statewide.

§ Lodging score: Rating scale 1-5 (1=Standing perfectly to 5=Completely flat) based on 2020 observations.

¶ Test weight and protein as compared to the trial averages (34.1 lb/bu & 13.6%).

Disease ratings: R - resistant, MR - moderately resistant, MS - moderately susceptible, S - susceptible, VS - very susceptible; CR & BYDV scores: 1 (very tolerant) - 9 (very severe symptoms)

* Ratings (X) based on information supplied by the entity submitting the variety.

Table 2. Grain quality and milling characteristics.

Variety	% Plump	% Mid	% Thin	1000 Kernel Weight (g)	Groat %	NIR groat protein (%)	NIR groat beta-glucan (%)	NIR groat fat (%)
Antigo	11.0	76.8	13.7	26.3	68.6	19.8	5.3	5.4
CS Camden	43.1	51.0	5.8	33.6	67.8	16.8	5.5	4.6
Deon	28.1	64.9	7.0	33.2	70.9	15.7	5.0	4.8
Esker2020	33.5	57.2	9.2	31.0	69.7	16.8	5.2	3.7
GM2015Y3232	55.6	38.4	5.9	35.7	72.1	17.7	5.3	5.0
Goliath	36.5	55.9	7.7	32.5	70.7	15.6	4.9	4.4
Hayden	37.3	55.8	6.8	33.1	68.2	15.3	5.0	5.3
MN Pearl	56.8	38.4	4.7	33.1	73.4	14.4	4.6	5.1
Natty	42.2	51.9	5.8	32.5	72.2	15.9	4.2	3.4
Rushmore	55.0	41.5	3.5	33.3	71.8	16.8	4.6	4.1
Saddle	28.6	64.4	6.9	29.2	71.8	16.7	4.4	3.6
Shelby427	42.4	51.8	5.7	29.9	71.3	16.5	4.7	4.9
Warrior	40.2	54.5	5.1	31.8	70.9	17.1	5.0	4.6
Trial Average	44.5	49.9	5.6	32.6	71.0	16.6	4.9	4.5
LSD(0.05)†	10.4	7.8	23.0	3.3	1.4	3.1	3.4	5.3
C.V.%‡	3.0	2.6	0.8	0.7	0.7	0.3	0.1	0.2

† Value required (\geq LSD) to determine if varieties are significantly different from one another.

‡ C.V. is a measure of variability or experimental error

Table 3. 2018-2020 oat variety performance trial results for testing sites in eastern South Dakota. Varieties ranking in the top 1/3 of each trial category are shaded light blue.

Variety	2018 Yield (bu/a)	2019 Yield (bu/a)	2020		2-year		3-year	
			Yield (bu/a)	Test Wt (lbs)	Yield (bu/a)	Test Wt (lbs)	Yield (bu/a)	Test Wt (lbs)
Deon	113.8	102.9	118.5	33.5	111.9	33.8	115.1	33.5
Rushmore	110.2	100.4	121.0	35.0	112.1	35.3	113.7	34.8
Warrior	103.5	100.5	112.0	32.4	107.0	33.1	108.2	32.9
CS Camden	109.1	79.2	110.1	28.7	96.9	29.3	102.6	28.9
Saddle	98.3	94.6	102.7	31.9	99.3	32.9	100.5	32.5
Goliath	98.8	69.3	108.4	33.4	91.7	33.1	96.0	32.8
Antigo	95.1	91.0	94.1	35.9	92.8	36.3	94.9	35.6
Natty	94.0	67.7	100.2	33.5	86.3	33.7	90.0	33.2
Hayden	85.5	55.4	99.3	32.4	80.5	32.0	83.7	32.3
Shelby427	80.0	53.4	87.9	33.9	73.1	33.5	76.8	33.4
MN Pearl	-	99.5	121.2	33.1	111.9	33.5	-	-
Esker2020	-	-	108.2	31.0	-	-	-	-
GM2015Y3232	-	-	99.7	31.7	-	-	-	-
Trial Average#	97.6	81.8	113.0	33.6	102.2	33.6	102.8	33.2
LSD(0.05)†	5.9	6.4	14.3	1.5	14.0	1.6	12.5	1.3
C.V.%‡	7.1	8.8	5.3	1.8	6.5	2.3	7.0	2.7

Trial averages may include values from experimental lines that are not reported.

† Value required (\geq LSD) to determine if varieties are significantly different from one another.

‡ C.V. is a measure of variability or experimental error, 15% or less is considered acceptable.

Table 4. 2018-2020 oat variety performance trial results for testing sites in central South Dakota. Varieties ranking in the top 1/3 of each trial category are shaded light blue.

Variety	2018 Yield (bu/a)	2019 Yield (bu/a)	2020		2-year		3-year	
			Yield (bu/a)	Test Wt (lbs)	Yield (bu/a)	Test Wt (lbs)	Yield (bu/a)	Test Wt (lbs)
CS Camden	133.9	104.4	155.8	31.4	133.8	30.4	133.8	30.5
Hayden	128.0	97.2	151.1	35.9	128.0	35.3	128.0	35.3
Deon	119.2	108.2	147.8	34.6	130.8	34.2	127.3	34.1
Rushmore	116.7	108.4	143.4	36.2	128.4	36.0	124.9	35.5
Warrior	112.4	110.2	133.2	34.0	123.3	34.3	120.0	34.0
Natty	116.3	95.0	140.2	35.8	120.9	35.1	119.5	35.0
Goliath	116.2	96.5	138.6	35.3	120.5	34.7	119.2	34.8
Saddle	100.6	103.2	130.0	34.2	118.5	33.7	113.1	33.5
Shelby427	103.4	91.3	127.6	35.6	112.0	35.0	109.4	34.9
Antigo	87.5	100.4	111.6	36.8	106.8	36.7	101.0	36.3
MN Pearl	-	110.7	146.7	34.7	131.3	34.2	-	-
Esker2020	-	-	143.1	32.1	-	-	-	-
GM2015Y3232	-	-	125.6	33.7	-	-	-	-
Trial Average#	113.9	103.3	140.6	35.1	125.2	34.6	121.4	34.4
LSD(0.05)†	4.5	5.2	3.8	0.4	14.2	1.4	10.8	1.1
C.V.%‡	4.9	6.3	3.9	1.7	4.5	2.2	4.6	2.2

Trial averages may include values from experimental lines that are not reported.

† Value required (\geq LSD) to determine if varieties are significantly different from one another.

‡ C.V. is a measure of variability or experimental error, 15% or less is considered acceptable.

Table 5. 2018-2020 oat variety performance trial results for testing sites in western South Dakota. Varieties ranking in the top 1/3 of each trial category are shaded light blue.

Variety	2018 Yield (bu/a)	2019 Yield (bu/a)	2020		2-year		3-year	
			Yield (bu/a)	Test Wt (lbs)	Yield (bu/a)	Test Wt (lbs)	Yield (bu/a)	Test Wt (lbs)
Goliath	76.3	107.1	89.8	35.4	98.5	34.7	92.9	35.4
Deon	79.2	95.7	88.9	35.1	92.3	34.3	89.0	34.6
Hayden	81.4	87.9	92.8	35.6	90.3	34.6	88.1	35.1
Rushmore	73.6	93.5	90.8	35.8	92.2	34.7	87.5	35.2
CS Camden	77.8	95.8	84.3	31.3	90.0	29.7	87.0	30.1
Natty	75.2	87.7	83.3	35.9	85.5	35.2	82.9	35.4
Shelby427	62.9	82.6	92.0	35.6	87.3	34.2	81.2	34.7
Warrior	68.8	86.2	82.2	34.6	84.2	33.2	80.4	33.3
Antigo	60.7	65.5	83.4	36.7	74.4	35.0	71.0	35.4
Saddle	59.9	60.8	76.8	34.9	68.8	32.5	66.6	33.0
MN Pearl	-	102.9	95.4	35.2	99.2	34.4	-	-
Esker2020	-	-	92.7	32.5	-	-	-	-
GM2015Y3232	-	-	70.7	33.3	-	-	-	-
Trial Average#	73.9	89.5	86.5	35.1	88.2	34.0	84.2	34.3
LSD(0.05)†	7.7	8.0	11.26	1.7	11.1	1.2	9.1	1.1
C.V.%‡	10.5	11.1	11.9	2.5	12.3	2.7	12.3	2.6

Trial averages may include values from experimental lines that are not reported.

† Value required (\geq LSD) to determine if varieties are significantly different from one another.

‡ C.V. is a measure of variability or experimental error, 15% or less is considered acceptable.