



# 2021 South Dakota Oat Variety Trial Results Regional Summaries

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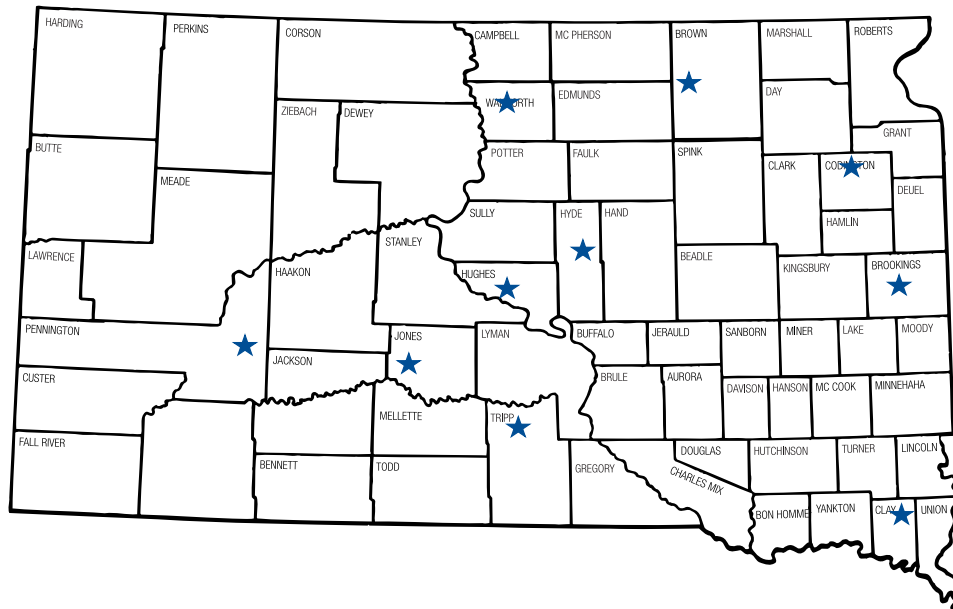
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Eastern trial locations: Beresford, South Shore, Volga

Central trial locations: Aberdeen, Highmore (no data), Pierre, Selby (no data)

Western trial locations: Okaton (not harvested), Wall, Winner

Individual trial location results can be accessed online at: <https://extension.sdstate.edu/oat-variety-trial-results>



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# 2021 South Dakota Oat Performance Trial Highlights

Jonathan Kleinjan | SDSU Extension Agronomist

The 2021 oat growing season in South Dakota was characterized by an early spring planting followed by heat and near-record dryness in many areas of the state. Yields at several trial locations were negatively impacted by heat and drought during flowering and grain fill. Harvest progressed rapidly and produced below-average yields in most areas of the state. Due to the dry conditions, there were no widespread outbreaks of crown rust in South Dakota during 2021.

Oat yields from the South Dakota State University Crop Performance Testing program averaged 90 bushels/acre (bu/acre) in the eastern trial locations (Beresford, Brookings and South Shore), ranging from 59 bu/acre at Beresford to 101 bu/acre at Brookings. The top yielding varieties over three years in the east were **Deon**, **MN Pearl** and **Warrior**. Yields in the central part of South Dakota (Aberdeen and Pierre) averaged 81 bu/acre, ranging from 62 bu/acre at Pierre to 101 bu/acre at Aberdeen. Highmore and Selby were harvested but the drought caused too much variability at these locations to include them in the final trial results. The top performing varieties over three years in the central region were **CS Camden**, **Deon** and **MN Pearl**. Yields in western South Dakota (Wall and Winner) averaged 52 bu/acre, ranging from 33 bu/acre at Winner to 71 bu/acre at Wall. The Okaton location was abandoned due to drought. The best performers over three years in the western part of the state were **Goliath**, **MN Pearl** and **Rushmore**. The eastern trial locations were 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 even greater yield response. However, due to the prevalent dry conditions, there was no significant response to fungicide in 2021. 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 to exhibit high yield potential at many locations over multiple years. For example, a variety that ranks in the upper 40% at all locations exhibits better yield stability than a variety that is No. 1 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.



## 2021 South Dakota Oat Variety Trial Results Variety List

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Table 1. List of oat varieties tested in 2021 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)	Height (inches)	2021 Lodging Score§	Grain Color	2021 Test Wt. (lb/bu)	2021 Protein (%)	Smut	Stem Rust	2020 Crown Rust	2020 BYDV score
CS Camden	5+	MS-16	6	24	1.9	White	29.7	13.9	MR	(S)*	7	4
Deon	5+	MN-13	5	27	3.3	Yellow	33.2	14.8	R	MR	6	4
Esker2020	2	WI-19	2	25	3.3	Yellow	30.6	14.4	-	-	7	4
Goliath	5+	SD-12	6	31	3.6	White	33.1	14.8	MR	R	9	4
Hayden	5+	SD-14	6	25	1.4	White	31.1	14.3	R	MS	9	4
KWS Ocre	new	KWS-22	4	23	2.8	Yellow	33.8	13.6	-	-	-	-
KWS Opaline	new	KWS-22	5	22	1.8	White	32.1	14.0	-	-	-	-
MN Pearl	3	MN-18	5	25	2.8	White	32.6	13.7	R	-	6	4
Natty	5+	SD-14	3	28	3.4	White	31.9	15.3	R	MS	8	3
Reins	new	IL-15	0	20	1.1	White	34.8	15.6	(R)	-	(MS)	(R)
Rushmore	5+	SD-19	3	26	2.9	White	33.0	13.9	R	-	6	3
Saddle	5+	SD-17	0	23	1.6	White	30.3	14.3	R	S	6	3
Shelby427	5+	SD-09	1	26	2.1	White	32.9	15.0	R	MS	9	3
Warrior	5+	SD-18	2	24	1.6	White	31.1	14.3	R	-	4	4

† IL, Illinois; KWS, KWS Seeds (via Albert Lea Seed); MN, Minnesota; MS, Meridian Seeds; SD, South Dakota; WI, Wisconsin; - (Year of Release)  
‡ Days to heading as compared to Saddle (160 days Julian) statewide.  
§ Lodging score: Rating scale 1-5 (1=Standing perfectly to 5=Completely flat) based on 2021 observations at Brookings and South Shore.  
# 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.



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## 2021 South Dakota Oat Variety Trial Results Quality Characteristics

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 (%)
CS Camden	30.3	63.2	6.5	35.3	69.0	18.9	5.7	4.3
Deon	24.9	64.3	11.7	32.0	70.6	18.1	4.9	4.6
Esker2020	33.2	51.9	17.1	29.8	71.0	19.4	5.2	3.7
Goliath	34.9	55.1	11.5	30.5	75.1	18.9	4.9	4.3
Hayden	53.1	38.2	9.4	32.5	70.1	17.7	4.8	4.8
KWS Ocre	31.2	62.3	7.3	32.8	67.7	18.6	5.1	4.2
KWS Opaline	43.4	52.7	7.3	29.3	67.6	19.2	5.0	3.5
MN Pearl	40.4	52.3	9.0	33.6	76.3	16.9	4.8	4.7
Natty	48.3	43.0	10.5	31.2	72.1	19.1	4.1	3.2
Reins	38.5	53.2	9.0	31.8	73.4	19.9	4.9	4.1
Rushmore	40.0	51.8	10.8	30.5	71.7	19.7	4.8	4.2
Saddle	20.2	70.1	10.4	29.3	69.8	19.2	4.6	3.6
Shelby427	32.3	59.6	9.8	29.1	70.6	19.4	4.8	4.7
Warrior	28.5	63.3	9.8	30.6	70.8	19.2	5.0	4.6
<b>Trial Average</b>	37.9	54.5	9.0	32.2	77.2	18.7	4.9	4.2
<b>LSD(0.05)†</b>	2.4	2.1	1.1	1.1	1.8	0.4	0.1	0.2
<b>C.V.%‡</b>	9.0	5.6	18.0	4.6	3.3	3.3	3.8	5.3

† Value required ( $\geq$ LSD) to determine if varieties are significantly different from one another.  
‡ C.V. is a measure of variability or experimental error



## 2021 South Dakota Oat Variety Trial Results Eastern Summary

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Table 3. 2019-2021 oat variety performance trial results for testing sites in eastern South Dakota. Varieties ranking in the top third of each trial category are shaded light blue.

Variety	2019 Yield (bu/a)	2020 Yield (bu/a)	2021		2-year		3-year	
			Yield (bu/a)	Test Wt (lbs)	Yield (bu/a)	Test Wt (lbs)	Yield (bu/a)	Test Wt (lbs)
Deon	102.9	118.5	91.7	33.2	105.1	32.9	104.4	33.1
MN Pearl	99.5	121.2	85.5	33.7	103.4	33.4	102.1	33.5
Warrior	100.5	112.0	92.7	32.3	102.3	32.0	101.7	32.4
Rushmore	100.4	121.0	82.1	35.0	101.5	34.6	101.1	34.8
CS Camden	79.2	110.1	99.1	29.4	104.6	29.1	96.1	29.3
Saddle	94.6	102.7	76.3	31.6	89.5	31.1	91.2	31.7
Goliath	69.3	108.4	86.7	33.9	97.6	33.3	88.2	33.2
Natty	67.7	100.2	85.1	33.4	92.7	32.9	84.3	33.1
Hayden	55.4	99.3	92.6	33.3	95.9	32.3	82.4	32.1
Shelby427	53.4	87.9	88.7	34.1	88.3	33.8	76.6	33.6
Esker2020	-	108.2	82.3	31.3	95.2	30.9	-	-
KWS Ocre	-	-	99.6	33.0	-	-	-	-
KWS Opaline	-	-	89.1	33.2	-	-	-	-
Reins	-	-	84.2	34.7	-	-	-	-
<b>Trial Average#</b>	81.8	113.0	89.5	33.2	97.8	32.6	92.8	32.7
<b>LSD(0.05)†</b>	6.4	14.3	9.2	1.9	9.7	1.2	11.2	1.3
<b>C.V.%‡</b>	8.8	5.3	4.5	2.9	5.3	3.4	6.3	3.1

# 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.



## 2021 South Dakota Oat Variety Trial Results Central Summary

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Table 4. 2019-2021 oat variety performance trial results for testing sites in central South Dakota. Varieties ranking in the top third of each trial category are shaded light blue.

Variety	2019 Yield (bu/a)	2020 Yield (bu/a)	2021		2-year		3-year	
			Yield (bu/a)	Test Wt (lbs)	Yield (bu/a)	Test Wt (lbs)	Yield (bu/a)	Test Wt (lbs)
CS Camden	104.4	155.8	107.2	31.4	131.5	31.4	122.5	30.6
Deon	108.2	147.8	86.6	32.7	117.2	34.0	114.2	33.9
MN Pearl	110.7	146.7	78.6	32.7	112.6	34.0	112.0	33.9
Rushmore	108.4	143.4	76.7	33.2	110.1	35.2	109.5	35.4
Warrior	110.2	133.2	84.3	30.5	108.7	32.8	109.2	33.5
Hayden	97.2	151.1	71.5	29.5	111.3	33.8	106.6	34.0
Goliath	96.5	138.6	76.6	32.8	107.6	34.5	103.9	34.3
Natty	95.0	140.2	75.3	29.7	107.8	33.8	103.5	33.9
Shelby427	91.3	127.6	83.9	32.5	105.7	34.5	100.9	34.4
Saddle	103.2	130.0	48.2	29.4	89.1	32.6	93.8	32.7
Esker2020	-	143.1	89.3	30.8	116.2	31.7	-	-
KWS Ocre	-	-	100.2	34.4	-	-	-	-
Reins	-	-	89.1	35.0	-	-	-	-
KWS Opaline	-	-	81.9	32.9	-	-	-	-
<b>Trial Average#</b>	103.3	140.6	81.1	32.0	110.7	33.7	107.6	33.7
<b>LSD(0.05)†</b>	5.2	3.8	17.9	4.9	13.1	1.8	13.4	1.6
<b>C.V.%‡</b>	6.3	3.9	7.9	5.8	5.0	3.5	5.2	3.4

# 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.



## 2021 South Dakota Oat Variety Trial Results Western Summary

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Table 5. 2019-2021 oat variety performance trial results for testing sites in western South Dakota. Varieties ranking in the top third of each trial category are shaded light blue.

Variety	2019 Yield (bu/a)	2020 Yield (bu/a)	2021		2-year		3-year	
			Yield (bu/a)	Test Wt (lbs)	Yield (bu/a)	Test Wt (lbs)	Yield (bu/a)	Test Wt (lbs)
Goliath	107.1	89.8	52.7	32.6	71.3	34.3	83.2	34.2
MN Pearl	102.9	95.4	42.5	31.4	68.9	33.7	80.3	33.6
Rushmore	93.5	90.8	53.8	30.7	72.3	33.8	79.4	33.7
CS Camden	95.8	84.3	56.9	28.3	70.6	30.1	79.0	29.3
Hayden	87.9	92.8	50.6	30.6	71.7	33.6	77.1	33.6
Deon	95.7	88.9	46.3	33.6	67.6	34.5	76.9	34.1
Shelby427	82.6	92.0	53.9	32.0	72.9	34.1	76.2	33.7
Natty	87.7	83.3	50.5	32.8	66.9	34.6	73.8	34.6
Warrior	86.2	82.2	39.5	30.5	60.9	33.0	69.3	32.5
Saddle	60.8	76.8	49.3	30.0	63.1	32.9	62.3	31.9
Esker2020	-	92.7	57.5	29.8	75.1	31.4	-	-
KWS Ocre	-	-	60.8	33.9	-	-	-	-
Reins	-	-	45.7	34.9	-	-	-	-
KWS Opaline	-	-	42.2	30.3	-	-	-	-
<b>Trial Average#</b>	89.5	86.5	51.8	31.6	69.2	33.4	75.7	33.1
<b>LSD(0.05)†</b>	8.0	11.26	4.5	1.8	10.6	2.1	10.5	1.5
<b>C.V.%‡</b>	11.1	11.9	8.5	5.8	13.4	3.9	13.4	3.6

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

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