SDSU Extension

agronomy

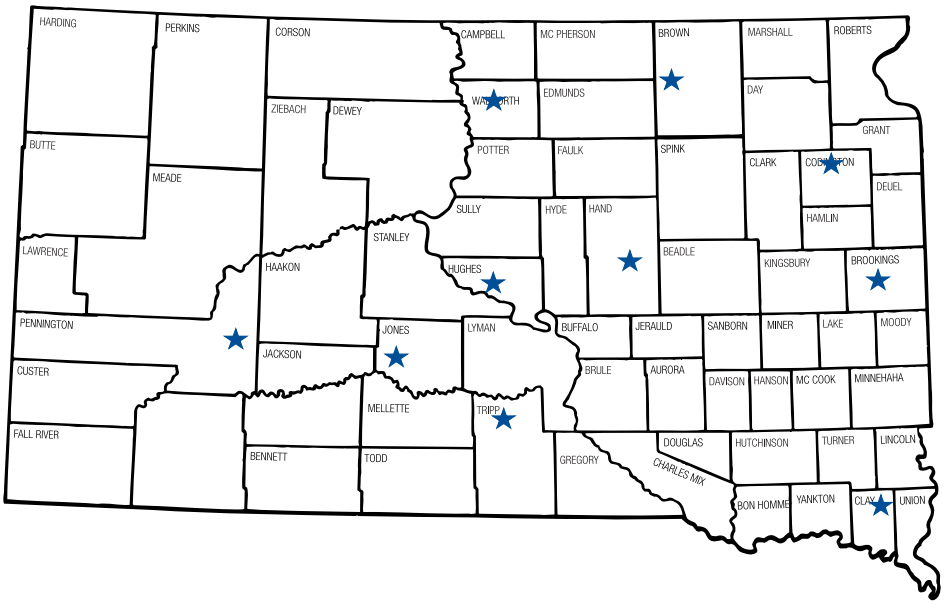
South Dakota Agricultural Experiment Station Research at SDSU

OCTOBER 2019

SOUTH DAKOTA STATE UNIVERSITY®
AGRONOMY, HORTICULTURE, & PLANT SCIENCE DEPARTMENT

2019 South Dakota Oat Variety Trial Results Regional Summaries

Jonathan Kleinjan | SDSU Extension Crop Production Associate
Christopher Graham | SDSU Extension Agronomist
Melanie Caffe-Treml | SDSU Oat Breeder
Padmanaban Krishnan | SDSU Food Science Professor
Shaukat Ali | SDSU Small Grains Pathologist
Kevin Kirby | Agricultural Research Manager
Shawn Hawks | Agricultural Research Manager
Bruce Swan | Agricultural Research Manager
Nick Hall | Agricultural Research Manager



Eastern trial locations: Beresford, South Shore, Volga

Central trial locations: Aberdeen, Miller, Pierre, Selby (hailed out)

Western trial locations: Okaton, Wall, Winner

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

S-0002-02

2019 South Dakota Oat Performance Trial Highlights

Jonathan Kleinjan | SDSU Extension Crop Production Associate

The 2019 oat growing season in South Dakota was characterized by a relatively late onset of spring planting due to cool, wet conditions in many areas of the state. Wet conditions persisted throughout the growing season in most of the state, causing the loss of some trial locations and depressing yields at others. A late onset of crown rust, most notably at the Volga trail location, also negatively affected yields. Harvest progressed slowly due to weather conditions and produced below-average to average yields in most areas of the state. The Pierre location, new in 2019, was planted relatively early (April 9th) and had the highest average yields in the SD trials.

Oat yields from the South Dakota State University CPT program averaged 82 bu/acre in the eastern trial locations, ranging from 40 bu/acre at Volga to 116 bu/acre at South Shore. Some of the top yielding varieties in the east in 2019 were **Deon, Warrior, MN Pearl, Saddle, and Antigo**. Yields in the central part of South Dakota averaged 103 bu/acre, ranging from 48 bu/acre at Miller to 141 bu/acre at Pierre. Some of the top performing varieties in the central region in 2019 were **MN Pearl, Warrior, Deon, CS Camden, and Saddle**. Yields in western South Dakota averaged 90 bu/acre, ranging from 66 bu/acre at Winner to 107 bu/acre at Wall. The best performers in 2019 for the western part of the state were **Goliath, MN Pearl, Newburg, CS Camden, and Deon**. 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 2019 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.

SDSU Extension

2019 South Dakota Oat Variety Trial Results Variety List

Table 1. List of oat varieties tested in 2019 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	3 yr Test Wt. (lb/bu)	3 yr Protein (%)	Smut	Stem Rust	Crown Rust	2019 BYDV score
Antigo	3	WI-17	0	36.1	4.0	Yellow	34.7	15.2	S	-	MR	5
CS Camden	4	MS-16	8	37.0	4.2	White	29.1	13.5	MR	(S)*	MS	5
Deon	5+	MN-13	8	40.5	3.5	Yellow	32.9	13.9	R	MR	R	5
Goliath	5+	SD-12	8	44.1	4.3	White	33.4	13.8	MR	R	S	2
Hayden	5+	SD-14	6	39.0	4.7	White	33.3	13.6	R	MS	S	4
Horsepower	5+	SD-11	2	33.6	4.9	White	30.7	14.1	MS	R	S	6
Jerry	5+	ND-94	4	37.7	4.5	White	32.3	14.0	S	MS	S	4
Jury	5+	ND-12	6	42.1	4.2	White	31.9	13.4	MS	R	S	4
MN Pearl	new	MN-19	7	39.0	3.5	White	33.8	13.0	R	-	MR	4
Natty	5+	SD-14	1	40.2	4.0	White	33.6	14.0	R	MS	S	4
Newburg	5+	ND-11	6	40.8	4.7	White	30.1	13.3	MS	R	S	4
Saddle	4	SD-17	0	35.8	1.8	White	31.9	13.4	R	S	R	6
SD140515	3	SD-exp	5	37.8	2.6	White	34.1	13.4	R	-	R	4
Shelby427	5+	SD-09	0	39.3	4.8	White	33.6	13.9	R	MS	S	4
Sumo	5+	ALS-16	-1	36.5	2.3	White	33.9	14.2	R	-	R	5
Warrior	4	SD-19	4	37.0	2.2	White	33.0	13.5	R	-	R	5

† ALS - Albert Lea Seed, MN - Minnesota, MS - Meridian Seeds, ND - North Dakota, SD - South Dakota, WI - Wisconsin; - (Year of Release)
‡ Days to heading as compared to Saddle (173 days Julian) statewide.
§ Lodging score: Rating scale 1-5 (1=Standing perfectly to 5=Completely flat) based on 2019 observations.
¶ Average of 2017-2019 statewide test weight and protein.
# Disease ratings: R - resistant, MR - moderately resistant, MS - moderately susceptible, S - susceptible, VS - very susceptible; BYDV scores: 1 (very tolerant) - 9 (very severe symptoms)
* Ratings (X) based on information supplied by the entity submitting the variety.

SDSU Extension

2019 South Dakota Oat Variety Trial Results Variety List

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	10.8	73.7	15.3	24.1	72.0	19.7	5.0	6.0
CS Camden	49.7	43.0	7.3	31.0	70.8	16.6	5.3	5.3
Deon	31.0	60.4	8.7	31.2	74.1	16.1	4.9	5.2
Goliath	33.8	56.0	10.3	27.9	72.1	15.6	4.8	5.0
Hayden	26.6	61.5	11.9	29.2	69.7	15.2	4.8	6.1
Horsepower	22.9	62.0	15.0	23.7	68.3	16.0	5.2	5.5
Jerry	30.0	60.6	9.3	28.9	70.7	17.6	4.8	4.4
Jury	32.8	54.0	12.7	28.8	73.4	16.1	5.1	5.5
MN Pearl	59.4	36.0	4.6	31.9	77.7	15.0	4.5	5.7
Natty	33.8	54.3	9.8	28.6	74.2	15.7	4.1	3.9
Newburg	38.7	47.2	14.0	28.2	71.0	15.8	5.3	5.6
Saddle	40.8	54.4	4.7	30.3	76.0	17.7	4.2	3.9
SD140515	61.4	34.6	3.9	31.6	74.8	17.7	4.4	4.5
Shelby427	27.9	59.8	12.2	24.9	71.8	15.7	4.5	5.6
Sumo	71.5	26.1	2.4	35.1	75.3	19.1	4.3	4.0
Warrior	50.3	45.4	4.2	31.8	75.3	17.3	4.7	4.9
Trial Average	41.5	50.4	8.0	29.8	73.5	16.8	4.8	5.1
LSD(0.05)†	10.8	9.1	3.9	2.1	1.9	0.8	0.2	0.3
C.V.%‡	12.8	9.2	25.0	4.4	1.7	3.0	3.3	3.1

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

SDSU Extension

2019 South Dakota Oat Variety Trial Results Eastern Summary

Table 3. 2017-2019 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	2017 Yield (bu/a)	2018 Yield (bu/a)	2019		2-year Yield (bu/a)	3-year Yield (bu/a)
			Yield (bu/a)	Test Wt (lbs)		
Deon	142.2	113.8	102.9	34.6	112.7	122.5
SD140515	140.2	110.2	100.4	35.8	108.8	119.3
Warrior	137.9	103.5	100.5	34.5	105.8	116.5
CS Camden	138.2	109.1	79.2	30.6	97.4	111.0
Saddle	134.2	98.3	94.6	34.9	99.1	110.8
Goliath	140.3	98.8	69.3	32.5	87.6	105.1
Antigo	118.9	95.1	91.0	37.2	95.6	103.3
Sumo	122.7	89.4	90.8	36.6	92.9	102.8
Natty	138.3	94.0	67.7	34.0	83.1	101.5
Hayden	142.0	85.5	55.4	31.4	73.3	96.2
Jury	131.7	88.3	53.3	32.1	73.5	92.9
Newburg	139.1	87.1	44.1	30.4	68.3	91.9
Shelby427	127.5	80.0	53.4	32.6	69.3	88.8
Horsepower	127.1	78.1	32.6	26.2	56.9	80.3
Jerry	123.3	74.0	38.1	30.5	58.1	79.7
MN Pearl	-	-	99.5	34.1	-	-
Trial Average#	135.2	97.6	81.8	33.9	93.2	104.8
LSD(0.05)†	6.1	5.9	6.4	1.0	4.6	3.8
C.V.%‡	5.6	7.1	8.8	3.0	8.2	7.3

Trial averages may include values from experimental lines that are not reported.
† Value required (≥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.

SDSU Extension

2019 South Dakota Oat Variety Trial Results Central Summary

Table 4. 2017-2019 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	2017 Yield (bu/a)	2018 Yield (bu/a)	2019		2-year Yield (bu/a)	3-year Yield (bu/a)
			Yield (bu/a)	Test Wt (lbs)		
CS Camden	78.8	133.9	104.4	29.1	114.0	109.1
Hayden	80.8	128.0	97.2	34.5	107.3	104.7
Warrior	79.4	112.4	110.2	34.8	106.0	103.3
Deon	70.2	119.2	108.2	33.6	108.8	102.8
SD140515	71.4	116.7	108.4	35.6	107.3	102.3
Goliath	72.4	116.2	96.5	33.8	101.3	97.8
Natty	71.0	116.3	95.0	34.1	100.1	97.0
Newburg	78.6	114.6	88.0	29.3	95.7	95.6
Jury	77.7	111.3	85.5	32.1	93.3	93.2
Shelby427	80.6	103.4	91.3	34.2	92.1	93.1
Saddle	55.8	100.6	103.2	33.0	96.5	90.4
Horsepower	71.2	114.7	73.4	29.3	88.0	88.3
Antigo	61.9	87.5	100.4	36.6	89.0	86.0
Jerry	63.5	97.4	81.4	33.8	84.3	82.9
Sumo	57.8	82.4	86.6	35.2	79.8	77.8
MN Pearl	-	-	110.7	33.5	-	-
Trial Average#	71.7	113.9	103.3	33.8	106.5	95.8
LSD(0.05)†	5.8	4.5	5.2	0.7	12.0	13.6
C.V.%‡	8.2	4.9	6.3	2.7	5.6	6.3

Trial averages may include values from experimental lines that are not reported.
† Value required (≥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.

SDSU Extension

2019 South Dakota Oat Variety Trial Results Western Summary

Table 5. 2017-2019 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	2017 Yield (bu/a)	2018 Yield (bu/a)	2019		2-year Yield (bu/a)	3-year Yield (bu/a)
			Yield (bu/a)	Test Wt (lbs)		
Deon	75.9	79.2	95.7	33.5	89.1	84.9
Hayden	77.8	81.4	87.9	33.7	85.3	83.5
Goliath	58.2	76.3	107.1	34.1	94.8	81.9
Newburg	69.1	72.1	98.6	31.5	88.0	81.5
CS Camden	66.7	77.8	95.8	28.1	88.6	81.4
Natty	73.2	75.2	87.7	34.5	82.7	80.0
SD140515	67.0	73.6	93.5	33.6	85.6	79.4
Jury	70.5	70.9	89.5	32.7	82.1	78.2
Warrior	71.9	68.8	86.2	31.7	79.3	76.9
Horsepower	70.2	71.2	79.9	31.3	76.4	75.0
Shelby427	65.5	62.9	82.6	32.9	74.8	71.9
Jerry	69.0	66.6	66.2	30.0	66.4	68.4
Antigo	64.9	60.7	65.5	33.2	63.6	65.0
Saddle	68.9	59.9	60.8	30.1	60.5	64.5
Sumo	55.4	61.1	64.4	32.3	63.1	61.5
MN Pearl	-	-	102.9	33.6	-	-
Trial Average#	68.5	73.9	89.5	32.8	81.5	75.8
LSD(0.05)†	9.5	7.7	8.0	0.8	11.2	12.1
C.V.%‡	17.2	10.5	11.1	3.0	11.3	14.0

Trial averages may include values from experimental lines that are not reported.
† Value required (≥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.