Choosing the Right Oat Varieties – Breeding to Buying

Melanie Caffe-Treml, Mac Ehrhardt, Chad Ingels

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Coming HOME

OAT BREEDING

PFI Annual Conference

Melanie Caffe-Treml

SDSU Oat Breeder

Our goal

Many reasons to include oats in rotations

Diversity

Soil health

Break pest cycles

Reduce input cost

Spread workload

Plant breeding

Adaptation to environment and production system
Yield
Disease resistance
Lodging resistance
End-use quality

Variety

Productivity **Marketability**

➡ **Make it more profitable to grow oats**

VARIETY DEVELOPMENT - 8 TO 10 YEARS

Number of lines

New variety
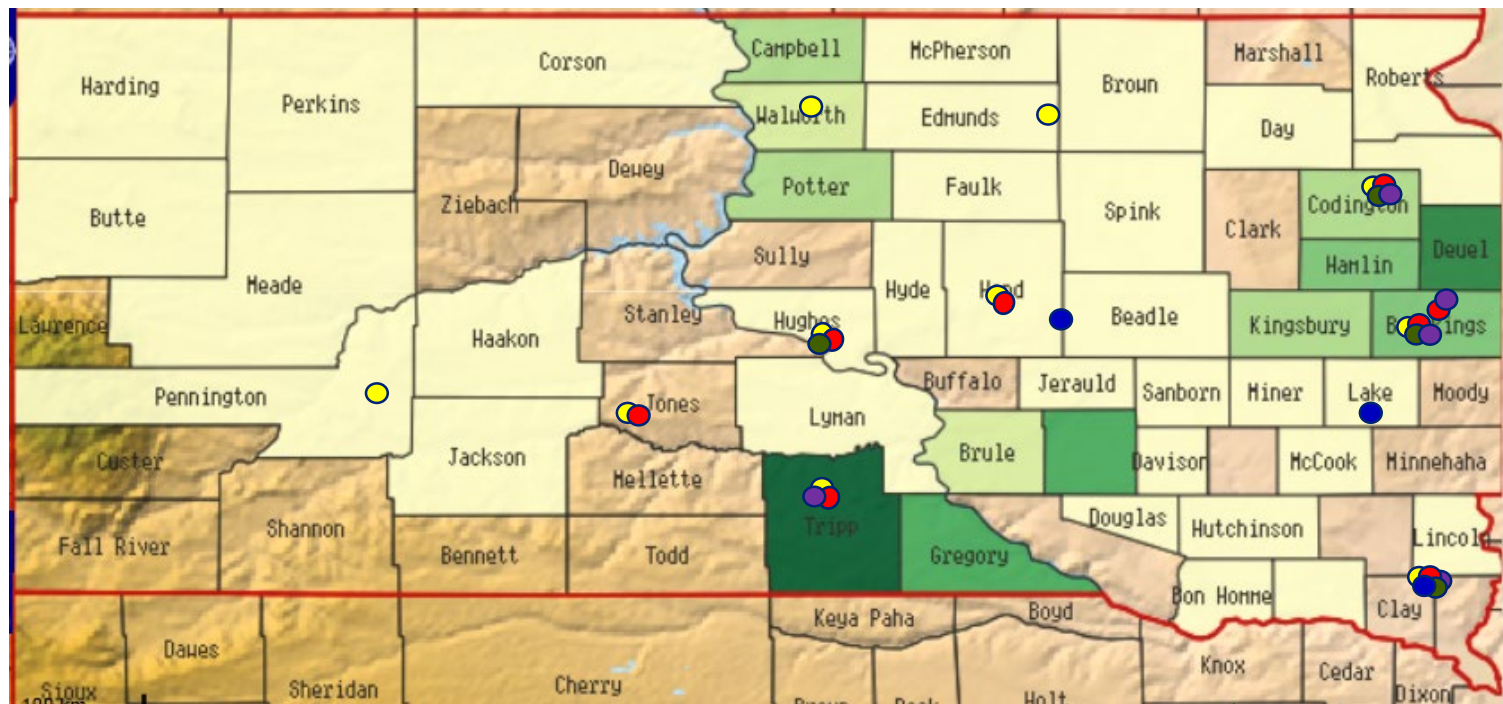
YIELD

● Advanced Yield Trials   ○ Oat Variety Trials CPT   ● Oat Organic Trials
● Preliminary Yield Trials   ● Oat Forage Trials

REVENUE AFFECTED BY THE CULTIVAR

**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 = Rushmore	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

+ 42.8 bu/a

× $2.50
conventional
= $107/acre

Kleinjan et al. https://extension.sdstate.edu/oat-variety-trial-results

MARKETABILITY AFFECTED BY THE CULTIVAR

TEST WEIGHT

Variety	2017 Yield (bu/a)	2018 Yield (bu/a)	2019 Yield (bu/a)	2019 Test Wt (lbs)
Deon	142.2	113.8	102.9	34.6
SD140515 = Rushmore	140.2	110.2	100.4	35.8
Warrior	137.9	103.5	100.5	34.5
CS Camden	138.2	109.1	79.2	30.6
Saddle	134.2	98.3	94.6	34.9
Goliath	140.3	98.8	69.3	32.5
Antigo	118.9	95.1	91.0	37.2
Sumo	122.7	89.4	90.8	36.6
Natty	138.3	94.0	67.7	34.0
Hayden	142.0	85.5	55.4	31.4
Jury	131.7	88.3	53.3	32.1
Newburg	139.1	87.1	44.1	30.4
Shelby427	127.5	80.0	53.4	32.6
Horsepower	127.1	78.1	32.6	26.2
Jerry	123.3	74.0	38.1	30.5
MN Pearl	-	-	99.5	34.1
Trial Average#	135.2	97.6	81.8	33.9
LSD(0.05)†	6.1	5.9	6.4	1.0
C.V.%‡	5.6	7.1	8.8	3.0

+ 5 lb/bu

Kleinjan et al. https://extension.sdstate.edu/oat-variety-trial-results

CROWN RUST RESISTANCE

June 25, 2019 — **8 days** → July 3rd, 2019

Beresford, SD

Table 2. 2020 oat variety response to fungicide (average of 4 replications) at Volga, SD.
Entries are sorted by 2020 yield. Varieties yielding in the top 1/3 of the trial are shaded light blue.

Variety	Height (in)	Lodging* (1-5)	Test Wt (lbs)	Yield w/fung. (bu/a)	Yield no fung. (bu/a)	Response to fung. (bu/a)
Rushmore	36.3	1.3	34.8	134.8	115.8	19.0
Deon	37.8	1.5	32.9	126.1	93.9	32.1
MN Pearl	39.3	1.5	32.9	125.6	99.3	26.3
Goliath	47.5	1.8	34.4	122.2	70.8	51.4
CS Camden	34.3	1.3	27.9	118.9	93.8	25.1
Hayden	35.8	1.3	33.4	118.1	66.6	51.5
Warrior	35.0	1.0	31.7	117.0	108.7	8.3
Esker2020	34.8	1.0	30.3	115.2	98.9	16.3
Saddle	33.0	1.0	31.9	111.1	102.0	9.1
Shelby427	37.0	1.0	33.4	110.1	61.3	48.8
Natty	35.5	2.3	33.2	109.4	68.5	40.9
GM2015Y3232	36.3	1.0	30.6	106.8	97.8	9.0
Antigo	33.5	1.3	34.8	103.0	82.1	20.9
Trial Average#	37.5	1.3	33.2	120.2	99.2	27.6
LSD(0.05)†	2.0	0.5	0.9	6.2	7.9	-
C.V.%‡	3.8	-	1.9	3.6	5.7	-

* Lodging score: 1, perfectly standing; to 5, completely flat.
# 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.

Kleinjan et al. https://extension.sdstate.edu/oat-variety-trial-results

South Dakota
State University
College of Agriculture, Food
and Environmental Sciences

FORAGE

SD Forage trials 2018-2020

Entry	DMY	ADF	NDF	TDN	RFV
SD160455	4.7	37.2	58.3	59.7	96.1
Rushmore	4.6	35.1	54.5	61.2	105.6
SD150012	4.4	34.5	52.1	62.8	111.3
Hayden	4.4	35.9	54.9	61.4	103.8
Rockford	4.4	37.2	57.2	59.5	97.8
SD140741	4.3	35.5	53.6	61.9	106.8
SD150270	4.3	37.0	57.3	60.0	98.1
Deon	4.3	35.9	54.9	60.8	104.2
Goliath	4.3	36.5	55.9	60.3	101
Natty	4.2	34.0	52.0	62.2	112.8
Jerry	4.2	34.7	54.0	60.8	107.5
Newburg	4.1	36.4	56.0	60.8	101.5
Stallion	4.1	37.6	56.1	59.7	99.4
Env	10	10	10	10	10
LSD	0.2	1.4	1.8	1.1	5.1
CV	9.7	4.4	3.8	2.1	5.6

MILLING QUALITY

Whole oat flour

Steel cut groat

Flakes

MILLING QUALITY

Hull

Groat %

Groat

Dehuller

Dehulling efficiency

Breakage

South Dakota State University
College of Agriculture, Food and Environmental Sciences

MILLING QUALITY

Plump Kernels
5.5/64 by ¾ inch

Mid Kernels
5/64 by ¾ inch

Thin Kernels

- Grain with higher proportion of thins require higher mechanical energy to dehull which can lead to more grain breakage.
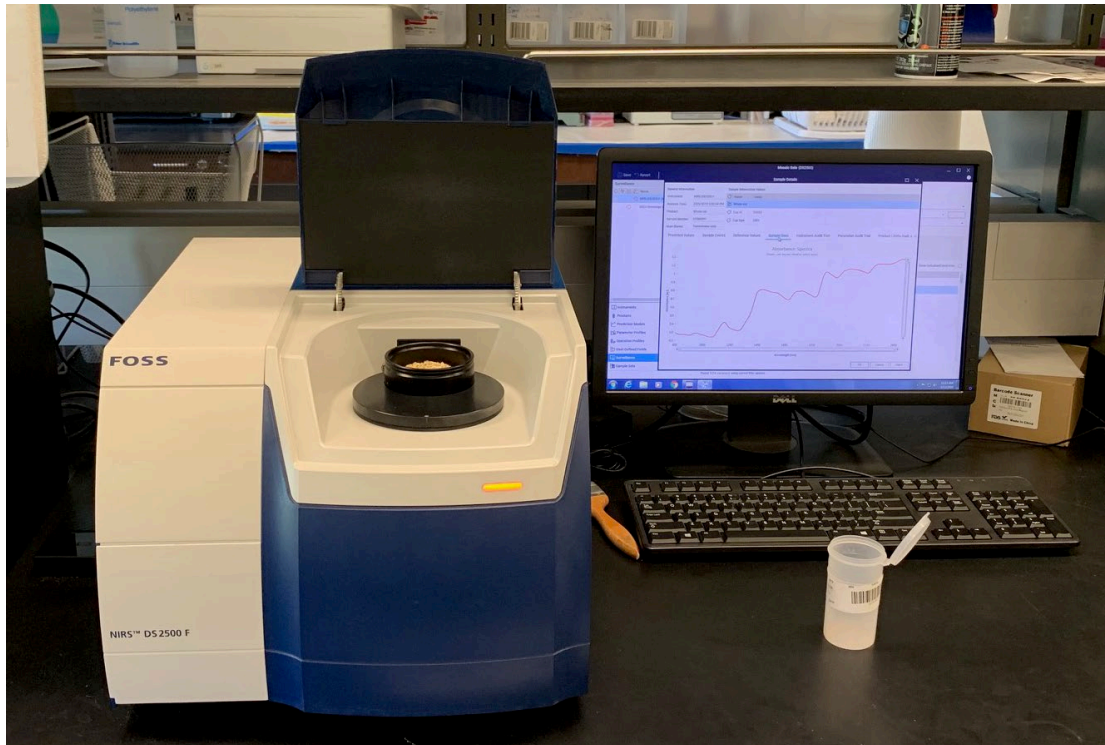- Thins are sorted out as byproduct for animal feed.

NUTRITIONAL QUALITY

Protein

Oil

Beta-glucan

THANKS

SDCIA

General Mills

Grain Millers

General Mills Foundation

SDAES

SD Foundation Seed Stocks Division

USDA NIFA