Minnesota Agricultural Experiment Station
University of Minnesota

Oat

D.D. Stuthman, R.A. Caspers, R. Dill-Macky, J. Miller-Garvin and J.J. Wiersma

Varietal Trials Results, January 2007

Proper selection of oat varieties requires consideration of the anticipated growing conditions, the pests that might be encountered in a specific production situation and the purpose for growing the crop. Specific growing situations will dictate the priority and emphasis given to each trait included in the tables. Generally, crown rust is the most important disease; this certainly was true in 2005 and 2006, primarily for southern Minnesota, many other parts of the Midwest and much of Canada.

A detailed interpretation of our crown rust data follows. Because we experienced some changes in rust races in 2005 and 2006, many of the varieties currently grown are now susceptible to crown rust. In the disease data table, we divided the crown rust readings into two columns. The first column gives a numerical value for each variety, which predicts the relative proportion of rust spores that will achieve a successful infection. The "Reaction Type" column values relate to the size of the pustule, which indicates how much the pustule will be restricted by the host reaction. A small and/or restricted pustule produces fewer spores for reinfection, a major factor in the ultimate level of rust infection.

Depending upon the plant growth stage at initial infection, there can be one to three cycles of re-infection during an oat-growing season. Each infection cycle is a minimum of 8 to 10 days long. The final amount of rust infection depends upon both the number and the size of spore-producing-pustules present to produce inoculum to cause subsequent infections. It is these later infections that severely damage the plant/crop.

Treated seed should be used for smut-susceptible varieties, and those with BYDV (red leaf) susceptibility (score of 6 or higher) should be chosen carefully.

Groat percent is an important consideration for grain production, perhaps equal to grain yield, whether the crop is intended for food or feed. Lodging can be site-specific; varieties with lodging scores above 2.6 should be chosen cautiously if your soil is highly fertile. Taller varieties generally tend to produce more forage and/or straw. Earlier varieties may perform relatively better in more southerly parts of the state; later varieties usually have an advantage in the north.

Descriptions of oat varieties covered by the U.S. Plant Variety Protection Act include a **PVP** designation. When **PVP** is followed by the notation (94), seed of that variety may not be sold by a grower, not even to a relative or neighbor, without the expressed permission of the variety's developer/owner. If the **PVP** designation is followed by (pending), consider the variety as having **PVP (94)** protection.

General-Purpose Varieties

Most of these varieties (except Spurs, Stallion and Beach) have been adequately tested three years or more; they usually are not grown for a specific special purpose.

Baker–Medium maturity, yield, height and lodging resistance. Above-average test weight and groat percentage. Ivory-white seed. Susceptible to crown rust, resistant to smut. Good tolerance to red leaf. Selected at Iowa AES. Released in 2006.

Beach–Mid-late maturity, tall, medium yield and lodging resistance. Resistant to crown rust and smut, little tolerance to red leaf. Ivory-white seed. Selected at N.D. AES. Released in 2006. **PVP (94)**

Drumlin–Late maturity, medium yield and height, average lodging resistance, below-average test weight and groat percentage, yellow seed. Susceptible to crown rust and resistant to smut, very good tolerance to red leaf. Selected at Wis. AES. Released in 2003. Foundation seed available to certified seed producers only under a license/fee collection agreement. **PVP (94)**

Esker–Medium maturity, yield and height; average lodging resistance, test weight and groat percentage. Yellow seed. Susceptible to crown rust, resistant to smut, susceptible to red leaf. Selected at Wis. AES. Released in 2003. Foundation seed available to certified seed producers only under a license/fee collection agreement. **PVP (pending)**

Gem–Medium-late maturity, medium yield and height, average lodging resistance, fair test weight and groat percentage. Yellow seed. Susceptible to crown rust, moderately resistant to smut, good tolerance to red leaf. Selected at Wis. AES. Released in 1995. Foundation seed available to certified seed producers only under a license/fee collection agreement. **PVP (94)**

HiFi–Late maturity, high yield, tall, good lodging resistance, high test weight, medium groat percentage. White seed. Resistance to crown rust, moderately susceptible to

smut, some tolerance to red leaf. Selected at N.D. AES. Released in 2001. **PVP (94)**

Kame–Early maturity, high yield, short, very good lodging resistance, fair test weight, good groat percentage. Yellow seed. Selected at Wis. AES. Released in 2004. Foundation seed available to certified seed producers only under a license/fee collection agreement. **PVP (pending)**

Leonard–Late maturity, fair yield, medium height, fair lodging resistance, poor test weight and groat percentage. Yellow seed. Susceptible to crown rust, resistant to smut. Good tolerance to red leaf. Selected at Minn. AES. Released in 2002.

Moraine–Medium maturity and yield, short, fair lodging resistance, average test weight, high groat percentage. Yellow seed. Susceptible to crown rust, resistant to smut, some tolerance to red leaf. Selected at Wis. AES. Released in 2001. Foundation seed available to certified seed producers only under a license/fee collection agreement. **PVP (94)**

Morton–Late maturity, high yield, tall, very good lodging resistance, very high test weight, medium groat percentage. Ivory seed. Susceptible to crown rust, resistant to smut, some tolerance to red leaf. Selected at N.D. AES. Released in 2001. **PVP (94)**

Reeves–Early maturity, fair yield, medium height, poor lodging resistance, high test weight and groat percentage. Ivory seed. Some resistance to crown rust, moderately susceptible to smut, susceptible to red leaf. Selected at S.D. AES. Released in 2002.

Richard–Early-medium maturity, medium yield, tall, good lodging resistance, high test weight, medium groat percentage. Yellow seed. Susceptible to crown rust, resistant to smut, some tolerance to red leaf. Selected at Minn. AES. Released in 2000. **PVP (94)**

Riser–Early maturity, lower yield, short, fair lodging resistance, high test weight and groat percentage. Yellow seed. Resistant to crown rust and smut, susceptible to red leaf. Selected at S.D. AES. Released in 1998.

Sesqui–Late maturity, lower yield, average height, fair lodging resistance, fair test weight, poor groat percentage. Yellow seed. Susceptible to crown rust, resistant to smut, good tolerance to red leaf. Selected at Minn. AES. Released in 2001.

Stallion–Medium-late maturity, very high yield, tall with average lodging resistance. Good test weight and groat percentage. White seed. Some resistance to crown rust, susceptible to smut, good tolerance to red leaf. Released by S.D. AES in 2006.

Spurs–Early, good yield, short with average lodging resistance. Good test weight, average groat percentage. Ivory-white seed. Susceptible to crown rust and smut, good tolerance to red leaf. Released by Illinois AES in 2005.

Wabasha–Medium maturity and height; lower yield, fair lodging resistance and test weight, high groat percentage. White seed. Susceptible to crown rust, resistant to smut and tolerant to red leaf. Selected at Minn. AES. Released in 2001.

Winona–Early, lower yield, short, fair lodging resistance, medium test weight, good groat percentage. Yellow seed. Susceptible to crown rust, resistant to smut and tolerant to red leaf. Selected at Minn. AES. Released in 2005.

Special-Purpose Varieties

These varieties have also been adequately tested three years or more. They have special attributes that differentiate them from general-purpose varieties or are intended for a specific end use.

Paul–Hulless. Medium-late maturity, good yield for hulless variety. Tall, very good lodging resistance, very high test weight. Susceptible to crown rust, resistant to smut, susceptible to red leaf. Selected at N.D. AES. Released in 1994. **PVP (94)**

Buff–Hulless. Medium maturity, good yield for hulless variety. Medium height, good lodging resistance, very high test weight. Susceptible to crown rust, resistant to smut, susceptible to red leaf. Selected at S.D. AES. Released in 2002.

Oat traits, 2004-2006.

Variety	Days After Planting To Heading	Height, Inches	Lodging, 1 = Erect 5 = Flat	Test Weight, Lb/Bu	Groat %
Winona	62	35	2.8	39.3	70.1
Spurs[1]	64	36	2.2	39.7	68.6
Kame	64	35	1.6	37.9	70.5
Esker	65	36	2.3	38.8	69.8
Baker	67	37	2.4	39.6	69.7
Wabasha	67	38	2.7	37.4	69.5
Stallion[2]	68	40	2.5	40.2	70.1
Beach[1]	69	41	2.3	40.6	69.3
Morton	69	43	1.6	40.8	69.1
Drumlin	69	37	2.3	38.3	67.9
Sesqui	69	37	2.9	37.2	63.7
Average	67	38	2.3	39.1	68.9

[1] 1-year data, adjusted for 3 years.
[2] 2-year data, adjusted for 3 years.

Oat yield, (percent of mean) off-station locations, 2006 only.

Variety	Stephen	Roseau
Winona	92	101
Spurs	109	105
Kame	85	97
Esker	98	109
Baker	113	102
Wabasha	96	103
Stallion	103	102
Beach	109	114
Morton	95	99
Drumlin	106	87
Sesqui	93	83
Location mean (bu/acre).	95	145
LSD 0.05 (%).	10.5	10.3

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

Oat yield, percent of mean, by location, 2004-2006.

Variety	Rosemount	Waseca	Lamberton	Morris	Crookston	Average of 5 Locations
Winona	93	79	85	96	87	88
Spurs[1]	104	111	106	110	108	108
Kame	107	108	109	103	109	107
Esker	103	100	99	95	102	100
Baker	97	96	98	105	109	102
Wabasha	85	92	86	80	94	87
Stallion[2]	125	123	115	108	100	113
Beach[1]	95	108	99	112	100	103
Morton	114	115	115	94	95	105
Drumlin	98	92	98	105	103	100
Sesqui	80	77	90	93	93	88
Location mean (bu/acre).	92	90	107	118	134	108
LSD 0.05 (% of mean).	7.5	9.4	9.1	8.7	7.9	3.9

[1]1-year data, adjusted for 3 years.
[2]2-year data, adjusted for 3 years.

Disease data in a single year, 2006.

Variety	Crown Amount[1]	Rust Reaction Type[2]	Smut Score[3]	BYDV Score[4]
Winona	>20	S	R	4
Spurs	>20	MS	S	4
Kame	10	MS	R	8
Esker	>20	S	R	6
Baker	>20	MS-S	MR	4
Wabasha	>20	S	R	3
Stallion	15	MR-MS	S	3
Beach	15	MR-MS	MR	6
Morton	>20	S	R	5
Drumlin	>20	S	R	3
Sesqui	>20	S	R	4

[1] Relative proportion of rust spores that will achieve a successful infection; varieties with high scores labeled as ">20."
[2] R = resistant, MR = moderately resistant, MS = moderately susceptible and S = susceptible.
[3] Artificially innoculated, R = resistant, MR = moderately resistant, MS = moderately susceptible and S = susceptible.
[4] Barley Yellow Dwarf Virus score from Urbana, Ill., with 1 = no symptoms and 9 = dead.