2014

Oat Variety Trial

Brian J. Lang
Iowa State University, bjlang@iastate.edu

Kenneth T. Pecinovsky
Iowa State University, kennethp@iastate.edu

Oat Variety Trial

Abstract
Oats are a major spring-sown small grain crop in Iowa. Spring-sown small grains can be used for grain and straw production, as a companion crop to establish hay and pastures, or for early-season forage as hay or haylage. Because small grains generally mature before the end of July, a forage legume, cover crop, or green manure crop can follow oats, or animal manure can be spread on the field in which oats were grown.

Disciplines
Agricultural Science | Agriculture

Oat Variety Trial

RFR-A13109

Brian Lang, extension agronomist
Ken Pecinovsky, farm superintendent

Introduction

Oats are a major spring-sown small grain crop in Iowa. Spring-sown small grains can be used for grain and straw production, as a companion crop to establish hay and pastures, or for early-season forage as hay or haylage. Because small grains generally mature before the end of July, a forage legume, cover crop, or green manure crop can follow oats, or animal manure can be spread on the field in which oats were grown.

Oat production is best under cool conditions. Careful management and proper choice of variety can make oats a profitable crop due to their low input requirements and favorable effects on succeeding crops in a rotation. Planting oats before April 15 is recommended for optimal yields in Iowa. This helps avoid exposure to warmer weather during grain fill.

Test weight is the most commonly used indicator of grain quality. High test-weight varieties should be chosen by growers who intend to market oat grain.

Oats are regularly affected by crown rust and barley yellow dwarf virus diseases in Iowa. Some varieties have adequate disease resistance or tolerance. Disease resistance should be considered when choosing an oat variety. Because the pathogen populations change from year-to-year, varietal resistance often breaks down within a few years, and growers should consider switching to a newer variety when this occurs.

Materials and Methods

Eight oat varieties were tested in 2013 (Table 1). The trial was planted on April 28, a month later than usual due to extremely wet spring field conditions. The farm received 13 inches of snow in March and 6.4 inches of rain in April.

The soil at the site is a 391B Clyde-Floyd loam complex. The site was in soybeans the previous year. No fertilizer was applied. Soil fertility was at optimal levels based on ISU soil fertility recommendations.

The site was field cultivated before planting. The planter was a John Deere BD1108 drill with 7.5-in. row spacing planting at a rate of four bushels/acre. Each plot of a variety occupied 1,438 sq ft and there were three replications.

The trial was sufficiently weed-free to not require the use of herbicides or hand weeding. The trial was harvested on August 8 with a JD4420 combine with weigh bin, concave set at 1, cylinder speed at 1,150 RPM. Straw yields were determined from 8-ft wide × 20-ft long windrows from the center of each plot.

Results and Discussion

Variety trial results for 2013 are presented in Table 2. Yields reported are on a 32 lb/bushel basis. Test weight is the most important indicator of grain milling quality. Minimum test weights are 36 lb/bushel for U.S. No. 1 oats, and 33 lb/bushel for U.S. No. 2 oats.

Yield results from a single year are not reliable predictors of next year's yield. Environment and disease conditions can fluctuate greatly from year to year, so it is important to consider yields averaged over multiple years. Table 3 provides a summary of

yield and test weight for varieties in trials conducted from 2010-2013.

Acknowledgements

Thanks to Hermann's Hybrids, Manchester, Iowa; Michael McMullen, North Dakota State University; Lon Hall, South Dakota State University; and the Agricultural Alumni Seed Improvement Association, Inc., Romney, Indiana.

Table 1. State of origin, PVP[a] and disease ratings[b] for oat varieties included in variety trials from 2010-2013 at the ISU Northeast Research and Demonstration Farm, Nashua.

			Disease and Disease Ratings[b]			
Variety	**State of origin**	**PVP[a]**	**BYDV[c]**	**Crown rust**	**Stem rust**	**Smut**
Excel	IN	PVP	MR	R	S	R
Goliath	SD	PVP	R	R	R	R
Horsepower	SD	PVP	MR	R	MS	MR
Jerry	ND	PVP	MS	S	MS	MR
Newberg	ND	PVP	MR	R	R	S
Ogle	IL	PVP	R	MS	S	S
Robust	IN	PVP	R	R	S	MR
Rockford	ND	PVP	MR	MR	S	R
Saber	IL	PVP	MR	MS	- -	S
Shelby 427	SD	PVP	MR	R	MR	R
Souris	ND	PVP	MR	R	MR	R
Spurs	IL	PVP	MS	MR	S	S
Tack	IL	PVP	MR	R	- -	S
Woodburn	IN	PVP	MR	R	S	R

[a]PVP=Plant Variety Protection. The PVP Act provides a certificate to the developer of a variety granting exclusive rights for reproducing and marketing the seed.
[b]Disease ratings: S=susceptible, MS=moderately susceptible, MR=moderately resistant, R=resistant.
[c]Disease: BYDV=Barley Yellow Dwarf Virus.

Table 2. Performance of oat varieties tested in 2013 at the ISU Northeast Research and Demonstration Farm, Nashua.

Variety	Grain yield[a] August 8 bu/ac	Grain moisture %	Test weight lb/bu	Heading July 4 %	Mature July 22 %	Plant height August 8 in.	Lodging August 8 %	Straw yield August 9 tons/ac
Excel	99.1	14.8	33.4	99	83	33.0	0	1.79
Goliath	97.1	14.3	35.4	90	33	42.7	0	2.01
Horsepower	99.4	14.1	35.4	99	80	29.0	0	1.92
Jerry	86.9	14.7	34.8	99	85	32.0	0	2.37
Ogle	89.7	13.5	32.1	99	85	31.7	0	1.83
Saber	100.3	14.3	35.0	99	87	30.3	0	1.74
Shelby 427	87.2	14.8	34.8	99	84	33.3	0	2.10
Tack	92.5	13.8	35.4	99	88	32.0	0	1.65
Average	94.0	14.3	34.5	98	78	33.0	0	1.93
LSD[b] 0.05	7.2	0.9	0.5	- -	4	2.6	- -	0.38

[a]Grain yields are based on 32 lb/bushel test weight.
[b]LSD=least significant difference. Entries that differ by one LSD or more are considered to be in different classes with 95 percent certainty.

Table 3. Individual and multi-year summaries of oat variety trial results at the ISU Northeast Research and Demonstration Farm, Nashua, 2010-2013[a]

Variety	2010		2011		2012		2013		2010 - 2013 average	
	yield bu/ac	test weight lb/bu	yield bu/ac	test weight lb/bu	yield bu/ac	test weight lb/bu	yield bu/ac	test weight lb/bu	yield bu/ac	test weight lb/bu
Excel	104	32.2	111	29.8	75	33.5	99	33.4	97	32.2
Goliath	- -	- -	- -	- -	- -	- -	97	35.4	- -	- -
Horsepower	- -	- -	105	34.7	99	36.6	99	35.4	- -	- -
Jerry	97	32.4	93	31.7	97	36.3	87	34.8	94	33.8
Newberg	- -	- -	104	31.3	- -	- -	- -	- -	- -	- -
Ogle	- -	- -	- -	- -	72	32.6	90	32.1	- -	- -
Robust	90	30.2	82	31.5	74	35.1	- -	- -	- -	- -
Rockford	126	34.9	96	32.5	- -	- -	- -	- -	- -	- -
Saber	117	32.0	113	30.6	86	34.7	100	35.0	104	33.1
Shelby 427	115	33.7	106	33.4	98	37.0	87	34.8	102	34.7
Souris	131	32.4	103	33.1	- -	- -	- -	- -	- -	- -
Spurs	114	32.5	95	32.6	80	35.9	- -	- -	- -	- -
Tack	98	34.0	99	34.1	81	34.7	93	35.4	93	34.6
Woodburn	97	32.2	- -	- -	86	36.2	- -	- -	- -	- -
Average	109	32.4	101	32.1	86	35.4	94	34.5	98	33.7
LSD 0.05	10	0.5	13	0.9	13	2.2	7	0.5	- -	- -

[a]Complete reports for the 2010, 2011 and 2012 Oat Variety Trials are available at: http://www.ag.iastate.edu/farms/progress_report.php
[b]LSD=least significant difference. Entries that differ by one LSD or more are considered to be in different classes with 95 percent certainty.