

2013

Oat Variety Trial

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Recommended Citation

Lang, Brian J. and Pecinovsky, Kenneth T., "Oat Variety Trial" (2013). *Iowa State Research Farm Progress Reports*. 1939.
http://lib.dr.iastate.edu/farms_reports/1939

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Abstract

Oat is the 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 | Agronomy and Crop Sciences

Oat Variety Trial

RFR-A12111

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Introduction

Oat is the 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.

Oat is regularly affected by crown rust and barley yellow dwarf virus diseases in Iowa. Some varieties have adequate disease resistance or tolerance, and 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

Twelve oat varieties were tested in 2012 at the ISU Northeast Research Farm, Nashua, Iowa. The trial was planted on March 29 with a John Deere BD1108 drill with 7.5-in. row spacing at a rate of four bushels/acre. Each plot of a variety occupied 1,462.5 sq. ft. The trial was sufficiently weed-free to not require the use of herbicides or hand weeding. The trial was grown on land that had been in soybeans the previous year. Fertilizer was broadcast before spring land preparation. Plots were replicated three times. The trial was harvested on July 16 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 by 20-ft long windrows from the center of each plot.

Results and Discussion

The results of the oat test for 2012 are presented in Table 1. 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 multi-year summaries of yield and test weight for varieties in trials conducted from 2010–2012.

Acknowledgements

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

Table 1. Performance of oat varieties tested in 2012 at the ISU Northeast Research Farm, Nashua, IA.

Variety	Grain yield ^a	Grain moisture (%)	Test weight (lb/bu)	% Heading	% Heading	% Mature	Plant height July 16 (in.)	% Lodging	Straw yield July 17 (tons/ac)
	July 16 (bu/ac)			June 5 (%)	June 11 (%)	June 27 (%)		July 16 (%)	
Excel	74.5	11.8	33.5	5	60	22	31.3	0	1.14
Horsepower	99.2	11.9	36.6	80	100	48	26.7	0	1.18
Jerry	97.2	12.0	36.3	20	100	50	33.3	0	1.52
Ogle	71.7	11.5	32.6	45	100	53	31.3	0	1.34
Robust	73.7	12.5	35.1	4	40	22	31.0	0	1.27
Saber	85.7	12.0	34.7	55	100	52	28.3	0	1.12
SD090522	95.7	12.4	36.6	5	65	22	38.3	0	1.68
SD091510	91.2	12.0	35.6	90	100	57	25.7	0	1.21
Shelby 427	98.1	12.1	37.0	90	100	50	33.3	0	1.52
Spurs	79.5	11.9	35.9	45	100	52	29.0	0	1.14
Tack	80.9	11.7	34.7	40	100	50	26.0	0	1.07
Woodburn	86.3	11.8	36.2	93	100	60	29.3	0	1.18
Average	86.1	12.0	35.4	48	89	89	30.3	0	1.28
LSD ^b 0.05	12.6	1.3	2.2	2	4	8	2.9	--	0.57

^aGrain yields are based on 32 lb/bushel test weight.

^bLSD = least significant difference. Entries that differ by one LSD or more are considered to be in different classes with 95 percent certainty.

Table 2. State of origin, PVP^a and disease ratings of varieties.

Variety	State of origin		Disease and Disease Ratings ^b			
	origin	PVP	BYDV	Crown rust	Stem rust	Smut
Excel	IN	PVP	R	MR	S	R
Horsepower	SD	PVP	MR	R	MS	MR
Jerry	ND	PVP	MS	S	MS	MR
Ogle	IL	PVP	R	MS	S	S
Robust	IN	PVP	R	R	S	MR
Saber	IL	PVP	MR	MS	--	S
SD090522	SD	--	--	--	--	--
SD091510	SD	--	--	--	--	--
Shelby 427	SD	PVP	MR	R	MR	R
Spurs	IL	PVP	MS	R	S	S
Tack	IL	PVP	MR	R	--	S
Woodburn	IN	PVP	MR	R	S	R

^aPVP. Plant Variety Protection Act provides a certificate to the developer of a variety granting exclusive rights for reproducing and marketing the seed.

^bDisease: S = susceptible, MS = moderately susceptible, MR = moderately resistant, R = resistant, BYDV = Barley Yellow Dwarf Virus.

Table 3. Multi-year summaries of oat variety trial results from 2010-2012^a.

Variety	2010-2011 avg.		2011-2012 avg.		2010-2012 avg.	
	yield (bu/ac)	test weight (lb/bu)	yield (bu/ac)	test weight (lb/bu)	yield (bu/ac)	test weight (lb/bu)
Excel	108	29.9	93	31.7	97	31.1
Horsepower	--	--	105	34.7	--	--
Jerry	95	32.1	95	34.0	96	33.6
Robust	86	30.9	79	33.3	82	32.3
Rockford	111	33.7	--	--	--	--
Saber	115	32.0	99	32.7	105	32.4
Shelby 427	108	29.9	102	35.2	106	34.7
Souris	117	32.8	--	--	--	--
Spurs	105	32.6	87	34.3	96	33.7
Tack	99	34.1	90	34.4	93	34.3
Average	105	32.0	94	33.8	96	33.2
LSD 0.05	12	1.1	13	2.0	12	1.7

^aThe complete reports for 2010 and 2011 Oat Variety Trials from the Northeast Farm are available at: http://www.ag.iastate.edu/farms/progress_report.php