Iowa Crop Performance Test – Winter Wheat, 1998–2000

Winter Wheat for Iowa

Yield trials of winter wheat are conducted annually by Iowa State University and the Iowa Crop Improvement Association. Survival of fall-sown winter wheat varieties may vary appreciably from year to year in all parts of Iowa, but stand losses due to winter weather are generally more common in central and northern Iowa compared to southern Iowa.

Winter wheat varieties adapted to Iowa are classified as either hard red or soft red. Flour made from hard red varieties is used for baking bread and rolls, whereas soft wheat flour is used in baking cookies and cakes. Hard red winter wheat is grown extensively in Nebraska; therefore, producers living in southwestern Iowa would likely find hard red winter wheat easier to market as a food grain. Soft red winter wheat is grown extensively in Illinois; thus, producers living in southeast Iowa would likely find soft red winter wheat easier to market as a food grain. Producers who intend to sell wheat grain should determine the market potential for both types in their area before deciding which type to plant.

Climatic conditions, prevalence of important diseases, and relative performances of varieties vary from year to year. Results from several years of testing are required for a reliable appraisal of a variety's value. Among varieties similar in yield, some may be superior to others in straw stiffness, grain quality, disease resistance, or winter hardiness, or they may have more desirable height and maturity. All of these characteristics should be considered when choosing a variety.

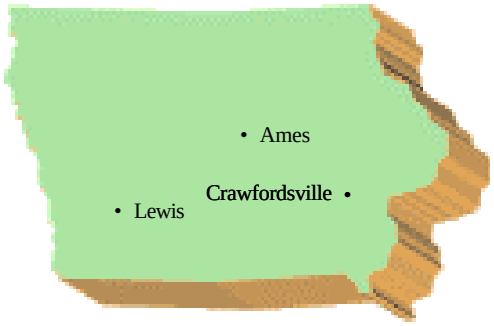

Figure 1. Location of winter wheat performance trials

How Winter Wheat Tests Are Conducted

Twenty hard red and nine soft red winter wheat varieties were tested in central Iowa near Ames, near Lewis (southwest), and near Crawfordsville (southeast) in 1999-2000. Figure 1 shows the location of the testing sites used during the period of this report. Winter wheat tests were planted in late September. Each plot of a variety occupied 32 square feet, and plots were replicated three times at each location to minimize the effects of soil variability. The plots were drill-seeded at approximately 1.5 bushels per acre in rows spaced one foot apart. Previous research indicates that higher planting density can be accomplished by using narrower row spacing, and this can result in higher yields. The relative performance of varieties tends to be similar at different planting rates, however. Plots were maintained weed-free by mechanical and hand cultivation

throughout the season. This careful maintenance is, in part, responsible for the superior yields usually attained on experimental farms compared to large-scale production fields.

The 1999-2000 winter was very mild, and no substantial stand losses due to winter kill were observed at any of the test sites, even on cultivars known to be highly susceptible to winter kill. Severe winter killing occurred at Ames and Lewis in 1997 and at Lewis and Crawfordsville in 1996. Each plot at those sites was rated twice in the spring of those years for percentage of stand that survived the winter. Therefore, winter survival data from 1996 and 1997 are presented, but no ratings of cultivars tested for the first time in 1999 or 2000 are available. Average yields across the three locations were computed for 1998-2000.

Pathogen populations responsible for diseases can change from year to year, and varieties rated as resistant in one year may not be resistant in another year. Therefore, leaf rust and powdery mildew ratings from 1999 alone are reported here.

The 1999-2000 Season

In Iowa, 18,000 acres of winter wheat were harvested for grain this season, according to Iowa Agricultural Statistics. This represents a 42 per cent decrease from 31,000 acres in 1999 . The average yield for winter wheat in Iowa in 2000 was 47 bu./A, compared to 43 bu./A in 1999. The predicted total winter wheat grain production in Iowa this year was 846 thousand bushels, a decrease of 37 percent from one year ago. Nationwide, U.S. farmers planted 53.8 million acres of wheat (winter and spring types) for harvest this year, a slight decrease from 1999. The nationwide average winter wheat yield for 2000 is estimated to be 44.6 bu./A for a total production of 1.56 billion bushels.

No substantial winter killing was observed at any of the test sites due to the mild winter season. Diseases were not a problem this year. All plots were standing at harvest thus no lodging data was recorded in 2000. Average grain yield in the variety test was 72.9 bu./A. up nearly 10 bu/A. from 1999. Average test weight was 56.2 lb./bu. Performances of the winter wheat varieties in 2000 are shown in Table 1. Grain yields, grain test weights are averaged over three years (1998-2000) for many of the cultivars are presented in Table 1. Heading date and height are shown for 2000 only. Lodging, leaf rust, and powdery mildew reactions are from 1999.

New Varieties

No new varieties were tested in 2000.

Certified Seed

Arapahoe hard red winter wheat was grown for certified seed in Iowa in 2000.

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Table 1. Performance of winter wheat cultivars tested in Iowa in 1998 – 2000.

Variety	3-year Average 98–00 Grain Yield (bu/A)	3-year Average 98–00 Test Weight (lb/bu)	3-year Average 98–00 Straw Yield (T/A)	2000 Grain Yield (bu/A)	2000 Test Weight (lb/bu)	2000 Date Headed (May)[1]	2000 Plant Height (in.)[1]	1999 Lodging %	1999 Leaf Rust Reaction[2]	1999 Powdery Mildew Reaction[2]	2-yr Ave. 96–97 Winter Survival %	State of Origin
Hard red winter wheat												
2137	73.1	57.3	3.6	82.1	56.2	18	31	7	MR	MR	49	KS
Alliance	61.6	55.9	3.4	79.4	56.0	16	33	50	S	MS	-	NE
Arapahoe	63.4	56.3	4.0	67.8	55.1	15	34	8	MR	MS	59	NE
Centura	56.8	57.6	3.5	65.5	57.0	19	33	7	MR	MS	49	NE
Cimarron	75.2	58.0	3.3	81.1	57.3	14	28	33	S	MS	20	OK
Crimson[4]	51.9	59.4	3.3	62.4	58.6	22	33	23	S	S	-	SD
Culver[4]	67.2	56.4	3.4	74.6	56.0	20	32	33	MS	MS	-	NE
Custer	82.3	57.5	3.6	87.2	57.8	15	31	7	MS	R	-	OK
Jagger	64.8	55.9	3.2	75.4	55.4	12	30	33	S	MR	24	KS
Karl92	70.6	57.2	3.6	82.9	56.3	14	31	37	S	R	37	KS
Nekota[4]	66.8	57.6	4.6	74.0	57.0	17	32	17	S	MR	-	SD
Prowers	49.5	58.4	5.0	60.8	58.0	17	35	43	MS	MS	-	CO
Rawhide	61.5	56.9	3.2	72.4	56.7	17	33	13	S	S	41	NE
Siouxland	59.0	57.3	4.0	67.9	56.9	18	36	0	MS	MS	61	NE
Tandem[4]	53.0	57.9	3.5	65.3	57.9	19	33	53	S	MR	-	SD
Tonkawah	73.6	58.2	3.4	77.6	57.8	18	29	0	MS	MR	-	OK
Vista	59.2	56.0	2.8	69.6	55.7	17	29	50	MS	MR	44	NE
Wesley[4]	67.5	56.3	4.1	80.1	56.3	17	32	7	MS	S	-	NE
Winstar	58.5	56.6	3.5	70.1	56.7	19	34	20	MR	MS	-	NE
Yumar	64.9	56.5	3.7	76.7	56.5	15	33	17	S	MR	-	CO

Table 1. Continued

Variety	3-year Average 98–00 Grain Yield (bu/A)	3-year Average 98–00 Test Weight (lb/bu)	3-year Average 98–00 Straw Yield (T/A)	2000 Grain Yield (bu/A)	2000 Test Weight (lb/bu)	2000 Date Headed (May)[1]	2000 Plant Height (in.)[1]	2000 Lodging %	1999 Leaf Rust Reaction[2]	1999 Powdery Mildew Reaction[2]	2-yr Ave. 96–97 Winter Survival %	State of Origin
Soft red winter wheat												
Cardinal	62.8	54.9	3.3	71.4	54.4	19	35	7	MS	MR	21	OH
Catoctin	63.1	55.8	3.2	70.1	54.8	18	31	17	MR	R	12	MD
Ernie	67.0	55.4	3.4	77.9	54.9	15	28	67	S	MR	30	MO
Glacier	56.2	55.2	3.5	64.0	56.6	20	35	13	S	MS	-	WI
Goldfield	63.4	56.0	3.7	66.1	54.8	13	35	13	MR	MS	-	IN
Hopewell	51.9	53.5	3.2	53.9	52.7	16	31	7	S	MR	-	OH
Howell	65.5	57.5	3.3	72.1	57.2	19	33	18	S	MS	36	IL
Kaskaskia	82.0	57.5	3.8	93.1	56.5	16	35	10	S	MS	-	IL
Patterson	59.8	55.3	3.2	71.3	54.7	13	32	13	S	MS	47	IN
Average	63.9	56.7	3.6	72.9	56.2	17	32	21	37			
LSD (0.05)[3]	8.7	0.9	0.6	12.1	1.2	3	3	22	18			

[1] Heading date and height data recorded at Ames only.
[2] Disease reactions: R = highly resistant, MR = moderately resistant, MS = moderately susceptible, S = susceptible
[3] Cultivars that differ by less than the least significant difference (LSD) are considered to be in the same class with 95% probability.
[4] Cultivars that were tested in 1999 and 2000 only.