

WINTER BARLEY VARIETIES IN KANSAS



Agricultural Experiment Station, Kansas State University, Manhattan
Marc A. Johnson, Director

Report of Progress 686

TABLE OF CONTENTS

	Page
INTRODUCTION1
VARIETY DESCRIPTIONS	1
VARIETY PERFORMANCE	3
VARIETY SELECTION	3
RESULTS:	
Table 1. Yield(bu/a) from Kansas Winter Barley Performance Tests and Kansas Intrastate Nursery, 1980-1992	4
Table 2. Summary of results from Kansas winter barley tests, 1980-1992	5

WINTER BARLEY VARIETIES IN KANSAS

INTRODUCTION

Barley is an excellent feed grain, fall and winter pasture, and forage crop. Barley has a wide range of adaptation, growing best on fertile, well-drained soils. Spring or winter and two- or six- row varieties are available. Most winter barleys grown in Kansas are the six-row type. Barley is grown in the state primarily for use as a feed grain, silage, and/or pasture. Kansas weather conditions are generally not suitable for the production of good malting barley.

Kansas barley acreage has varied greatly over the years. In the 1890's, the annual acreage averaged less than 25,000 acres. Early in this century, over 1,000,000 acres were planted in some years. From 1975 to 1988, Kansas barley acreage averaged nearly 113,000 acres. In recent years, barley acreage has been distinctly smaller, averaging 34,000 acres from 1989 through 1992.

For additional information on winter barley production in Kansas, refer to Extension publication C-677: *Winter Barley in Kansas*, available at County Extension Offices or at the Distribution Center, Umberger Hall, Kansas State University, Manhattan, KS 66506.

VARIETY DESCRIPTIONS

A brief description of each of the seven winter barley varieties tested extensively in Kansas since 1980 is presented below. Other varieties, such as 'Will', 'Nebar', 'Paoli', 'Kearney', 'Reno', etc., have been grown in Kansas but have virtually been replaced by more recent releases.

Dundy was developed by the Nebraska Agricultural Experiment Station and released in 1982. It was selected from the cross 'Sabbaton'/'Meimi'/'Decatur'/'3'/'Paoli'. In early testing, Dundy was similar to Nebar in winter hardiness. It was also shown to be more

productive, 1 to 3 days earlier, and 4 to 6 inches shorter than Nebar. Limited disease and insect reactions indicate that Dundy is susceptible to scald and greenbug.

In Kansas tests, Dundy has been most productive at western locations. Its test weight has been slightly below average. Dundy has averaged about 1/2 day later and 5 inches shorter than Kanby. It has tended to lodge more than some of the other varieties tested but has had better than average winter hardiness.

Hitchcock was developed by the Nebraska Agricultural Experiment Station and released in 1984. Hitchcock is a composite of six lines selected from an F2-derived line from the cross 'Dictoo'/'Reno'/'Shonan'/'Randolph'/'3'/'OAC WB2-11'/'Decatur'. In early Nebraska tests, Hitchcock was similar to Kearney in winter hardiness, shorter in plant height, about 1 day later in maturity, and superior in lodging resistance. Early disease and insect screening was minimal but indicated that Hitchcock is susceptible to scald and greenbugs. It appeared to be much less susceptible to chinch bug than other winter barley cultivars in one field test.

In Kansas tests, Hitchcock has performed at or slightly above the test average in all areas of the state. Its test weight values have equaled the test average. Hitchcock has been about 3 1/2 days later and about 3 inches shorter than Kanby. Responses for both lodging and winter survival have been better than average in all areas of the state.

Kanby was developed in Kansas from a composite cross of 18 winter barley cultivars made by ARS-USDA. It was distributed to Kansas growers in 1973. Kanby is a midtall, midseason-maturity, winter feed barley that is similar to Will. Kanby exceeded Will and Reno in early tests for both yield and test weight. Kanby is quite susceptible to scald, stripe, barley yellow dwarf, and mildew.

In variety tests performed since 1980, Kanby has not consistently yielded better than average in any of the areas of the state. Kanby's test weights have been average or slightly above average at all locations. It has been the earliest and tallest variety in Kansas tests over the past 12 years. Susceptibility to lodging and relatively poor winter hardiness have been problems in several tests.

Perkins was developed by the Nebraska Agricultural Experiment Station and was released in 1989. Perkins originated from the cross 'Nebar Selection'/Dundy. In early Nebraska tests, Perkins was intermediate in heading date between Dundy and Hitchcock. Winter survival was similar to or slightly less than that of these two cultivars. Test weights were excellent and grain yields of Perkins exceeded those of Dundy and Hitchcock by 20%. In limited testing, Perkins was tolerant to barley yellow dwarf virus and susceptible to prevalent races of stem rust.

Included in Kansas tests since 1990, Perkins has yielded well in all areas of the state, especially the east and central regions. Test weights also have been well above the average in all areas. Perkins has been about 2 1/2 days later and about 2 inches shorter than Kanby. Initial winter survival and lodging notes have indicated that Perkins may be comparable or slightly superior to other commonly grown varieties for these traits.

Post was developed by the Oklahoma Agricultural Experiment Station and released to growers in 1977. Post originated as a selection from the cross 'Harrison'/Will'. In early studies in Oklahoma, Post outyielded Will by 30%. Post also exhibited better straw strength than Will or Kerr. At the time of its release, Post possessed resistance to greenbug, barley yellow dwarf virus, net blotch, powdery mildew, and leaf rust.

Post has been tested extensively in Kansas and has demonstrated very good yield potential in environments where winterkill is not a problem. It has consistently performed well in eastern Kansas. Test weights have been good in all areas of the state. Post has been about 2 days later in heading and 2 inches shorter than Kanby. It has had very good straw strength in Kansas

tests, but poor winter hardiness often has been a problem.

Schuyler was developed in New York and release was approved in 1968. It was a selection from the cross 'Hudson'/Alpine'. After early testing in New York, Schuyler was described as having strong, short straw, mid-late maturity, and excellent resistance to powdery mildew and scald.

In Kansas, Schuyler has had good yields and test weights only in the eastern locations. In central and western tests, yield and test weight have been much less than the average of the other varieties tested. Schuyler's poor showing in much of Kansas has been due, at least in part, to its late maturity - 8 1/2 days later than Kanby. It has averaged 3 1/2 inches shorter than Kanby and has had good straw strength. Schuyler's winter hardiness has been good in the eastern locations but poor in the west when winterkill was a problem.

Weskan was developed by the Kansas Agricultural Experiment Station (KAES) and was approved for release in 1990. Weskan was a selection from the cross Purdue 6515A2/KY 66-7-63-1294. Tests conducted prior to release indicated that Weskan had a 10% advantage in yield and 2 pounds per bushel advantage in test weight when compared to Dundy, Kanby, Hitchcock, and Post. Weskan was slightly later and shorter than Kanby.

In Kansas Performance Tests, Weskan has had better than average yields and test weights in the central and western locations. Performance has been relatively poor in the eastern tests. Weskan has headed about 1/2 day later and has been about 3 1/2 inches shorter than Kanby. Weskan's winter hardiness has been very good, especially in the west, but it has tended to lodge more severely than other varieties.

VARIETY PERFORMANCE

A summary of the agronomic performance information for seven winter barley varieties tested extensively throughout the state from 1980 through 1992 is presented in Tables 1 and 2. This information was obtained from two sources: KAES Crop Performance Tests (CPT) and Kansas Intrastate Nurseries (KIN). Winter barley variety evaluations have been conducted by the KAES-CPT Program as one part of fulfilling its mission to provide Kansas growers with unbiased performance information on varieties and hybrids of major Kansas field crops. Advanced experimental lines and some released varieties have been evaluated in the KIN as a part of the KAES mission to develop and release improved crop varieties adapted to Kansas. Tests have been conducted at many locations across Kansas (Figure 1).

variety means over the locations including a given variety. Yield and test weight are presented as percents of the test mean. Maturity is presented as days earlier or later than Kanby. Plant height is presented as a percent of the height of Kanby. Lodging and winter survival ratings were developed for each variety in each region based on actual notes taken when varietal differences in these characters were evident. These ratings are based on the following scale: 1=poor (most lodging or winterkill compared to other varieties in tests); 4=best (least lodging or winterkill compared to other varieties in the tests).

VARIETY SELECTION

When selecting a variety, it is important to remember two key problems encountered when growing winter barley in Kansas: winterkill and lodging. No available variety is hardy enough to produce consistently under adverse winter conditions in any part of the state. Only the most winter hardy varieties should be selected. Winter barley also tends to lodge, so good straw strength is important. The potential for lodging is greater with irrigation and/or high fertility.

Small differences in any one character should not be overemphasized. Variety selection should be based on the best combination of characters important to the area and situation where the variety will be grown. Test weight and lodging may not be important, if the seeding is intended strictly for pasture, but fall growth and winter survival are very important. On the other hand, yield, test weight, lodging, and winter survival are all critical for satisfactory grain production.

No matter which variety is chosen, remember to use high-quality, professionally prepared seed to ensure the potential for maximum variety performance.

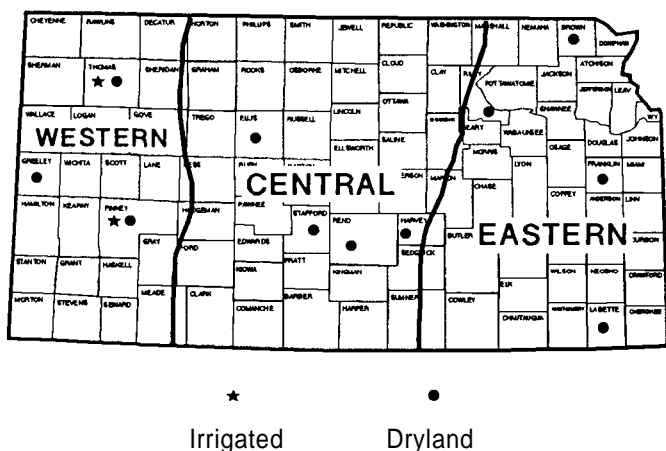


Figure 1. Winter Barley Test Locations

Table 1 presents the actual yield data in bushels/acre from each test conducted since 1980. Test results for yield, test weight, maturity, plant height, lodging, and winter survival were summarized over the Eastern, Central, Western Dryland, and Western Irrigated areas and are presented in Table 2. Each character was standardized at each location before calculating

Table 1. Yield (bu/a) from Kansas Winter Barley Performance Tests and Kansas Intrastate Nursery, 1980-1992.

Variety	East																						
	Brown					Riley-KIN				Franklin						Labette							
	92	91	90	89	88	92	91	89	80	92	91	90	89	88	85	84	92	91	89	88	86	85	84
Hitchcock	11	59	86	53	59	50	43	33	--	65	73	48	53	87	60	--	57	57	43	80	58	63	--
Kanby	30	42	88	0	66	47	39	12	56	45	70	48	44	94	51	39	52	36	26	95	60	51	48
Perkins	36	65	103	--	--	54	41	--	--	74	78	49	--	--	--	--	67	70	--	--	--	--	--
Post	35	46	87	14	60	69	38	28	63	52	87	54	48	100	84	71	65	59	66	99	86	63	66
Weskan	16	53	--	--	--	51	39	27	--	37	66	--	--	--	--	--	53	31	--	--	--	--	--
Dundy	--	--	96	38	69	--	40	35	34	--	--	44	39	101	54	52	--	--	43	85	56	68	59
Schuyler	--	--	94	23	77	--	--	26	--	--	--	35	81	100	65	78	--	--	50	87	72	69	76
Mean	25	53	92	25	66	54	40	27	51	55	75	46	53	96	63	60	59	50	46	89	66	63	62
LSD	8	7	12	7	9	11	NS	19	11	9	8	5	11	8	10	NS	14	15	16	8	NS	NS	14

Variety	Central																					
	Harvey						Reno					Reno-KIN			Ellis		Ellis-KIN					
	92	91	90	88	87	86	90	88	87	86	85	92	89	86	88	87	92	91	90	88	87	86
Hitchcock	68	49	46	62	51	40	60	63	31	71	79	43	18	69	36	68	66	57	84	41	59	64
Kanby	66	9	47	48	56	56	41	45	41	76	72	42	13	74	56	85	64	46	70	65	74	71
Perkin	66	33	50	--	--	--	53	--	--	--	--	41	--	--	--	--	80	47	--	--	--	--
Post	59	12	51	56	62	44	33	81	48	72	89	41	9	76	48	94	68	38	65	59	80	85
Weskan	62	25	--	--	--	--	--	--	--	--	--	39	18	81	--	--	77	50	86	68	83	67
Dundy	--	--	46	60	54	49	58	49	27	65	57	--	18	78	47	65	--	42	77	39	87	61
Schuyler	--	--	44	58	43	19	33	50	27	60	77	--	19	89	46	79	--	--	--	22	93	68
Mean	64	26	47	57	53	42	46	58	34	69	75	41	16	78	47	77	71	47	76	49	79	69
LSD	14	4	4	7	4	9	8	9	5	9	12	12	10	14	5	14	11	--	10	11	7	--

Variety	Central - Continued				West Dryland												Gre.					
	Stafford				Thomas								Thomas-KIN									
	91	90	88	87	92	91	90	89	88	87	85	84	92	91	90	89		88	87	82	81	80
Hitchcock	78	56	64	--	46	67	104	22	52	64	76	--	40	61	111	47	42	81	--	--	--	39
Kanby	75	53	61	39	53	42	104	15	57	83	47	50	31	28	107	45	48	92	70	67	93	35
Perkins	76	62	--	--	43	60	115	--	--	--	--	--	36	52	--	--	--	--	--	--	--	--
Post	67	48	52	53	41	41	120	15	54	79	75	46	37	27	109	48	36	96	--	55	86	46
Weskan	79	--	--	--	56	72	108	--	--	--	--	--	40	71	113	49	44	110	--	--	--	--
Dundy	--	61	71	--	--	--	108	25	53	82	69	45	--	67	118	48	39	87	67	65	95	39
Schuyler	--	73	60	--	--	--	--	9	50	78	78	39	--	--	--	40	22	93	--	--	--	50
Mean	75	59	62	46	48	56	109	17	53	76	69	45	37	51	112	46	39	93	69	62	91	40
LSD	8	12	12	10	7	6	8	5	6	8	6	4	6	--	8	--	11	7	10	NS	8	6

Variety	West Dryland - Continued								West Irrigated											
	Finney		Finney-KIN						Thomas						Finney					
	90	88	92	91	90	89	88	86	91	90	89	88	87	85	84	92	91	90	88	86
Hitchcock	55	29	39	81	88	41	18	27	86	103	40	97	83	102	--	86	78	31	62	93
Kanby	58	33	45	75	78	30	23	43	45	95	28	107	95	97	87	76	43	61	41	92
Perkins	59	--	52	59	--	--	--	--	78	104	--	--	--	--	--	96	71	41	--	--
Post	61	31	42	61	64	36	20	39	57	99	24	105	90	114	85	104	33	74	56	129
Weskan	--	--	58	91	82	47	32	36	94	97	--	--	--	--	--	92	60	--	--	--
Dundy	49	36	--	72	85	50	27	35	--	104	55	115	86	109	119	--	--	42	43	99
Schuyler	34	23	--	--	--	37	11	39	--	--	16	84	77	96	99	--	--	23	50	93
Mean	53	30	47	73	79	40	22	11	72	100	33	102	88	104	98	91	57	45	51	101
LSD	8	4	10	--	7	15	--	--	11	NS	8	6	15	15	11	14	16	13	11	11

Table 2. Summary of results from Kansas winter barley tests, 1980-1992. 1/

Variety	Yield %mean	Test Weight %mean	Maturity Days from Kanby	Plant Height %Kanby	Lodging 2/	Winter Survival 2/
East						
Hitchcock	103.0 (20)	99.5 (18)	2.5 (17)	93.9 (17)	3 (11)	4 (3)
Kanby	83.2 (23)	98.7 (19)	0.0 (20)	100.0 (20)	2 (13)	1 (3)
Perkins	118.2 (10)	105.3 (9)	1.9 (9)	97.3 (9)	2 (7)	4 (1)
Post	109.2 (23)	101.9 (20)	1.5 (20)	99.9 (20)	3 (13)	1 (3)
Weskan	84.8 (9)	99.6 (7)	0.4 (7)	96.1 (7)	1 (6)	2 (1)
Dundy	98.9 (16)	97.1 (13)	0.6 (14)	84.9 (14)	2 (7)	3 (2)
Schuyler	108.7 (14)	99.1 (12)	6.0 (12)	93.0 (12)	4 (6)	3 (2)
Mean	57.2 bu/a	43.1 lb/bu	1.7 day	34.2 in	46.8 %	68.6 %
Central						
Hitchcock	103.3 (20)	99.4 (18)	4.6 (17)	87.3 (19)	3 (11)	4 (6)
Kanby	98.0 (23)	102.4 (19)	0.0 (20)	100.0 (23)	2 (13)	2 (7)
Perkins	108.0 (10)	102.6 (9)	1.3 (9)	89.9 (7)	2 (7)	2 (4)
Post	99.8 (23)	103.0 (20)	2.2 (20)	91.9 (22)	3 (13)	1 (7)
Weskan	106.9 (9)	102.9 (7)	-0.4 (7)	91.3 (12)	1 (6)	3 (4)
Dundy	98.3 (16)	97.7 (13)	0.3 (14)	83.8 (19)	2 (7)	3 (3)
Schuyler	92.4 (14)	94.6 (12)	9.6 (12)	86.7 (13)	4 (6)	2 (2)
Mean	56.3 bu/a	44.9 lb/bu	2.5 day	34.2 in	36.5 %	65.4 %
West Dryland						
Hitchcock	100.9 (22)	100.9 (21)	4.6 (20)	84.2 (19)	4 (9)	4 (8)
Kanby	97.3 (26)	101.0 (25)	0.0 (25)	100.0 (23)	2 (13)	2 (8)
Perkins	100.5 (8)	102.9 (8)	3.6 (8)	85.4 (7)	3 (4)	2 (3)
Post	95.1 (25)	100.5 (24)	3.6 (23)	89.9 (22)	4 (12)	1 (8)
Weskan	116.2 (15)	103.5 (14)	1.3 (14)	86.8 (12)	1 (7)	4 (5)
Dundy	107.0 (22)	98.4 (21)	0.8 (21)	82.4 (19)	2 (11)	3 (7)
Schuyler	85.9 (14)	93.4 (13)	9.4 (12)	85.7 (13)	4 (4)	1 (5)
Mean	57.5 bu/a	45.1 lb/bu	2.7 day	30.4 in	26.9 %	58.6 %
West Irrigated						
Hitchcock	104.1 (11)	99.8 (11)	3.0 (10)	95.9 (10)	3 (7)	3 (3)
Kanby	92.0 (12)	100.8 (12)	0.0 (11)	100.0 (11)	2 (8)	2 (3)
Perkins	106.6 (5)	107.4 (5)	3.4 (4)	98.0 (4)	2 (5)	3 (1)
Post	102.3 (12)	102.1 (12)	1.6 (11)	96.2 (11)	4 (8)	1 (3)
Weskan	108.5 (4)	102.0 (4)	1.2 (3)	85.3 (3)	1 (4)	4 (1)
Dundy	109.1 (9)	96.7 (9)	0.6 (9)	87.3 (8)	1 (5)	3 (2)
Schuyler	81.5 (8)	95.1 (8)	9.2 (8)	92.6 (8)	3 (4)	1 (2)
Mean	78.5 bu/a	44.1 lb/bu	2.6 day	36.6 in	51.1 %	76 %

1/ Number in parentheses is the number of observations that was used to calculate that mean.

Means over varieties in each district are the standardized mean presented in actual units (bu/a, lb/bu, etc.).

2/ Ratings are based on the following scale: 1 = poor (most lodging or winter kill compared to other varieties in tests);

4 = best (least lodging or winter kill compared to other varieties in the tests).

CONTRIBUTORS

MAIN STATION, MANHATTAN

Kraig Roozeboom, Assistant Agronomist (Senior Author)

Charles Rife, Research Assistant

Rollin Sears, Wheat Breeder

BRANCH EXPERIMENT STATIONS

John Lawless, Colby

James Long, Parsons

T. Joe Martin, Hays

Alan Schlegel, Tribune

Merle Witt, Garden City

EXPERIMENT FIELDS

Mark Claessen, Hesston

William Heer, Hutchinson

Keith Janssen, Ottawa

Brian Marsh, Powhattan

Victor Martin, St. John

NOTE: When trade names are used in Kansas State University publications, no endorsement of them or criticism of similar products not named is intended.



Agricultural Experiment Station, Kansas State University, Manhattan 66506-4008

Report of Progress 686

June 1993

Kansas State University is committed to a policy of non-discrimination on the basis of race, sex national origin, disability religion, age sexual orientation, or other non-merit reasons, in admissions, educational programs or activities' and employment, all as required by applicable laws and regulations. Responsibility for coordination of compliance efforts and receipt of inquiries, including those concerning Title IX of the Education Amendments of 1972 and Section 5504 of the Rehabilitation Act of 1973 has been delegated to Jane D Rowlett, Ph D, Director, Affirmative Action Office, 214 Anderson Hall, Kansas State University, Manhattan, KS 66506-0104 (913/532-6220) 3M