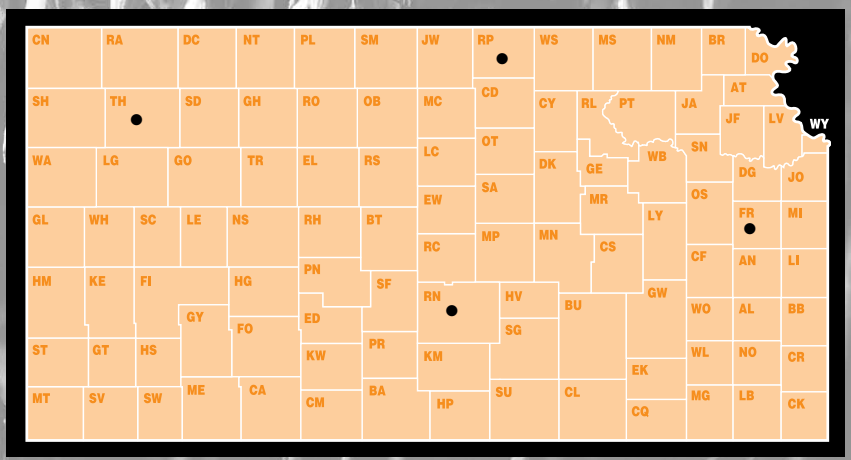
2004

KANSAS PERFORMANCE TESTS WITH

SPRING SMALL GRAINS

REPORT OF PROGRESS 931

Kansas State University
Agricultural Experiment Station
and Cooperative Extension Service



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INTRODUCTION

Spring-planted small grains in Kansas

Although not major cash crops in Kansas, spring-planted small grains are of interest in many situations. Spring wheat often is viewed as an alternative when winter wheat fails to establish or survive the winter. Spring oats can be important as a feed grain for balancing animal rations, as an intermediate crop when changing crop rotations, or as a food crop when and where such a market is available. All spring-planted small grains can produce highly nutritious forage for grazing, ensiling, or hay.

Averaged over the past five years (2000 through 2004), spring oat acreage ranked seventh behind wheat, sorghum, corn, hay, soybeans, and sunflowers, representing less than 1% of the total crop acres (Figure 1). During that time, only 43% of the oat acres were harvested for grain; the rest were abandoned, grazed, or harvested for forage. Production statistics are not available for other spring-planted small grains. (Kansas Agricultural Statistics)

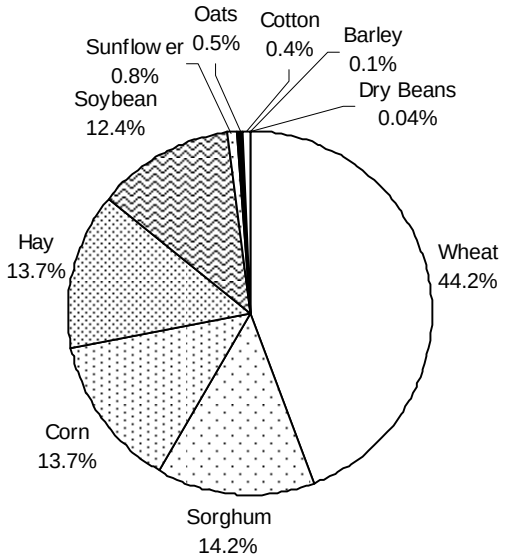


Figure 1. Kansas crop acreage.

Oat historical acreage and yield

Oats historically have been an important crop in Kansas. Figure 2 shows that oat acreage grew steadily as the state was settled in the last half of the 1800s, peaking at more than 1.6 million acres during the early 1900s. Acreage declined rapidly during the 1950s and 1960s, leveled off at around 200,000 acres in the 1970s and 1980s, and dropped to just more than 100,000 acres in the 2000s. State average yield followed nearly an opposite pattern, starting at more than 30 bushels per acre in the 1860s and decreasing to around 25 bushels per acre in the first part of the 1900s, at which it stayed until the 1950s. Since then, average yield has increased to slightly more than 50 bushels per acre. (Kansas Agricultural Statistics)

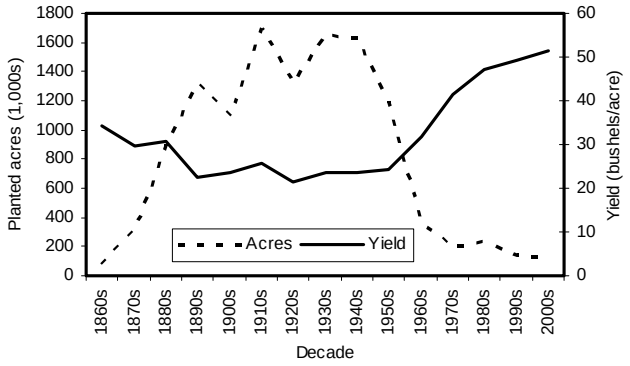


Figure 2. Historical acreage and yield of spring oats.

MANAGEMENT

Planting date

It is important to plant spring cereals as early as possible in late winter, but without "mudding in" the seed. Planting-date studies have shown that early plantings out-yield later plantings. The zones for the recommended planting date ranges are presented in Figure 3.

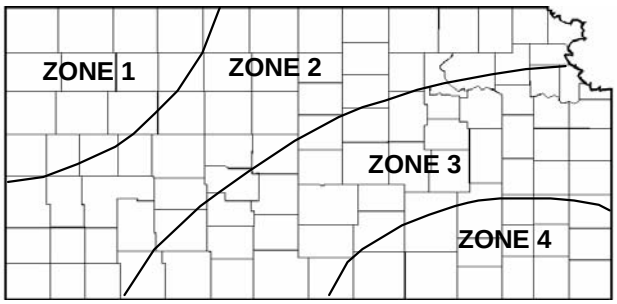


Figure 3. Kansas planting date zones.

Table 1. Kansas planting dates.

	Zone 1	Zones 2 & 3	Zone 4
Spring Oats	Mar 5 – Mar 20	Feb 25 – Mar 15	Feb 20 – Mar 15
Spring Barley	Feb 25 – Mar 15	Feb 25 – Mar 15	Not recommended*
Spring Wheat	Feb 25 – Mar 15	Feb 25 – Mar 15	Not recommended*

*Spring barley and spring wheat generally are not recommended for Zone 4, but if they are being considered, they should be planted earlier in the recommended range of dates.

Planting rate

The recommended planting rates change across the state due to moisture conditions, with lower seeding rates in the western parts of the state and increasing rates as moisture conditions improve in the eastern parts of the state. Although the old recommendation – a bushel and a peck – is often used, in general, recommended seeding rates have increased, especially in the eastern areas. Also, when planting cereals for forage, the seeding rates tend to be higher. The areas for seeding rate recommendations are presented in Figure 4.

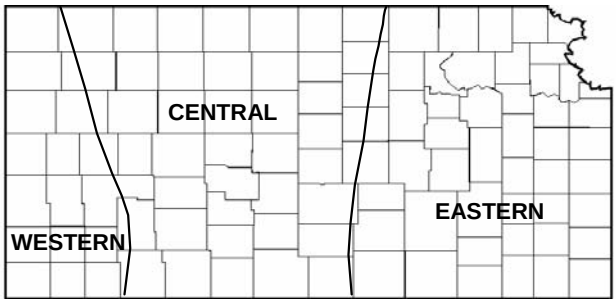


Figure 4. Kansas planting rate areas.

Table 2. Kansas planting rates.

	Western	Central	Eastern	Irrigated
	lb/a			
Spring Oats	48 – 64	48 – 64	64 – 96	64 – 96
Spring Barley	60 – 96	64 – 96	72 – 96	72 – 96
Spring Wheat	75 – 100	90 – 120	90 – 120	90 – 120

Fertility

Nitrogen is the nutrient most frequently limiting spring cereal production. Yield goal, precipitation, cropping system, and soil texture are factors that influence nitrogen recommendations. A general rule is that spring cereals require about one pound of nitrogen per bushel of yield. In addition to applied N fertilizer, nitrogen can come from residual soil nitrogen, legume rotations, and manure. Nitrogen rates should be adjusted to account for these other sources. No more than 20 pounds N plus K2O per acre should be in direct seed contact. Excessive nitrogen often results in increased lodging, especially with spring oats and spring barley.

VARIETIES

Choosing the right variety

Achieving adequate grain or forage yields requires selecting varieties adapted to the Kansas environment. Yield-limiting factors that must be considered include high temperatures and low moisture availability during the grain-filling period; diseases such as barley yellow dwarf virus, leaf rust, crown rust, and stem rust; and summer storms and fertility situations that might cause lodging. Selecting varieties that are equipped to perform reliably under these conditions requires information about varieties and their performance in Kansas.

With no commercial or university spring small grain variety-development programs located in Kansas to provide specifically adapted varieties, most varieties grown in the state originate elsewhere. Crop specialists examine maturity, disease resistance, and yield-potential information from the originating institutions. Early-maturing varieties with good test weights and adequate disease resistance are included in Kansas performance tests. Private firms occasionally enter varieties for evaluation.

Performance tests

Kansas performance tests are designed to evaluate small grain varieties in several environments by using recommended production practices. Varieties are evaluated for yield, test weight, maturity, height, and other characters that may arise in a given season.

Yield integrates a number of factors that affect the potential performance of a variety, but yield may not tell the entire story. For instance, a variety may yield well in a year with a cool, wet summer but be unsuited for Kansas in most years. Using a number of years of yield information minimizes the possibility of choosing an unsuitable variety on the basis of its performance under unusual circumstances.

Collecting other information about a variety, in addition to yield, provides a more complete picture of its potential performance. Bloom date is a consistent trait that indicates the relative maturity of a variety and its potential for maturing early enough to fill grain before the hot, dry conditions of summer. Test weight helps evaluate the ability of a variety to fill seed under harsh summer conditions, and often is related closely to maturity. It also may indicate the density of the grain and its ability to "pack" into a certain volume. Height is another consistent trait that often is related to maturity.

Pages 3 to 6 present performance test results for individual tests, for multiple years at a location, and for multiple years and locations.

Figures 5 through 8 compare oat varieties with three check varieties, Bates, Dane, and Don, on the basis of test results from 1991 to 2004. Numbers within bars indicate how many direct comparisons were made. The +/- symbols indicate if the variety was significantly greater or less than the average of the check varieties averaged over all comparisons.

Table 3. Ottawa Spring Oat Performance Tests.

Variety	Yield (bu/a)	Yield (% avg)	Moist (%)	TW (lb/bu)	Head date	Ht (in)	Ldg (%)	Forage (lb/a)
2002								
INO9201	89	150	11	28	148	40	0	
Jay	84	141	11	29	154	41	0	
Blaze	83	139	11	28	151	42	6	
Jim	77	130	11	27	149	43	1	
Chaps	75	125	11	28	150	42	6	
Classic	70	118	10	25	152	43	0	
Rio Grande	66	110	9	22	152	42	31	
Dane	62	105	10	25	148	40	5	
Jerry	61	102	11	30	153	45	6	
Gem	60	100	11	26	155	43	2	
Don	59	99	11	28	146	40	38	
Ogle	56	94	10	24	153	42	1	
Rodeo	54	90	11	24	152	42	1	
Moraine	53	89	11	26	151	44	38	
Armor	52	88	10	22	153	42	13	
Riser	50	84	11	30	141	42	40	
Bates	46	77	10	28	144	40	26	
Powell	41	68	10	20	157	41	73	
Monida	30	50	8	20	156	44	85	
Russell	24	39	11	25	156	43	2	
Average	60	60	10	26	151	42	19	
CV (%)	11	11	4	4	0	4	65	
LSD (0.05)*	9	15	1	2	1	2	17	
2003								
Jim	109	118	10	33	147	46	5	
INO9201	108	116	10	31	148	45	1	
Blaze	103	111	10	33	150	48	28	
Gem	101	109	10	32	154	51	14	
Moraine	101	108	10	33	148	49	35	
Dane	99	106	10	32	145	44	23	
Jay	98	106	10	31	152	44	0	
Rodeo	97	104	10	30	152	49	1	
Chaps	95	102	10	32	149	48	3	
Armor	87	93	10	29	153	48	1	
Richard	84	90	10	33	152	51	1	
Reeves	83	90	10	36	150	54	38	
Jerry	80	86	10	35	151	52	28	
Don	76	81	10	33	146	44	35	
Bates	75	81	10	34	147	49	13	
Average	93	93	10	32	150	48	15	
CV (%)	10	10	2	3	0	3	60	
LSD (0.05)*	13	14	0	1	1	2	13	

Variety	Yield (bu/a)	Yield (% avg)	Moist (%)	TW (lb/bu)	Head date	Ht (in)	Ldg (%)	Forage (lb/a)
Two - year averages (2002, 2003)								
INO9201	98	133	10	30	148	42	1	
Jim	93	124	10	30	148	45	3	
Blaze	93	125	10	31	151	45	17	
Jay	91	123	11	30	153	42	0	
Chaps	85	114	10	30	149	45	4	
Dane	81	106	10	28	147	42	14	
Gem	80	104	11	29	155	47	8	
Moraine	77	99	10	30	150	47	36	
Rodeo	75	97	10	27	152	45	1	
Jerry	71	94	11	32	152	48	17	
Armor	69	90	10	26	153	45	7	
Don	67	90	10	30	146	42	36	
Bates	61	79	10	31	145	45	19	
Average	76	76	10	29	150	45	17	
CV (%)	10	10	3	4	0	4	63	
LSD (0.05)*	11	14	0	1	1	2	15	

* Unless two varieties differ by more than the LSD, little confidence can be placed in one being superior to the other.

Table 4. Hutchinson Spring Oat Performance Tests.

Variety	Yield (bu/a)	Yield (% avg)	Moist (%)	TW (lb/bu)	Head date	Ht (in)	Ldg (%)	Forage (lb/a)
2003								
Dane	82	129	9	29	146	40	20	
Moraine	75	117	9	29	148	38	23	
Reeves	74	116	9	33	148	41	35	
INO9201	72	112	8	27	148	38	11	
Chaps	71	110	8	28	148	41	15	
Jim	70	110	8	27	148	37	35	
Richard	69	108	11	28	150	43	15	
Jerry	65	101	9	29	151	39	15	
Blaze	64	101	9	29	149	40	18	
Gem	58	91	10	28	153	40	21	
Bates	57	90	9	30	147	39	34	
Jay	57	89	9	27	154	37	13	
Rodeo	56	87	8	26	152	38	29	
Armor	45	71	9	25	154	38	7	
Don	44	69	8	29	148	36	52	
Average	64	64	9	28	149	39	23	
CV (%)	11	11	7	5	1	9	96	
LSD (0.05)*	10	16	1	2	2	5	31	
2004								
Dane	71	123	9	31	132	37	75	8,138
Esker	70	120	9	31	140	36	83	7,456
INO9201	68	116	9	30	138	35	88	7,145
Bates	66	114	9	32	137	34	95	7,545
Jay	66	114	9	30	141	33	76	8,128
Chaps	65	111	9	31	138	36	100	7,752
Moraine	64	110	9	32	137	39	98	8,013
Spurs	63	109	9	32	137	35	90	8,672
Gem	61	104	9	30	140	39	85	8,289
Jim	60	103	9	32	132	38	65	8,583
Reeves	59	102	9	34	140	42	98	8,269
Jerry	56	97	9	31	139	39	93	8,135
Blaze	55	95	9	31	134	35	100	7,500
Don	49	84	10	34	136	33	100	7,225
Richard	49	84	9	26	140	38	35	8,272
Armor	47	81	9	27	140	36	100	8,870
EH-CHD-SO	19	32	9	20	142	35	23	6,920
Average	58	58	9	30	138	36	82	7,936
CV (%)	13	13	4	3	0	3	28	9
LSD (0.05)*	10	18	0	1	1	2	32	1,196

Variety	Yield (bu/a)	Yield (% avg)	Moist (%)	TW (lb/bu)	Head date	Ht (in)	Ldg (%)	Forage (lb/a)
Two - year averages (2003, 2004)								
Dane	77	126	9	30	139	38	48	
INO9201	70	114	9	29	143	36	49	
Moraine	69	113	9	30	142	39	60	
Chaps	68	111	9	29	143	38	58	
Reeves	67	109	9	33	144	42	66	
Jim	65	107	9	30	140	37	50	
Bates	62	102	9	31	142	36	64	
Jay	61	101	9	28	147	35	44	
Jerry	60	99	9	30	145	39	54	
Blaze	60	98	9	30	142	38	59	
Gem	60	98	9	29	147	40	53	
Richard	59	96	10	27	145	40	25	
Don	47	77	9	31	142	35	76	
Armor	46	76	9	26	147	37	53	
Average	61	61	9	29	144	38	53	
CV (%)	12	12	6	4	1	7	42	
LSD (0.05)*	10	17	1	2	1	3	31	

* Unless two varieties differ by more than the LSD, little confidence can be placed in one being superior to the other.

Table 5. Belleville Spring Oat Performance Tests.

Variety	Yield (bu/a)	Yield (% avg)	Moist (%)	TW (lb/bu)	Head date	Ht (in)	Ldg (%)	Forage (lb/a)
2002								
Don	74	134	13	35		28		
Dane	71	128	13	32		29		
INO9201	71	127	13	34		30		
Blaze	71	127	13	34		32		
Jim	70	126	12	35		29		
Armor	69	125	13	34		31		
Riser	67	120	12	34		27		
Moraine	63	113	13	35		32		
Rio Grande	62	112	12	32		29		
Jerry	61	109	13	35		33		
Jay	58	104	13	35		28		
Bates	54	98	13	35		27		
Rodeo	51	93	14	32		31		
Chaps	51	92	13	33		30		
Powell	49	88	14	30		28		
Gem	47	84	15	32		33		
Classic	43	77	15	32		32		
Monida	36	65	19	23		30		
Ogle	23	41	15	30		30		
Russell	21	37	15	29		30		
Average	56	56	14	33		30		
CV (%)	8	8	6	4		5		
LSD (0.05)*	6	11	1	2		2		
2004								
Gem	84	129	12	36	149	36	0	
Esker	83	128	12	36	148	32	0	
Moraine	76	117	12	36	147	33	6	
Reeves	76	116	12	36	148	35	5	
Chaps	72	111	12	35	146	31	6	
Jim	66	102	12	36	146	31	0	
Riser	66	101	12	36	143	28	0	
Dane	64	99	12	36	146	30	0	
Jay	64	98	12	36	146	32	0	
Blaze	63	97	12	35	146	33	0	
Spurs	60	92	13	35	146	34	2	
Richard	60	92	12	34	148	33	0	
Bates	59	90	12	36	144	30	0	
INO9201	58	89	12	36	148	34	1	
Armor	58	89	12	34	150	33	0	
Jerry	51	79	12	36	147	36	0	
Don	46	70	12	36	145	31	0	
Average	65	65	12	36	147	32	1	
CV (%)	11	11	1	1	0	2	53	
LSD (0.05)*	10	16	0	0	1	1	1	

Variety	Yield (bu/a)	Yield (% avg)	Moist (%)	TW (lb/bu)	Head date	Ht (in)	Ldg (%)	Forage (lb/a)
Two-year averages (2002, 2004)								
Moraine	70	115	12	35	147	33		4,616
Jim	68	114	12	35	146	30		4,782
Dane	68	114	13	34	146	30		4,251
Blaze	67	112	12	35	146	32		4,511
Riser	66	111	12	35	143	27		
Gem	65	106	14	34	149	34		6,205
INO9201	64	108	12	35	148	32		5,389
Armor	64	107	13	34	150	32		5,205
Chaps	62	101	13	34	146	31		5,210
Jay	61	101	13	35	146	30		5,366
Don	60	102	12	36	145	29		5,436
Bates	57	94	12	35	144	28		4,294
Jerry	56	94	13	36	147	34		5,950
Richard								5,206
Reeves								5,300
Average	60	60	13	34	147	31		5,086
CV (%)	10	10	5	3	0	4		10
LSD (0.05)*	8	13	1	1	1	2		697

* Unless two varieties differ by more than the LSD, little confidence can be placed in one being superior to the other.

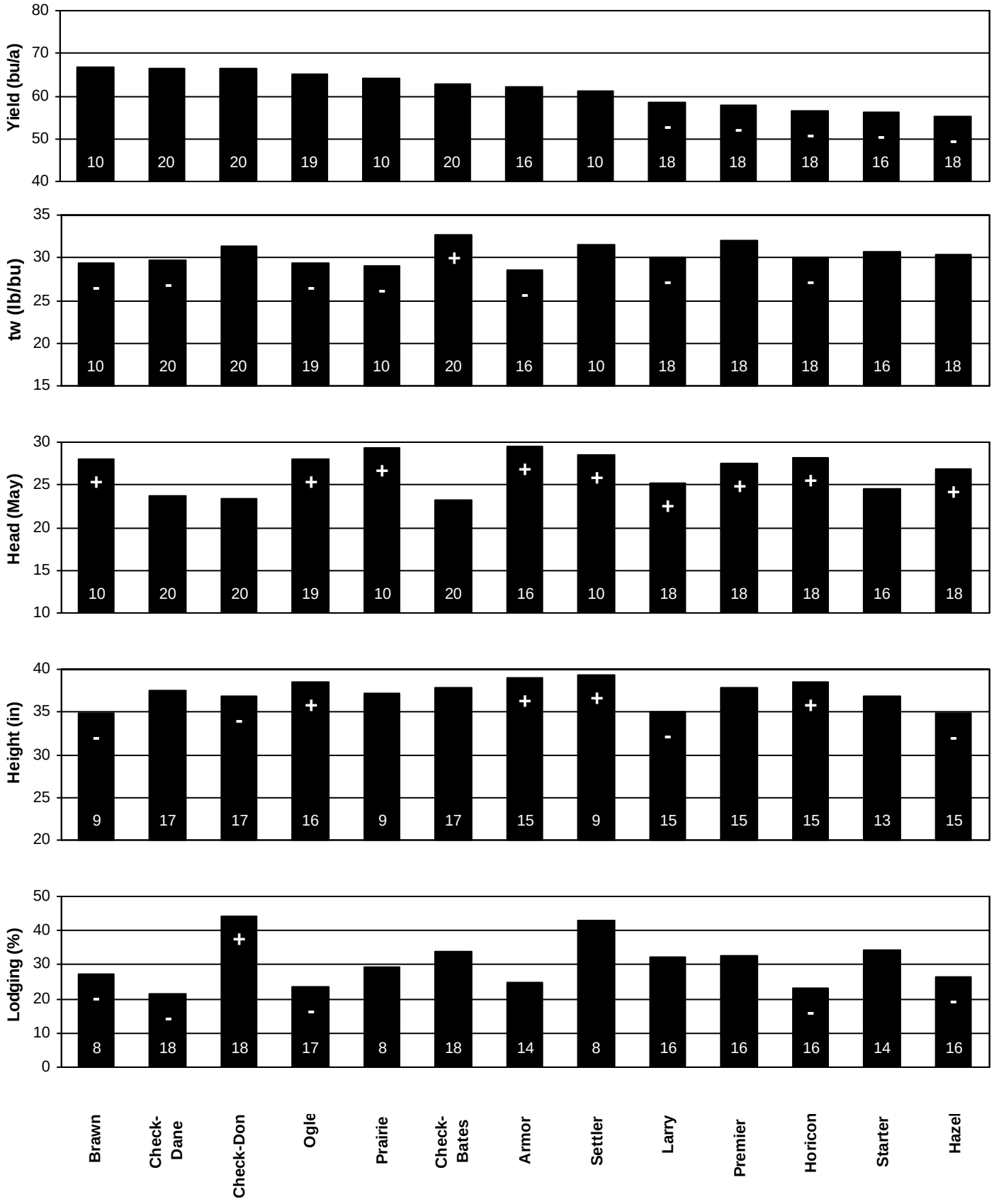
Forage yields are from 2003; no grain harvested due to hail.

Table 6. Colby Spring Oat Performance Tests.

Variety	Yield (bu/a)	Yield (% avg)	Moist (%)	TW (lb/bu)	Head date	Ht (in)	Ldg (%)	Forage (lb/a)
2001								
Dane	61	113	8	28	152	32	0	
Ogle	60	111	7	28	157	32	5	
Jim	60	110	9	31	154	31	0	
INO9201	59	110	8	30	154	31	0	
Jay	59	109	9	30	157	28	0	
Chaps	58	107	8	28	156	33	8	
Bates	57	106	8	31	152	30	0	
Don	57	105	8	31	152	29	3	
Blaze	57	105	9	30	157	31	0	
Riser	57	105	8	32	152	31	3	
Rio Grande	55	101	8	25	158	27	3	
Rodeo	54	100	8	28	158	31	0	
Armor	53	99	9	28	159	30	0	
Classic	53	97	8	29	156	32	0	
Moraine	50	93	9	28	157	33	13	
Jerry	50	93	9	30	157	33	6	
Gem	47	86	8	28	160	33	3	
Powell	47	86	8	23	162	25	0	
Russell	46	84	8	28	159	31	8	
Monida	42	78	9	26	163	29	14	
Average	54	54	8	28	157	30	3	
CV (%)	8	8	12	4	0	4	154	
LSD (0.05)*	6	11	NS	2	1	2	7	
2003								
Jim	68	116	10	36	152	28		
Blaze	67	114	15	35	154	26		
INO9201	66	113	11	36	152	26		
Don	65	111	8	35	150	26		
Rodeo	64	110	13	33	155	27		
Dane	61	105	10	32	152	28		
Bates	60	102	9	35	150	28		
Jay	58	100	14	38	154	26		
Chaps	58	99	13	33	153	29		
Moraine	57	97	13	33	153	29		
Richard	56	97	21	32	157	28		
Armor	53	91	17	33	157	27		
Gem	51	87	27	32	159	28		
Jerry	47	80	16	33	157	29		
Reeves	45	76	13	35	152	29		
Average	58	58	14	34	154	27		
CV (%)	8	8	14	3	1	4		
LSD (0.05)*	7	12	3	2	1	2		

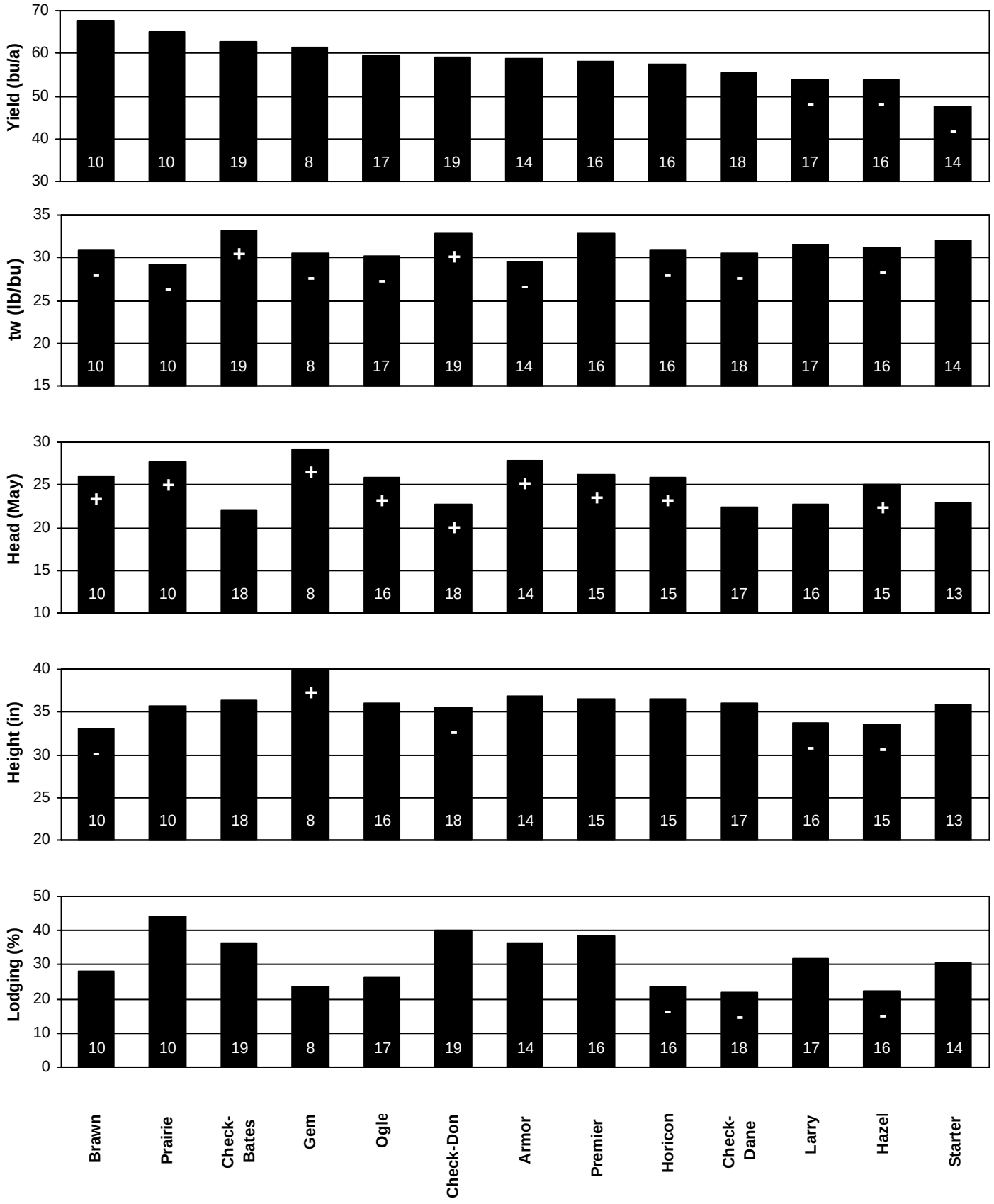
Variety	Yield (bu/a)	Yield (% avg)	Moist (%)	TW (lb/bu)	Head date	Ht (in)	Ldg (%)	Forage (lb/a)
2004								
Dane	36	124	10	21	145	20		2,233
Spurs	35	121	11	26	146	18		2,124
Jim	34	118	11	26	146	20		2,073
Chaps	32	113	11	25	148	19		2,058
Jay	31	109	12	27	147	18		1,841
INO9201	31	107	11	25	146	19		1,740
Esker	29	101	11	24	149	19		1,850
Blaze	29	101	12	24	149	18		1,874
Bates	28	97	11	25	146	20		1,791
Jerry	27	95	13	26	148	20		1,911
Moraine	27	95	11	23	146	19		1,862
Don	25	87	10	24	145	18		1,924
Reeves	25	86	13	28	146	20		1,830
Armor	24	84	12	25	149	19		1,819
Gem	24	83	14	24	150	19		1,860
Richard	22	78	15	22	150	19		1,785
Average	29	29	12	25	147	19		1,911
CV (%)	7	7	5	4	0	3		7
LSD (0.05)*	3	10	1	1	1	1		180
Three - year averages (2001, 2003, 2004)								
Jim	54	115	10	31	150	26		
Dane	53	114	9	27	149	27		
INO9201	52	110	10	30	150	25		
Blaze	51	107	12	30	153	25		
Jay	50	106	11	32	153	24		
Chaps	50	107	10	29	152	27		
Don	49	101	9	30	149	24		
Bates	48	102	9	30	149	26		
Moraine	45	95	11	28	152	27		
Armor	44	91	12	28	155	25		
Jerry	41	89	13	30	154	27		
Gem	40	85	16	28	156	27		
Average	47	47	11	29	152	26		
CV (%)	8	8	11	4	0	4		
LSD (0.05)*	5	11	2	2	1	1		
All-location averages (2001, 2002, 2003, 2004)								
INO9201	69	116	10	31	148	33	17	4,758
Jim	68	115	10	31	147	34	18	5,146
Dane	68	115	10	29	146	33	20	4,874
Blaze	66	110	11	31	149	34	25	4,628
Chaps	64	108	11	30	148	34	23	5,007
Jay	64	108	11	31	151	32	15	5,112
Moraine	63	104	11	31	148	35	35	4,830
Gem	59	97	13	30	153	36	21	5,451
Bates	56	95	10	32	146	33	28	4,543
Jerry	55	94	11	32	150	36	25	5,332
Don	55	94	10	32	146	32	38	4,862
Armor	54	91	11	28	152	34	20	5,298
Reeves								5,133
Richard								5,088
Average	60	60	11	30	149	34	24	4,977
CV (%)	10	10	8	4	1	5	60	10
LSD (0.05)*	8	14	1	1	1	2	16	717

* Unless two varieties differ by more than the LSD, little confidence can be placed in one being superior to the other.



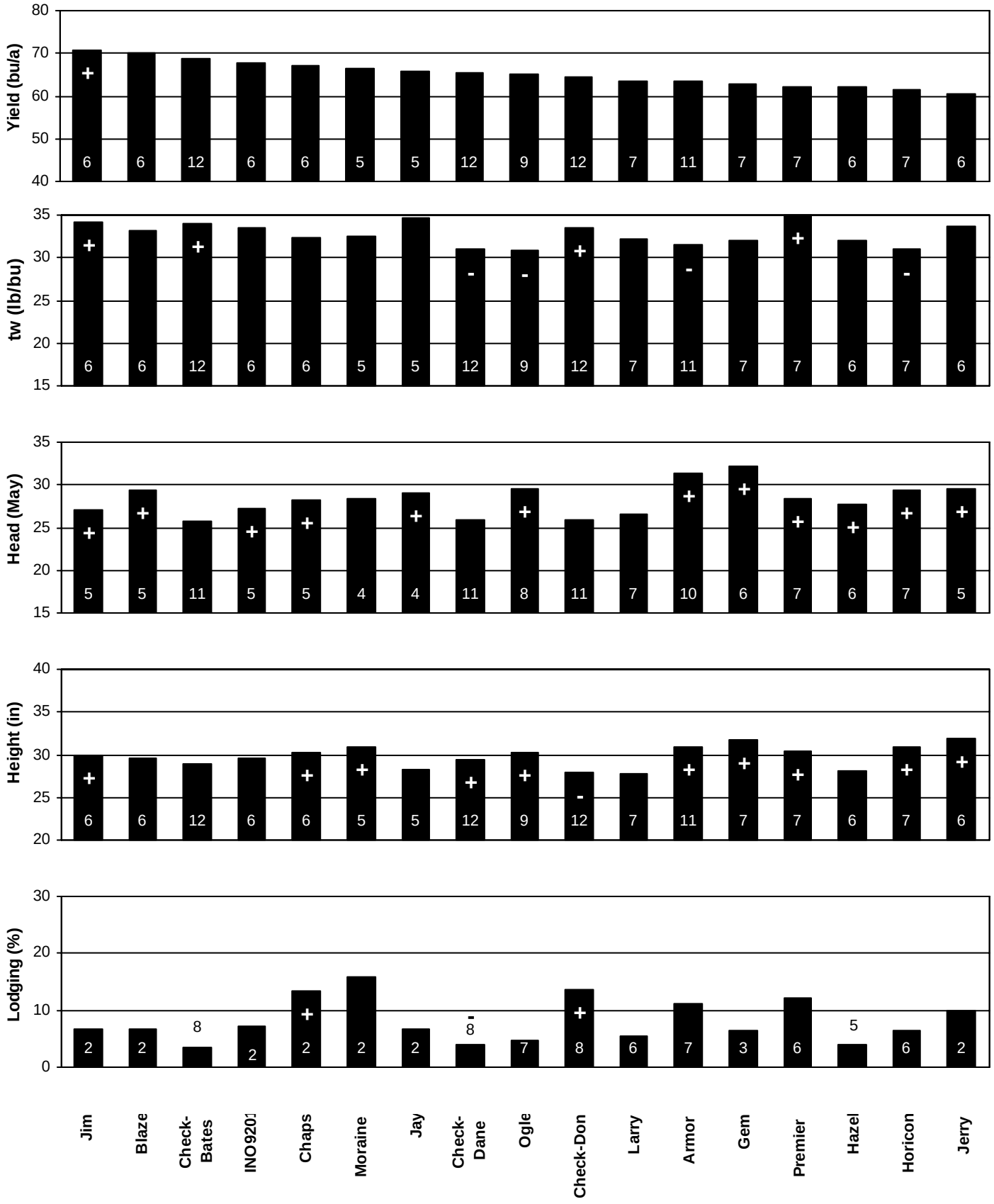
+ = significantly greater than the average of the checks; - = significantly less than the average of the checks

Figure 5. Kansas oat variety performance summary, EAST, 1991-2004



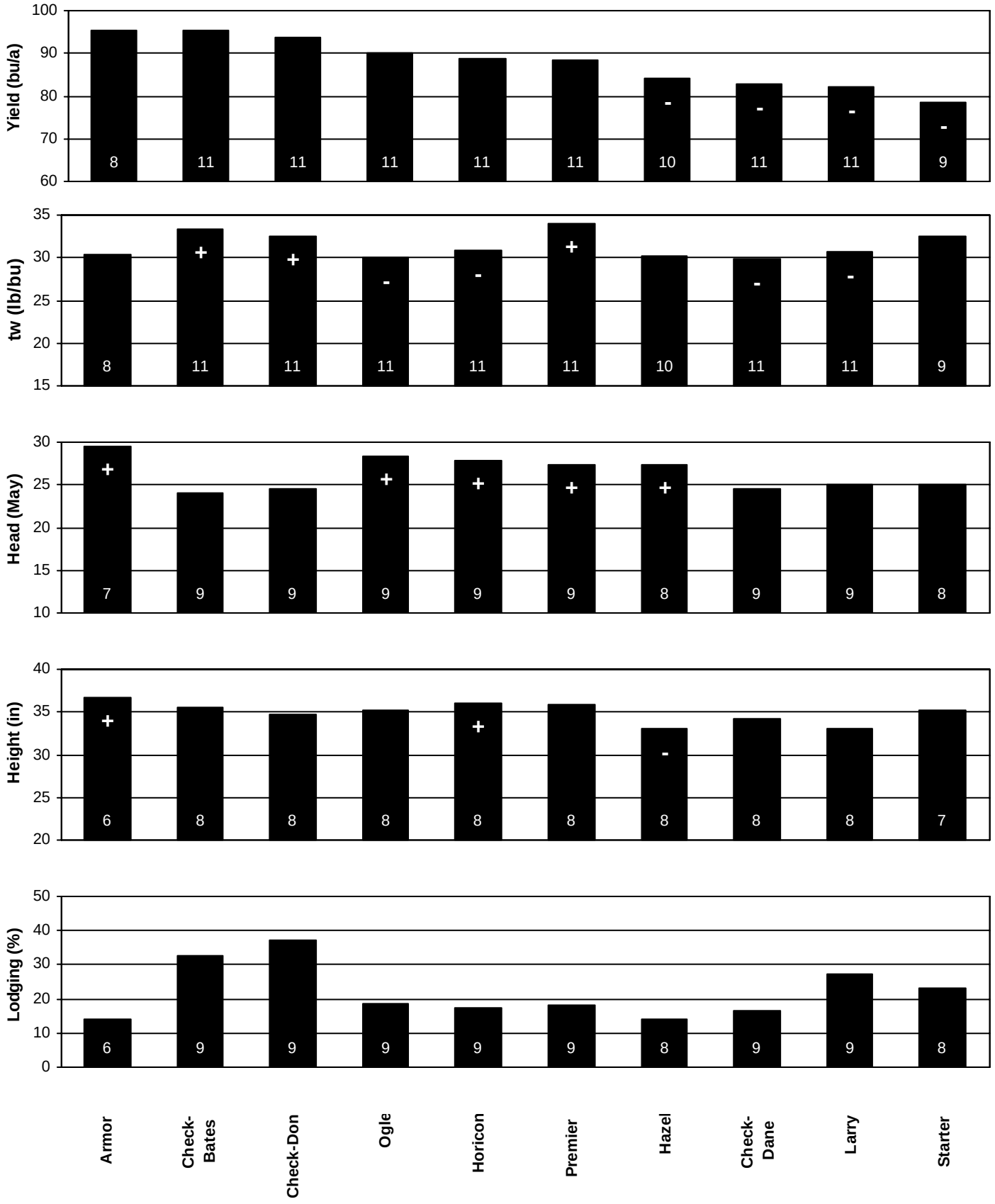
+ = significantly greater than the average of the checks; - = significantly less than the average of the checks

Figure 6. Kansas oat variety performance summary, SOUTH CENTRAL, 1991-2004



+ = significantly greater than the average of the checks; - = significantly less than the average of the checks

Figure 7. Kansas oat variety performance summary, NORTHWEST, 1991-2004



+ = significantly greater than the average of the checks; - = significantly less than the average of the checks

Figure 8. Kansas oat variety performance summary, IRRIGATED, 1991-1997

Table 7. Kansas Spring Wheat, Triticale, Spring-planted Winter Wheat, and Triticale Performance Tests.

Variety	Yield (bu/a)	Yield (% avg)	Moist (%)	TW (lb/bu)	Head date	Ht (in)	Ldg (%)	Forage (lb/a)
SPRING WHEAT - 2003 Hutchinson								
Oxen	30	120	10	52	146	27	4	
Russ	28	110	10	53	148	32	6	
Blanca Grande	26	103	10	53	145	23	6	
Forge	26	103	11	54	146	33	10	
Plata	25	100	10	53	148	23	8	
Ingot	25	100	11	56	145	35	14	
2375	16	65	10	53	148	28	9	
Average	25	25	10	53	146	29	8	
CV (%)	15	15	2	2	1	4	54	
LSD (0.05)*	5	22	0	1	1	2	7	
SPRING TRITICALE - 2004 Hutchinson								
EH-CT1-ST	26	105	11	46	139	34		7,676
EH-P-ST	24	97	12	46	134	40		7,856
SPRING WHEAT - 2004 Hutchinson								
Oxen	35	141	10	53	132	31		6,659
Forge	35	141	10	52	132	30		7,215
Plata	35	138	10	52	132	25		5,633
Blanca Grande	32	126	11	53	132	27		5,730
GM40064	30	118	10	52	132	30		7,729
Ingot	29	115	11	56	132	35		5,932
Pristine	24	94	10	47	132	31		7,012
Russ	14	56	10	48	132	31		4,789
Average	25	25	11	50	133	30		6,418
CV (%)	11	11	10	4	0	11		13
LSD (0.05)*	4	16	2	3	1	6		1,367
WINTER TRITICALE - 2004 Hutchinson								
EH-DP-WT	14	54	16	43	142	25		6,033
WINTER WHEAT - 2004 Hutchinson								
Jagger	4	15	11	48		21		4,754
SPRING WHEAT - Two - year averages (2003, 2004) Hutchinson								
Oxen	33	130	10	53	139	29		
Forge	31	122	10	53	139	32		
Plata	30	119	10	52	140	24		
Blanca Grande	29	114	10	53	138	25		
Ingot	27	108	11	56	138	35		
Russ	21	83	10	51	140	31		
Average	25	25	11	52	140	29		
CV (%)	13	13	7	3	0	9		
LSD (0.05)*	4	18	1	2	1	4		
SPRING WHEAT - 2001 Colby								
Oxen	29	106	8	51	153	29		
GM40019	28	105	8	50	153	26		
2375	28	105	9	52	151	31		
Ingot	27	100	8	51	152	36		
GM40020	27	99	8	50	152	27		
Forge	26	98	8	47	152	34		
GM40002 Exp	26	97	9	54	151	28		
Russ	26	95	8	48	154	34		
Pristine	26	95	7	47	152	30		
Average	27	27	8	50	152	30		
CV (%)	6	6	7	7	0	4		
LSD (0.05)*	2	9	1	5	1	2		

Variety	Yield (bu/a)	Yield (% avg)	Moist (%)	TW (lb/bu)	Head date	Ht (in)	Ldg (%)	Forage (lb/a)
WINTER WHEAT - 2001 Colby								
Jagger	42	207	8	45	161	27		
(W) Heyne	30	147	17	41	166	24		
TAM 202	30	145	14	45	162	25		
Karl 92	0	0	0	0	0	0		
Custer	0	0	0	0	0	0		
Average	20	20	13	44	163	25		
CV (%)	14	14	31	8	1	5		
LSD (0.05)*	4	22	7	6	2	2		
SPRING WHEAT - 2004 Colby								
GM40064	15	130	15	48	145	18		2,445
Oxen	15	126	14	51	146	17		2,562
Plata	14	124	14	47	147	15		2,184
Blanca Grande	14	123	14	50	145	18		2,203
Pristine	14	119	15	52	145	18		2,002
Ingot	13	114	15	51	146	18		2,445
Forge	12	102	15	48	145	20		2,327
Russ	7	63	25	39	149	18		1,712
Average	12	12	16	48	146	17		2,121
CV (%)	13	13	6	3	1	6		19
LSD (0.05)*	2	19	1	2	2	2		597
WINTER WHEAT - 2004 Colby								
Jagger	0	0				11		1,206
SPRING WHEAT - Two - year averages (2001, 2004) Colby								
Oxen	22	116	11	51	150	23		
Ingot	20	107	12	51	149	27		
Pristine	20	107	11	49	148	24		
Forge	19	100	11	47	149	27		
Russ	17	79	17	44	151	26		
Average	19	19	12	49	149	24		
CV (%)	8	8	7	5	1	5		
LSD (0.05)*	2	11	1	3	1	2		
SPRING WHEAT - All-location averages (2001, 2003, 2004)								
Oxen	27	123	11	52	144	26	4	4,611
Forge	25	111	11	50	144	29	10	4,771
Plata	25	121	11	51	143	21	8	3,909
Blanca Grande	24	117	12	52	141	23	6	3,966
Ingot	24	107	11	54	143	31	14	4,189
Pristine	21	102	11	48	143	26		4,507
Russ	19	81	13	47	146	29	6	3,251
GM40064								5,087
Average	22	22	11	50	144	26	8	4,269
CV (%)	11	11	7	4	1	7	54	16
LSD (0.05)*	3	15	1	3	1	3	6	982
WINTER WHEAT - All-location averages (2001, 2003, 2004)								
Jagger								2,980

* Unless two varieties differ by more than the LSD, little confidence can be placed in one being superior to the other.

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http://www.ksu.edu/kscpt.

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Permission is hereby given to Kansas State University to test varieties and/or hybrids designated on the attached entry forms in the manner indicated in the test announcements. I certify that seed submitted for testing is a true sample of the seed being offered for sale.

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This Report of Progress was edited, designed, and printed by the Department of Communications at Kansas State University

Kansas State University Agricultural Experiment Station and Cooperative Extension Service, Manhattan 66506
SRP 931 February 2005