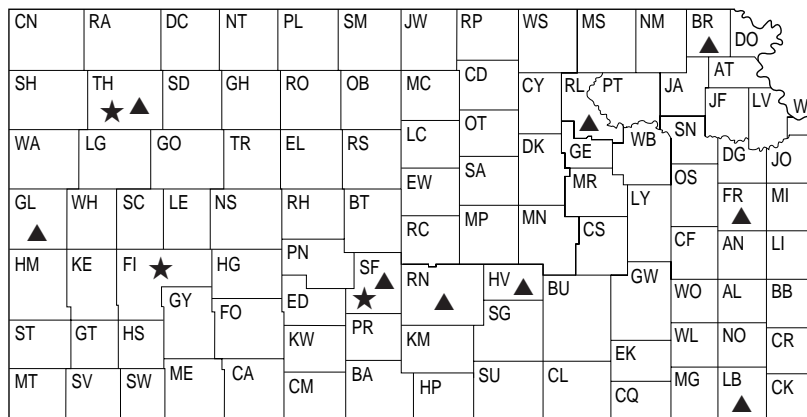




SPRING OAT VARIETIES FOR KANSAS



Report of Progress 806

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INTRODUCTION

Spring oats in Kansas

Although not a major cash crop in Kansas, spring oats can be important as a feed grain for balancing animal rations, as a source of highly nutritious forage, as an intermediate crop when changing crop rotations, or occasionally as a food crop when and where such a market is available. Spring oat acreage ranked 6th behind wheat, sorghum, corn, soybeans, and sunflowers in 1997, with 130,000 acres representing less than 1% of the total crop acres (Figure 1). Nearly 62% of the oat acres were harvested for grain; the remainder were abandoned, grazed, or harvested for forage. (Kansas Agricultural Statistics)

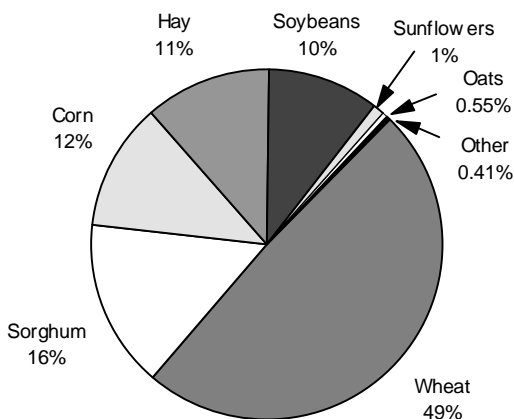


Figure 1. Kansas crop acreage.

Historical acreage and yield

Historically, oats 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 over 1.6 million acres during the early 1900s. Acreage declined steadily during the 1950s and 1960s, leveling off at around 200,000 acres in the 1970s. State average yield followed nearly an opposite pattern, starting at over 30 bushels per acre in the 1860s and dropping to around 25 bushels per acre in the first part of the 1900s where it stayed until the 1950s. Since then, average yield has increased to over 50 bushels per acre in the 1990s. (Kansas Agricultural Statistics)

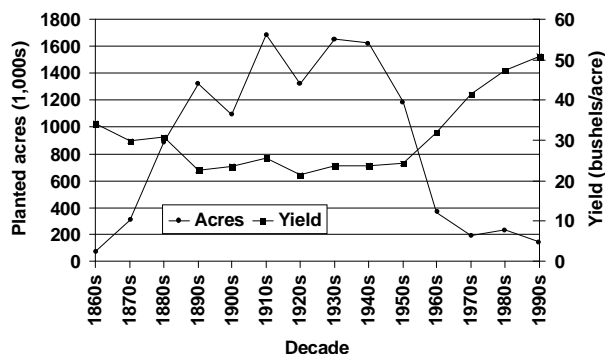


Figure 2. Historical acres and yields of spring oats.

OAT VARIETIES

Choosing the right variety

Achieving adequate grain yields requires selecting varieties adapted to the Kansas environment. Yield-limiting factors that must be considered include potentially high temperatures and low moisture availability during the grain-filling period; diseases such as barley yellow dwarf virus, crown rust, and stem rust; and summer storms and fertility situations that might result in lodging. Selecting varieties that are equipped to perform reliably under these conditions requires information. K-State Research and Extension attempts to obtain, generate, and disseminate that information in a variety of ways.

With no commercial or university oat variety development programs located in Kansas to provide

specifically adapted varieties, most spring oat varieties grown in the state originate in surrounding states. Crop specialists examine maturity, disease resistance, and yield-potential information from the originating states. Early-maturing varieties with good test weights and adequate disease resistance are included in Kansas performance tests at locations around the state.

Table 1 summarizes information from a number of sources including originating states, Kansas performance tests, and field observations. It is a consolidation of observations by agronomists, plant pathologists, and others over many years and locations.

Table 1. Comparisons of oat varieties

Variety	Origin	Year released	Relative ¹				Resistance or tolerance to: ²			
			Yield	Maturity	Test weight	Straw strength	BYDV ³	Crown rust	Stem rust	Loose smut
Armor	Ohio	1991	5	7	4	4	I	--	--	--
Bates	Missouri	1977	2	1	2	6	I	--	--	--
Bay	Wisconsin	1993	6	9	6	3	MR	S	S	I
Belle	Wisconsin	1995	9	9	2	3	I	R	I	R
Blaze*	Illinois	1997	2	7	3	--	--	--	--	--
Brawn	Illinois	1993	2	6	4	5	I	I	--	--
Chairman*	Ohio	1996	5	3	4	4	--	--	--	--
Chaps*	Illinois	1997	2	4	3	--	--	--	--	--
Dane	Wisconsin	1990	7	2	3	3	I	I	I	R
Don	Illinois	1985	4	2	2	7	I	--	--	--
Eli*	McCurdy Seeds	~1980	9	5	2	7	--	--	--	--
Ensiler*	Wisconsin	1990	9	9	3	3	I	I	I	R
Gem	Wisconsin	1996	3	8	3	5	MR	R	R	S
Hazel	Illinois	1985	8	4	3	4	I	S	S	S
Horicon	Wisconsin	1989	7	5	3	4	I	I	I	R
Hy-Test*	South Dakota	1986	9	4	1	3	S	--	--	--
INO9201*	Indiana	1992	2	5	3	--	--	--	--	--
Jerry*	North Dakota	1994	2	5	2	--	--	--	--	--
Jim*	Minnesota	1996	4	3	2	--	MR	I	I	--
Larry	Illinois	1980	8	3	3	6	S	--	--	--
Lyon*	Minnesota	1978	9	6	7	5	S	--	--	--
Milton*	Minnesota	1994	2	9	3	--	I	I	I	I
Moore*	Minnesota	1980	9	6	7	5	--	--	--	--
Ogle	Illinois	1980	4	5	4	4	MR	S	S	S
Prairie	Wisconsin	1992	4	7	5	5	MR	S	I	I
Premier	Minnesota	1990	7	5	2	6	I	S	S	R
Rio Grande*	Idaho	1989	2	8	6	--	--	--	--	--
Rodeo*	Illinois	1996	2	7	3	--	--	--	--	--
Russell*	Canada	1960	7	9	3	--	--	--	--	--
Settler	South Dakota	1989	7	6	3	6	I	--	--	--
Starter	Minnesota	1985	9	2	3	7	I	--	--	--
Troy*	South Dakota	1991	3	9	3	--	I	R	R	R
Webster*	Iowa	1984	8	1	4	--	S	--	--	--

¹ Varieties rated on scale of 1 - 9; 1 = best or earliest, 9 = poorest or latest. -- indicates variety not adequately tested or information not available.

² R = Resistant, MR = Moderately Resistant, I = Intermediate, S = Susceptible; ratings provided by Bob Bowden.

All ratings are experts' best estimates based on information and observations from several sources.

³ BYDV = Barley Yellow Dwarf Virus.

* Ratings for these varieties are based on limited information, often only 1 or 2 years and / or few locations.

Oat performance tests

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

Yield often integrates a number of factors that affect the potential performance of a variety. However, 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 based on 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. Shorter varieties may be early-maturing and able to produce and fill grain before temperature and moisture stresses become extreme. Taller varieties tend to mature later and are usually better adapted to the northern states.

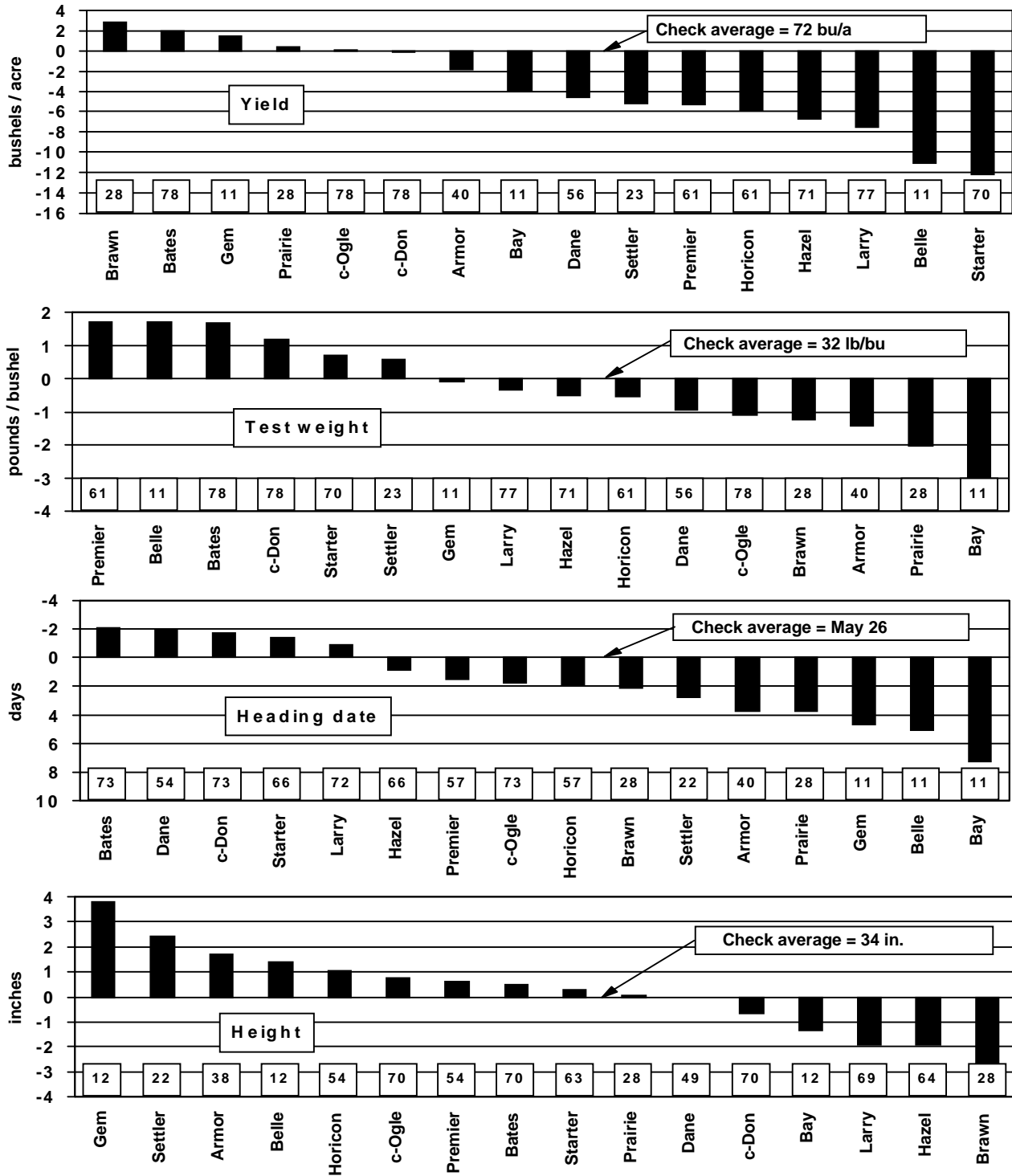
Performance test summaries

In figures 3-8, varieties are compared to two well-known, check varieties, Don and Ogle, based on test results from 1988 - 1997. Figure 3 presents a statewide summarization that integrates performance

over all testing sites in Kansas. This provides information on the ability of a variety to perform over a wide range of conditions. It may be especially useful for producers located far from any of the testing sites or with conditions that are quite different from

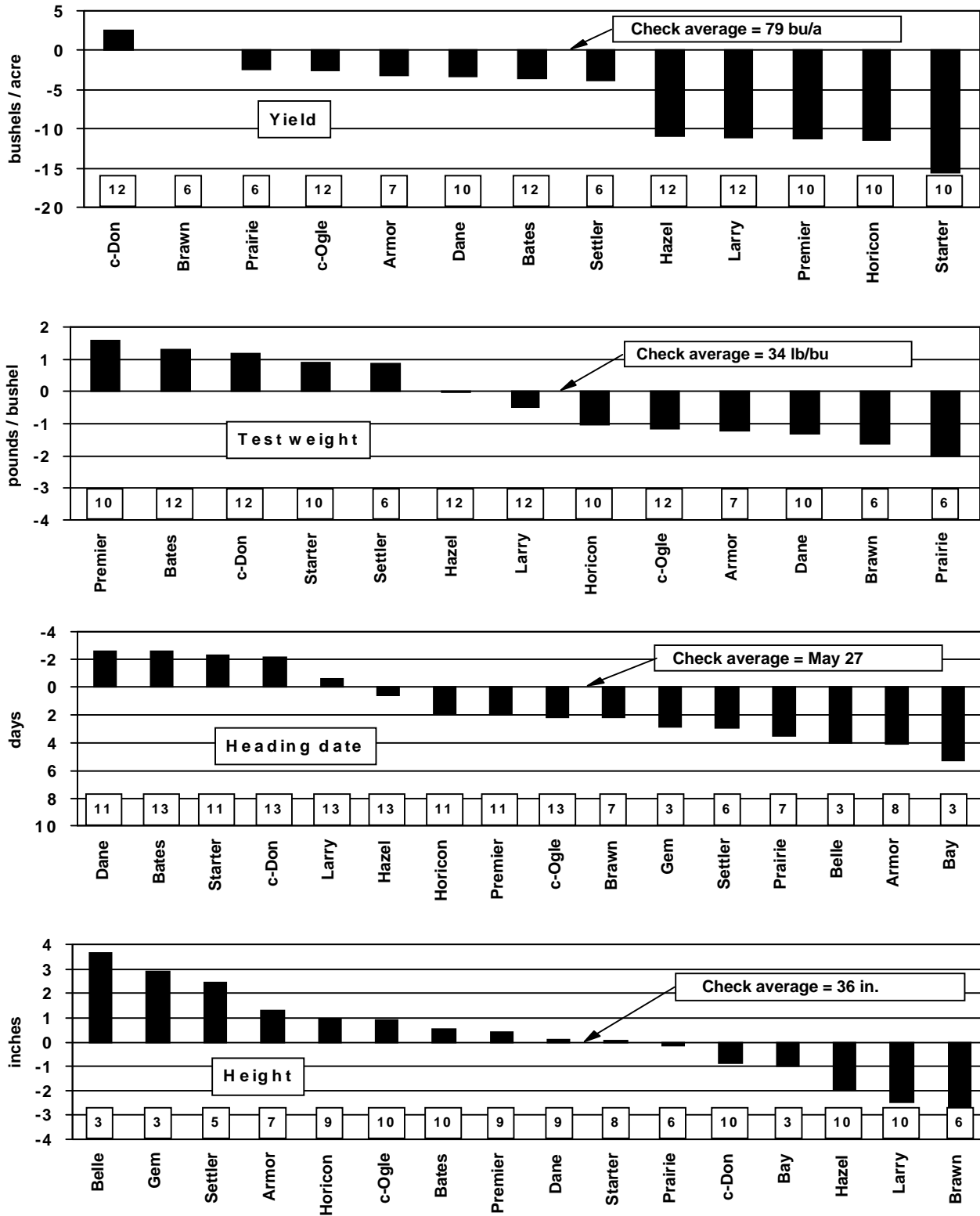
any one testing site. Figures 4-8 present test summaries by growing region to reflect the slightly different environments each region offers. These figures reveal the specific suitability of some varieties to certain areas of Kansas.

Figure 3. Kansas oat variety performance summary - STATEWIDE
1988 - 1997 Oat Performance Tests



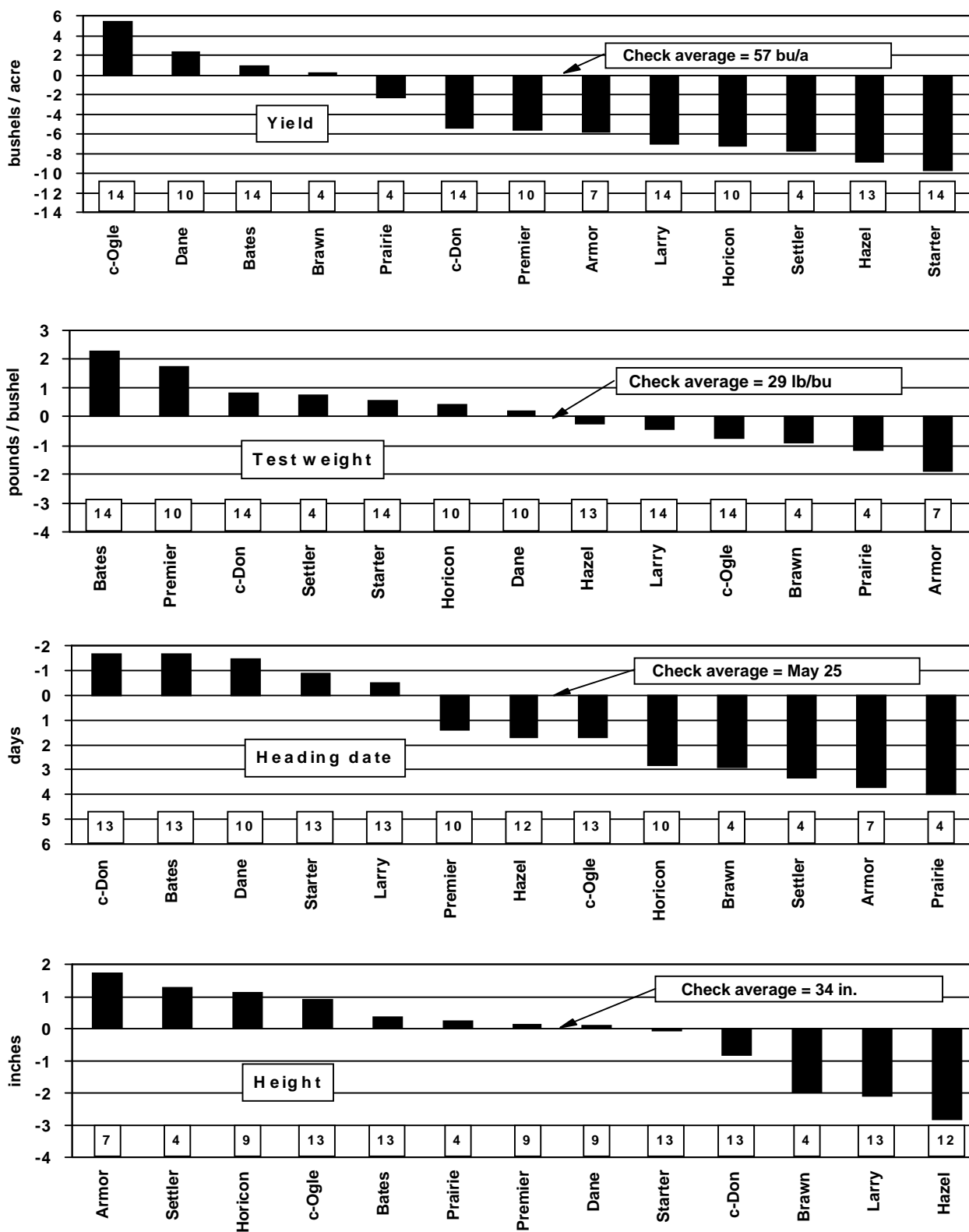
Bars represent differences between variety and average of check varieties (c) in actual test comparisons. Values in boxes show the numbers of comparisons of that variety with check varieties for that trait.

Figure 4. Kansas oat variety performance summary - NORTHEAST
1988 - 1997 Powhattan and Manhattan Oat Performance Tests



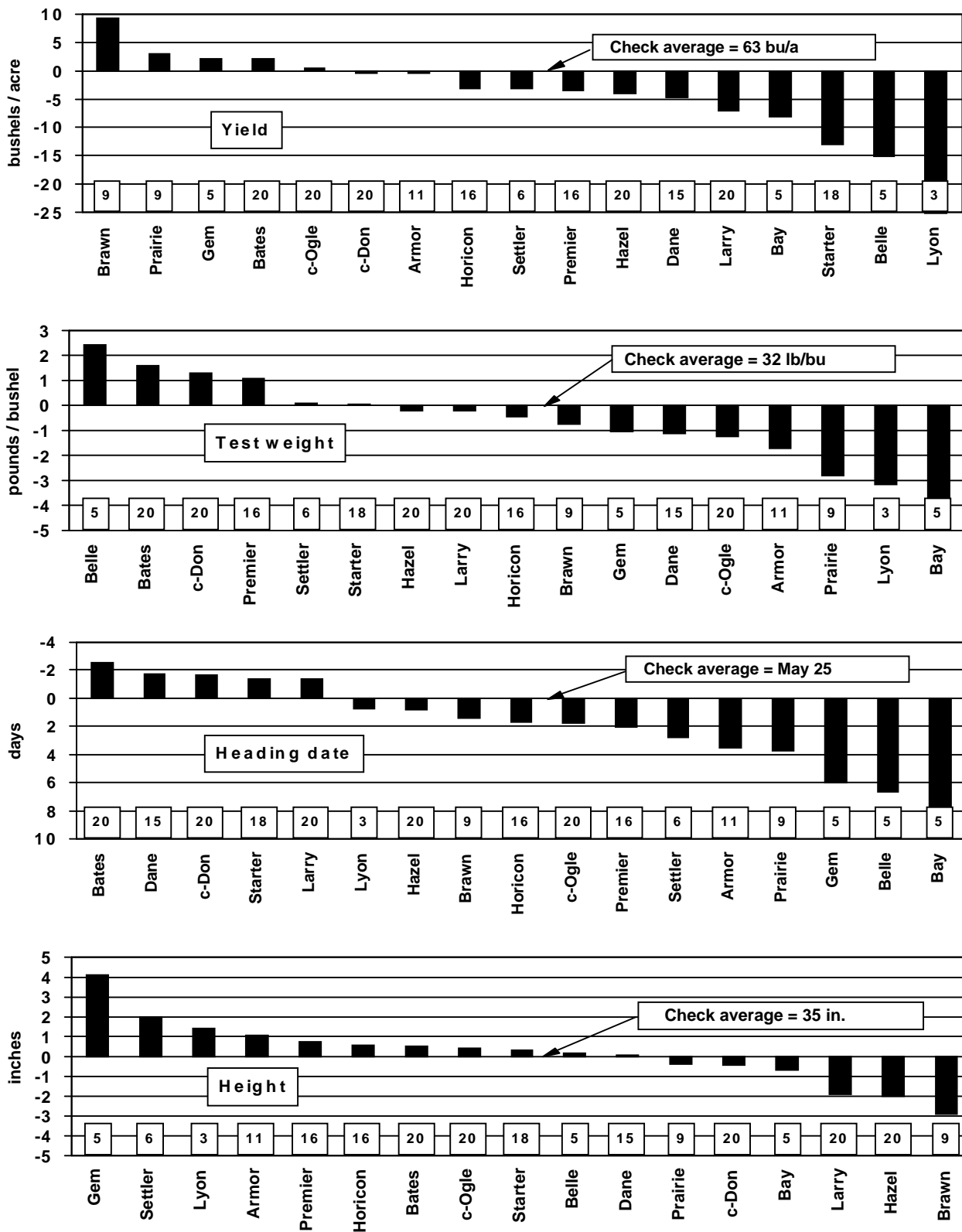
Bars represent differences between variety and average of check varieties (c) in actual test comparisons. Values in boxes show the numbers of comparisons of that variety with check varieties for that trait.

Figure 5. Kansas oat variety performance summary - SOUTHEAST
1988 - 1997 Ottawa and Parsons Oat Performance Tests



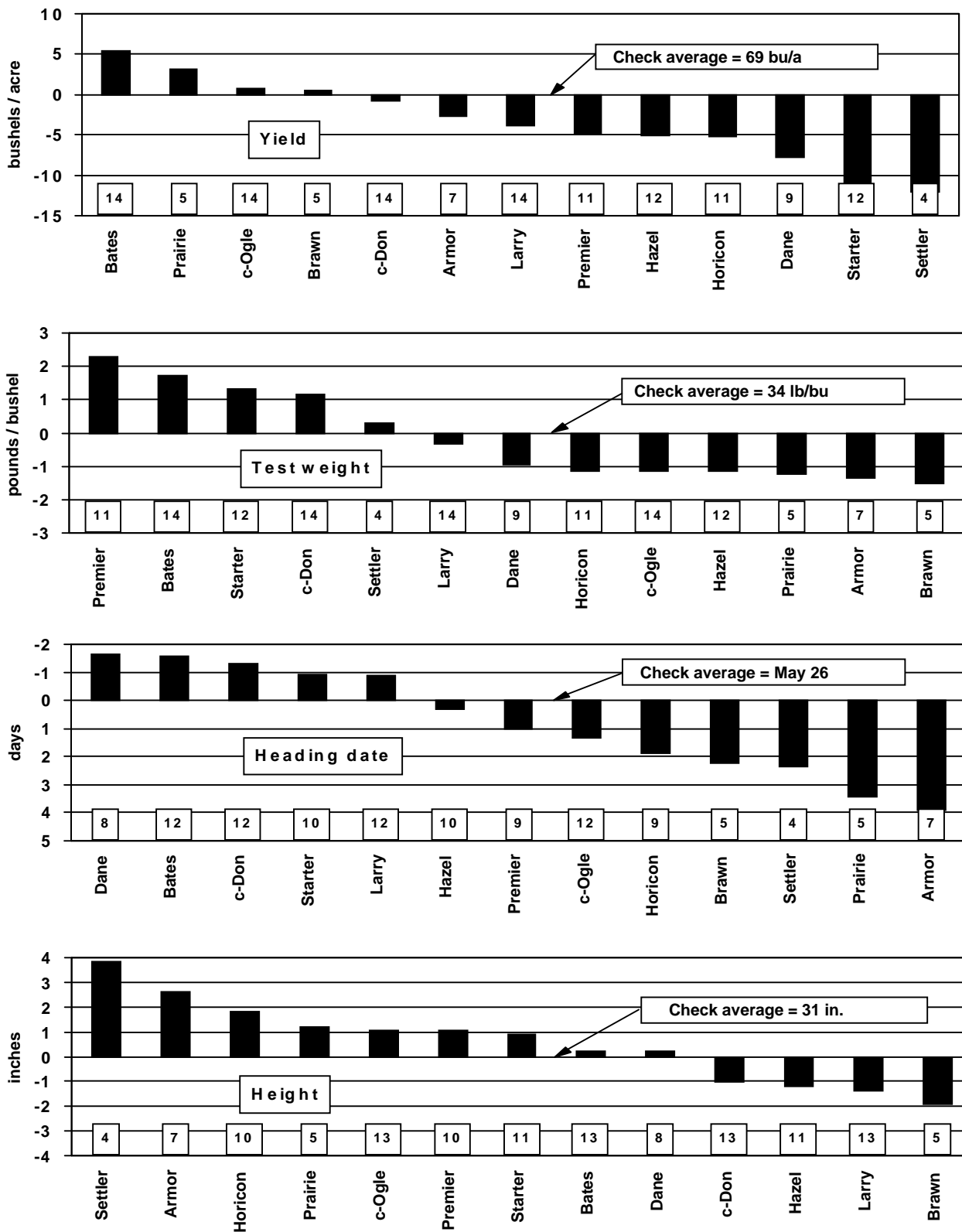
Bars represent differences between variety and average of check varieties (c) in actual test comparisons. Values in boxes show the numbers of comparisons of that variety with check varieties for that trait.

Figure 6. Kansas oat variety performance summary - SOUTH CENTRAL
1988 - 1997 Hesston and Hutchinson Oat Performance Tests



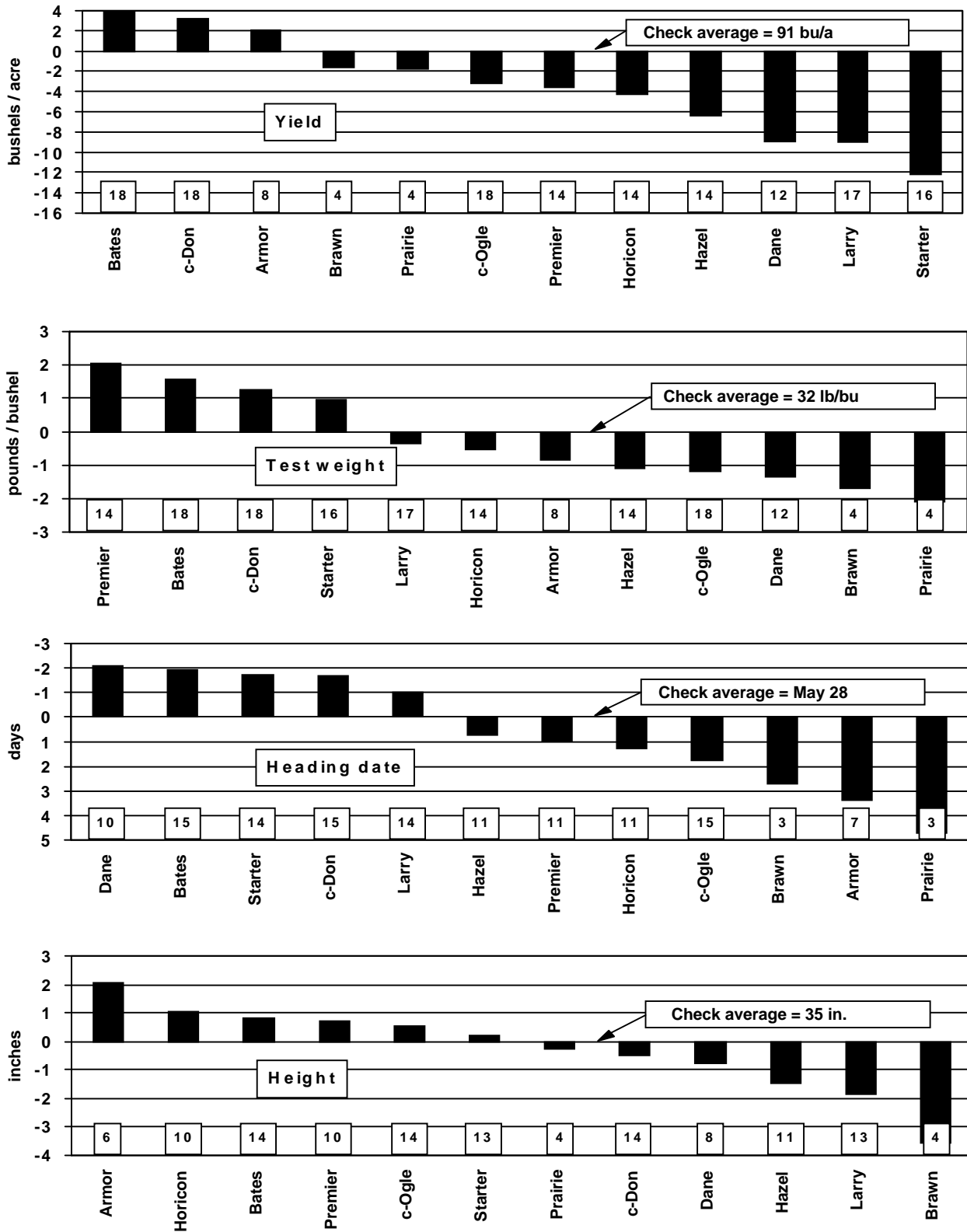
Bars represent differences between variety and average of check varieties (c) in actual test comparisons. Values in boxes show the numbers of comparisons of that variety with check varieties for that trait.

Figure 7. Kansas oat variety performance summary - WEST, NONIRRIGATED
1988 - 1997 St. John, Colby, and Tribune Oat Performance Tests



Bars represent differences between variety and average of check varieties (c) in actual test comparisons. Values in boxes show the numbers of comparisons of that variety with check varieties for that trait.

Figure 8. Kansas oat variety performance summary - WEST, IRRIGATED
1988 - 1997 St. John, Colby, and Garden City Oat Performance Tests



Bars represent differences between variety and average of check varieties (c) in actual test comparisons. Values in boxes show the numbers of comparisons of that variety with check varieties for that trait.

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