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Using Winter Wheat Yield Data to Improve Variety Selection

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Variety selection is one of the most important decisions a winter wheat grower has to make. The right or wrong decision can enhance or negate all other factors in profitable wheat farming. When selecting seed, consider these variety characteristics: yield potential, maturity, winter hardiness, straw strength, coleoptile length, plant height, lodging and shattering, seed size, test weight, disease and insect resistance, herbicide tolerance, milling and baking quality and enhanced traits.

This extension circular describes a method for comparing and selecting various wheat varieties. Its objectives are to:

- increase familiarity with the traits listed in variety information;
- relate variation in these traits with their suitability to a farmer's specific production system;
- evaluate data from plots, based on location; and
- take advantage of information provided in variety trials to separate normal variability from actual differences in variety performance.

Yield Potential

Harvested grain yield is one of the most important factors to consider when selecting varieties. Results of University of Nebraska–Lincoln variety tests are the best and most publicly available information on how specific varieties have performed under Nebraska conditions.

Yield varies from year to year and location to location as a result of environmental factors (soil, rainfall, temperature, etc.) Thus, care needs to be taken when interpreting the yield data from variety test plots. The more locations tested and the more years represented, as well as the extent of similarity between the test and grower's field environments, the more reliable the information will be.

Agronomic Characteristics

Maturity

Early maturing varieties are more likely to escape damage from hot winds, drought, and rust infection; however, they are more subject to late spring freezes. Producers with large acreages can spread out risk and harvest by using varieties of differing maturity.

Winter Hardiness

Wheat is most likely to be damaged by cold temperatures

- just after heading,
- in the spring after growth starts, and
- in the fall before wheat hardens.

Varieties differ in their susceptibility to freeze damage.

Straw Strength

Good straw strength is important to keep wheat from lodging. Also, standing stubble traps more snow and benefits the following crops. Stripper headers on combines work best with varieties having good straw strength.

Coleoptile Length

The coleoptile is a leaf sheath that surrounds and protects the first true leaf as it grows from the seed toward the surface. If the coleoptile is shorter than the depth of planting, emergence will become difficult. The young seedling might not reach the surface and ultimately will die, resulting in stand loss. With the introduction of semi-dwarf varieties, depth control became even more important because of the shorter coleoptile of semi-dwarf wheat compared to conventional height wheat varieties.

Height

There is a fairly good correlation between overall plant height and coleoptile length; taller varieties tend to have longer coleoptiles. More stressed environments frequently require a taller wheat variety for emergence and combine harvest.

Lodging and Shattering

Since wheat is harvested with the combine and harvesting must wait until the crop is ripe, varieties that are less likely to lodge or shatter are preferable. The shorter (semi-dwarf) varieties usually are less susceptible to lodging. Varieties with upright stature incur less hail damage (shattering).

Disease and Insect Resistance

Genetic resistance to insects and diseases is an excellent control method when such resistance is available. Hessian fly, wheat streak mosaic, soil-borne mosaic, Russian wheat aphids, stem, stripe and leaf rusts, and other pests can, and do, cause serious losses in the Nebraska wheat crop at times. Use of resistant or tolerant varieties, plus good cultural practices, can minimize the losses.

Herbicide Tolerance

Varieties are now available that are tolerant to a specific herbicide. For example, Clearfield® wheat varieties are tolerant of Beyond® herbicide. Beyond may be used to selectively control weeds such as jointed goatgrass, feral rye and downy brome in Clearfield wheat varieties. Beyond herbicide will kill non-Clearfield wheat varieties.

Acid Tolerance

Some Nebraska soils are becoming more acidic as a result of using nitrogen fertilizers. Acidic (low pH) soils have more free aluminum, which can burn root tips and lead to poor vigor. The wheat producer should be aware of the soil pH and mineral content of the soil. Wheat varieties differ in the ability to tolerate low pH soils and alkali.

Seed Size/Weight and Test Weight

Planting larger seed will require higher seeding rates (pounds per acre) to achieve the necessary plant population (plants per acre). Seed should have a minimum test weight of 57 lb/bu, preferably greater. Winter wheat seeding recommendations should be changed from a pounds-per-acre rate to a seeds-per-acre rate. The number of winter wheat seed in one pound can range from more than 20,000 to less than 10,000, depending on the variety and the year produced. All seed should be cleaned and the small and cracked seeds eliminated. Shriveled seed can reduce yields because germination is slower and emergence less.

Winter wheat will respond to a limited range of seeding rates without affecting yields. Using seeding rates below that range can lead to excessive tillering. It also may delay maturity, increase weed competition and fail to make use of the full yield potential. However, rates above that limited range may increase costs and lodging and possibly reduce yields.

Table I. Seeding rate for winter wheat with 18 seeds per foot of row.

Row spacing	*Feet of row/ acre*	*Wheat seeds/lb*						
		12,000	*13,000*	*14,000*	*15,000*	*16,000*	*17,000*	*18,000*
inches	---------- lb/ac of seed ----------							
6	87,120	131	121	112	105	98	92	87
8	65,340	98	90	84	78	74	69	65
10	52,272	78	72	67	63	59	55	52
12	43,560	65	60	56	52	49	46	44
14	37,337	56	52	48	45	42	39	37

Too much competition, even among small grain plants, may lead to fewer kernels per head and lower kernel weight. The key is to use an optimum plant population with uniform distribution for efficient use of available resources.

How many winter wheat seeds per acre should the grower plant? There are several opinions on this. Floyd E. Bolton, crop scientist at Oregon State University, says 18 seeds per foot of row seems to be the point of diminishing yield increases, no matter the row spacing from 6 to 18 inches. For dryland winter wheat in western Nebraska, row spacings of 10 to 14 inches are recommended. For weed competition there is an advantage to the narrow row spacing. For irrigation, row spacings of 6 to 8 inches are preferred. *Table I* shows the pounds of seed needed per acre for 6- to 14-inch row spacings and seed sizes of 12,000 to 18,000 seeds/lb, based on 18 seeds/foot of row.

Seed Protein and Phosphorus Content

Seed protein is another factor linked to increased plant vigor and higher grain yields. Actually, it is not the percent protein in the seed that has the greatest influence on seed quality, but rather the amount of protein contained in each kernel. For example, seed that has a thousand kernel weight (TKW) of 34 grams (13,500 seeds per pound) with 11 percent protein contained 3.7 mg protein per seed. A seed lot with a TKW of 20 grams (22,700 seeds per pound) with 13 percent protein would only contain 2.6 mg protein per seed. In this example the larger seed with a lower protein percentage would actually provide more protein per seed (and consequently more protein per seedling) than the smaller, higher protein percentage seed lot. Again, seed size should be the overall determining factor for seed lot selection. However, all things being equal (variety and seed size), producers should look for high grain protein in seed lots.

There is continuing interest in the phosphorus (P) content of wheat seed and how this might influence plant vigor and yield. Given the fact phosphorus is involved in energy production and energy transfer, this would be logical; however, much like protein, it would be the amount of phosphorus present in each seed that is important, not simply the percentage of phosphorus in a seed lot. Since the phosphorus percentage of seed lots are not normally reported, producers should consider seed size first and protein second.

Grazing Potential

In a study conducted near Sidney, Nebraska during the mid 1990s, six wheat varieties were evaluated: four were standard height and two were semi-dwarf. While some differences among the varieties were observed for various traits in specific years, there were no consistent or overall trends for superior forage performance by any of the varieties over the three years of the study or for standard height wheat versus semi-dwarf. Since there was little difference in forage yield, we encourage planting the one with the most yield potential. Longhorn is a semi-awnless (beardless) variety developed for grazing, but it has a relatively low grain production potential. Scout 66 has been used by local cattle producers because it has strong seedling vigor and good fall growth, but its grain yield potential is low relative to newer wheat varieties. Buckskin is a tall wheat variety grown extensively in areas of western Nebraska and surrounding areas that have shallow soils and limited rainfall. It has recently been replaced by Goodstreak, which combines good seedling vigor and good yield. Grazing cattle before the boot stage does not impact grain yield of Buckskin, according to local producers. Wheat will grow back to out-compete weeds before reaching grain maturity.

Arapahoe is a semi-dwarf wheat that was planted on more acres than any other wheat in the state dur-

ing the mid to late 1990s. It has good to excellent winter hardiness and appears to be a good dual-purpose wheat. Alliance is a newer semi-dwarf wheat that is grazed in the region. Producer experience suggests that Alliance can be grazed "hard," but that it may have to be sprayed for weeds after the grazing period. Other varieties grazed in the Nebraska Panhandle include 2137 and Pronghorn.

Grain Quality

The major use of Nebraska wheat is as a bread wheat for human consumption. Therefore, it is important that it meet the expectations of millers and bakers to produce a quality end product. Quality is determined by both variety and growing conditions. Hard white wheat has excellent potential to be a successful crop in Nebraska. It has significant advantages over hard red winter wheat. Whenever they have a choice, millers, bakers, and consumers prefer white wheat which can also be used for noodles and other food products. This preference is particularly strong in some of the international markets that buy wheat from the United States.

Wheat Variety Complementation

Complementation means getting consistent performance by planting multiple varieties that offset each other's strengths and weaknesses. This should be basic to your crop planning. An example of complementation might be growing a high yielder with less winter hardiness and a variety that yields a bit less but has good winter hardiness.

Because there is no single perfect wheat variety for all production systems or in all years, using complementary varieties will enable you to realize the greatest benefit from a specific variety's strengths and offset, to a high degree, its potential weaknesses. This compensation improves the opportunity for yield stability and profitability of your entire wheat production system. The number of complementary varieties that are grown as part of a wheat farming enterprise and the acres planted to each variety will depend entirely on specific production conditions and any special needs (common diseases or insects, etc.).

Farmers who do not have enough acres to justify planting several varieties, may want to consider using a blend of three or four varieties. Also, tenants whose landlords don't have enough acres to justify planting several varieties could reduce risks by planting a blend.

There are four steps in developing and updating your wheat farm's variety complementation strategy:

1. **Identify your workhorse varieties.** These are the varieties you now grow on a majority of your wheat acres because they have a reliable and proven record of performance over several years in your preferred production management system.

2. **Complement your production needs and limits.** Select a variety or varieties that have characteristics needed for specific production practices (e.g., straw strength or height) and typical soil conditions. Choose varieties that offer the best level of protection from expected diseases and other yield limiting factors common to your growing conditions or area.

3. **Complement with a range in maturity.** The major limiting factor to wheat production in Nebraska is the short grain fill period (from 2.5 to 4 weeks). Because you can never be sure about the weather during that critical time of year, select varieties that will mature earlier (or later or some of both) than your workhorse variety. A spread of maturities also will allow you to stagger your harvest schedule and take maximum advantage of your available equipment, plus reduce yield losses (e.g., from shattering) and end-use quality (e.g., from weathering).

4. **Complement with different genetic families.** Varieties with closely related genetic backgrounds often can be susceptible to the same diseases and production stresses. You can lower those risks by selecting varieties that share 50 percent or less common parentage with your workhorse variety and each other. Varieties with similar genetic backgrounds often can be susceptible to the same disease, insects, and production risks. See the *Nebraska Fall Seed Guide* (EC103) for a list of many of the winter wheat varieties and their predominant genetic family.

Using Field Trial Data in Seed Selection

Reliable field trial data is one of the best sources of information for winter wheat producers selecting seed for the next season. This publications presents a method of comparing yield results and variety traits to develop a "short list" of those varieties best suited to an individual operation. The example provided uses information from the University of Nebraska–Lincoln Extension Circular, *Fall Nebraska Seed Guide* EC103, although the same process could be used with variety information from other sources. (UNL Crop Variety Trial results are available in EC103 and on the Web at *http://cropwatch.unl.edu* under *Variety Testing.*)

Table II. West central Nebraska dryland wheat variety tests three-year averages (2009-2011). Entries represent the average of the sites for each of the identified traits. Areas shaded green indicate the top yielding varieties, according to the Least Significant Difference (LSD) grouping.

Brand	*Variety*	*Grain Yield (bu/ac)*	*Bushel Weight (lb/bu)*	*Kernel Weight (000/lb)*	*Grain Protein (%)*	*Plant Height (in)*	*Lodging (%)*
Three year averages							
	NE05496	67	57.1	13.4	11.3	35.4	7.3
	McGill	66	57.0	14.7	11.6	36.8	8.1
	Settler CL	66	57.9	13.1	12.1	32.7	5.3
	Alliance	65	57.8	13.7	11.3	37.0	10.4
	Wesley	65	56.8	12.8	12.1	31.9	2.8
	NE02558	65	58.3	15.2	11.2	35.5	8.2
WestBred	Winterhawk	64	59.0	14.2	11.3	34.1	6.4
NuPride	Camelot	64	57.8	13.0	12.0	36.2	6.4
WestBred	Armour	64	57.4	15.0	11.8	29.7	4.8
AgriPro/Syngenta	Art	64	58.6	15.2	12.1	33.1	5.8
Husker Genetics	Overland	64	58.8	13.9	11.7	36.4	2.8
	Arrowsmith (W)	64	56.6	14.2	11.8	39.9	6.2
	Robidoux	64	56.3	14.6	11.5	34.2	8.1
	NE03490	64	55.7	14.4	11.9	31.3	8.2
	Bond CL	63	55.9	15.5	11.4	35.4	6.4
	Goodstreak	63	59.4	14.0	12.1	40.6	12.9
	Infinity CL	63	58.7	13.9	11.5	35.9	11.5
	Millennium	63	59.4	13.6	12.0	38.2	4.1
	NE05548	62	57.7	14.9	12.5	39.9	8.7
Average of all 31 entries		62	57.8	14.2	11.9	35.4	8.7
Difference required for significance at 5%		5	1.4	1.1	0.6	1.3	8.4

To choose the best variety, first examine the latest copy of the *Nebraska Fall Seed Guide.* (We used the 2011 edition in this example.) Along with the variety trial yield data, the seed guide provides: 1) plot locations, problems, farmer entries; 2) cooperators, soil types, planting and harvesting dates; 3) average performance at each location; and 4) maps of test sites.

For the purpose of illustrating this process, let's say the farm is in Hayes County, Nebraska and the West Central Dryland tests best apply. Check the tables that list the two-, three-, four-, and five-year averages since multi-year data reduce risks. Varieties with a good track record are generally preferred.

For this example the three-year data on pages 24 and 25 of the 2011 Fall Seed Guide (EC103) will be used (*Table II*). First, look at the column with the average yields. To simplify this, *Table II* lists only the top 19 out of 31 entries that have been in the test for three years.

This is also the high yielding group, which is explained later. Look at the difference required for the Least Significant Difference (LSD), which in this test is more than or equal to 5 bushels (see bottom row). The LSD is listed at the 0.05 probability level. These values indicate how large a difference is needed to be 95 percent confident that one variety is superior to another. Differences between varieties that are equal to or less than the 0.05 LSD value have only a 1 in 20 likelihood of being truly different from one another. There is a good chance that the different yields listed for these varieties is due to random or experimental error rather than any true difference in yield performance. By subtracting 5 bushels from the top yielding variety (67 bushels per acre), we get 62 bushels per acre. In *Table II* those varieties with a yield from 67 (the top yield) to 62 bushels per acre are highlighted in green. This is the high yielding group of varieties. If possible, select varieties from this group.

For many winter wheat varieties characteristics such as family are known. This is probably the most important characteristic to use in selecting genetic diversity. In *Table III* the families are grouped by color. These are also cross hatched to indicate that colors are only to separate families and do not indicate that one family of wheat variety is superior to another. (*Table III* includes information on winter wheat characteristics also listed in the *Nebraska Fall Seed Guide*.)

This selection process can be continued with other categories of plant characteristics, such as maturity, with 1 = early and 5 = late. These will be cross-hatched since there are advantages and disadvantages to both early and late maturity such as when a late spring frost occurs. Another important characteristic is winter hardiness. Green will be used for the most hardy, 5; yellow for the next hardy, 4; salmon for average winter hardiness, 3; purple for in between average and tender, 2; and pink for most tender, 1. For coleoptile length a 9 or 8 indicates a long coleoptile and is shaded green; 7-6, yellow; 5-4, salmon; 3-2, purple; and the shortest coleoptile length, 1, pink.

To separate the varieties by bushel weight, use the LSD. The highest bushel weight is 59.4 with Goodstreak and Millennium. If we subtract 1.4 (the LSD) from the highest (59.4), we get 58.0. All those varieties that have test weights between 59.4 and 58.0 are colored green. Other groupings are as follows: 57.9-56.5, yellow; and 56.4-55.0, salmon. The LSD for plant height is 1.3. The height groups in *Table III* are as indicated by the following colors, starting with the shortest 29.9-31.0, green; 31.1-32.4, yellow; 32.5-33.8, salmon; 33.9-35.2, purple; 35.3-36.6, brown; 36.7-38.0, pink; 38.1-39.4, blue; and 39.5-40.6, red. In some situations a grower might prefer taller varieties and would reverse the ranking.

The grouping for plant lodging starts with the lowest score, since that is preferred, and works up. The LSD for plant lodging is 8.4. We get the high ranking varieties by adding 8.4 to 2.8 (the lowest lodging number). We find that the lodging groups are as follows: 2.8-11.2, green and 11.3-19.7, yellow. To group varieties based on grain protein, use the LSD of 0.6. By subtracting 0.6 from the highest protein (12.5 percent), we determine that the first group is between 12.5 and 11.9. It is colored green. The other grouping is: 11.8-11.2, yellow.

Select varieties that are the best (shaded green) in all characteristics of interest to the producer and are from different genetic families. In order to ensure genetic diversity among your chosen varieties, you may need to select varieties that do not perform the best in all characteristics. In this case, select varieties from different LSD levels (shaded non-green) in traits that are of less concern for a particular system or operation, i.e., plant height. Use information from seed comparisons on grower plots to supplement this process.

The next step in selecting diverse, high-yielding varieties is to use the information along with your farm results. As an example, *Table IV* includes data for a hypothetical farm.

Examine the variety publication to see if any of the varieties on "your farm" (*Table IV*) were included in the test. Three are highlighted in *Table IV*. We add the yields from the University of Nebraska–Lincoln test results in the adjusted columns. In the columns the number in parentheses indicates the difference between University yields and your farm yields.

To compare "your winter wheat" yields and those in the UNL test, adjust the yield on "your farm." For example, the yield in the UNL test was four bushels higher for Millennium, six bushels higher for Alliance, and five bushels higher for Pronghorn, or five bushels higher on the average. Therefore, yields for your varieties should be increased by five bushels per acre to compare them (*Table IV*). If you have other information, you could also make those adjustments.

You are now ready to make your selection for next year. Compare your information directly to the UNL yield trial information using the adjusted values. Remember to select varieties with different characteristics to assure greater diversity. In this example, you might select MdGill and Armour to replace some of the varieties that you grow on your farm. These two varieties are in the highest yield category and there is a large difference in some of their characteristics. Record your variety selections in *Table IV* and consider including two or three new varieties on some of your acres next year, based on comparisons with the UNL results.

The results from the University of Nebraska–Lincoln crop variety trials are available online at *varietytest.unl.edu* or in the University of Nebraska–Lincoln Extension *Fall Seed Guide* (EC103). Growers also may want to visit the Virtual Wheat Tour (*www.panhandle.unl.edu/wheat*) to see the latest information on Nebraska wheat variety performance, variety descriptions, photos, and regional recommendations.

A blank worksheet (*Table V*) is included on page 9 so you can copy it and use this process to assess yield and agronomic characteristics annually when selecting seed.

Table III. Three-year averages of West Central dryland wheat variety tests (2009-2011). Entries represent the average of the sites for each of the identified traits. Results are grouped and shaded according to their Least Significant Difference (LSD). All varieties within a particular color would be considered equal. Vertical colors show only differences in family most related to and maturity — not ranking.

Brand	*Variety*	*Average (bu/ac)*	*Family Most Closely Related to*	*Maturity*	*Winter Hardiness*	*Coleoptile*	*Bushel Weight (lb/bu)*	*Plant Height (in.)*	*Plant Lodging (%)*	*Grain Protein (%)*
	NE05496	67	TREGO/Hallam	—	—	—	57.1	35.4	7.3	11.3
	McGill	66	Ike	2	4	5	57.0	36.8	8.1	11.6
	Settler CL	66	Infinity, Millennium, Wesley Families	3	4	—	57.9	32.7	5.3	12.1
	Alliance	65	Chisholm	3	2	2	57.8	37.0	10.4	11.3
	Wesley	65	Sumner	3	4	1	56.8	31.9	2.8	12.1
	NE02558	65	Semidwarf	1	4	—	58.3	35.5	8.2	11.2
WestBred	Winterhawk	64	--	3	4	—	59.0	34.1	6.4	11.3
NuPride	Camelot	64	--	3	5	5	57.8	36.2	6.4	12.0
WestBred	Armour	64	PL2180	1	3	5	57.4	29.7	4.8	11.8
AgriPro/Syngenta	Art	64	Jagger, TAM200, Archer	2	4	—	58.6	33.1	5.8	12.1
Husker Genetics	Overland	64	Millennium, Wahoo	4	5	—	58.8	36.4	2.8	11.7
	Arrowsmith (W)	64	Arapahoe	4	4	7	56.6	39.9	6.2	11.8
	Robidoux	64	Wahoo, Millennium	3	4	6	56.3	34.2	8.1	11.5
	NE03490	64	Culver, Wahoo, Millennium	2	3	6	55.7	31.3	8.2	11.9
	Bond CL	63	Yumar	2	3	6	55.9	35.4	6.4	11.4
	Goodstreak	63	Colt	3	3	8	59.4	40.6	12.9	12.1
	Infinity CL	63	Windstar, Above, Millennium	4	4	4	58.7	35.9	11.5	11.5
	Millennium	63	Abilene, Arapahoe	4	3	3	59.4	38.2	4.1	12.0
	NE05548	62	NE97426, NE98574	—	—	—	57.7	39.9	8.7	12.5
Average of all entries		62		1= Early	1=Tender	1=Short	57.8	35.4	8.7	11.9
Difference required for significance at 5%		5		5=Late	5= Hardy	9=Long	1.4	1.3	8.4	0.6
Groups					5	9-8	59.4-58.0	29.7-31.0	2.8-11.2	12.5-11.9
					4	7-6	57.9-56.5	31.1-32.4	11.3-19.7	11.8-11.2
					3	5-4	56.4-55.0	32.5-33.8		
					2	3-2		33.9-35.2		
								35.3-36.6		
								36.7-38.0		
								38.1-39.4		
								39.5-40.8		

2011 Winter Wheat Variety Selection Worksheet

Table IV. For this example select four varieties and their acreage for seeding 1,000 acres of winter wheat this fall. One source of data for this table is the 2011 EC103 *Nebraska Fall Seed Guide* from west central Nebraska wheat variety tests. This year you measured the yields from the four varieties you grew and that data is below.

Agronomic Characteristics[1]	*2011-2012 Winter Wheat Varieties — Your Farm, NE*				*2011-2012 Winter Wheat Varieties — Your Farm, NE*			
Variety Acres	*Millennium 300*	*Alliance 300*	*Pronghorn 300*	*Cougar 100*	*McGill*	*Armour*		
Yield, bu/ac	59	59	54	42				
University Yield, bu/ac	63 (+4)	65 (+6)	59 (+5)		66	64		
Adjusted Yield, bu/ac	64	64	59	47				
Family	Abilene Arapahoe	Chisholm	Colt	Thunder-bird	Ike	PL2180		
Maturity 1=Early, 5=Late	4	3	3	4	2	1		
Winter Hardiness 1=Tender, 5=Hardy	3	2	4	4	4	3		
Straw Strength 1=Weak, 6=Strong	5	5	3	4	3	5		
Plant Height 1=Short, 9=Tall	7	6	8	7	4	2		
Coleoptile Length 1=Short, 9=Long	3	2	8	8	5	5		
Bushel Weight 1=High, 9=Low	3	6	5	4	7	7		
Protein Content 1=High, 9=Low	5	9	5	4	—	6		
Hessian Fly 1=Susceptible 9=Resistant	5	4	1	1	1	1		
Leaf Rust 1=Susceptible 9=Resistant	3	1	3	3	3	8		
Stem Rust 1=Susceptible 9=Resistant	7	7	7	4	7	8		
Stripe Rust 1=Susceptible 9=Resistant	7	7	—	7	1	8		
Soil-borne Mosaic 1=Susceptible 9=Resistant	1	1	1	4	7	9		
Wheat Streak Mosaic 1=Susceptible 9=Resistant	1	3	1	1	1	4		

[1]The rating scales provided here reflect those used by the University of Nebraska–Lincoln in the *Nebraska Fall Seed Guide,* EC103. If you are using other resources for information on agronomic characteristics, be sure to check the scale being used for each characteristic and adjust the labeling accordingly.

Winter Wheat Variety Selection Worksheet

Table V. Worksheet to compare and select the most appropriate wheat varieties for your operation. Use *Table IV* and the related discussion in this publication as a guide in completing this worksheet. Also refer to the latest version of EC103, *Nebraska Fall Seed Guide*, or the website, *http://CropWatch.unl.edu/web/varietytest,* for the latest ratings of yield and agronomic characteristics of wheat varieties grown in Nebraska.

Agronomic Characteristics	*Crop Yields (average of previous 2-3 years) Your Farm, NE*				*Winter Wheat Varieties for Next Year Your Farm, NE*			
Variety *Acres*								
Yield, bu/ac								
University Yield, bu/ac								
Adjusted Yield, bu/ac								
Family								
Maturity								
Winter Hardiness								
Straw Strength								
Plant Height								
Coleoptile Length								
Bushel Weight								
Protein Content								
Hessian Fly								
Leaf Rust								
Stem Rust								
Stripe Rust								
Soil-borne Mosaic								
Wheat Streak Mosaic								

This publication has been peer reviewed.

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