



# Kansas Wheat Variety Guide 2024

MF991 • Wheat Ratings

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Variety selection is one of the most important decisions a wheat grower makes. This choice profoundly influences the potential wheat crop’s productivity. Agronomic characteristics, such as height, acid soil tolerance, and maturity, determine how well a variety is adapted for a region or desired cropping system. Selecting a good variety also influences how well the crop tolerates drought or resists diseases and insects.

The agronomic characteristics and resistance ratings in this publication summarize results of multiple field and greenhouse tests by public and private wheat researchers.

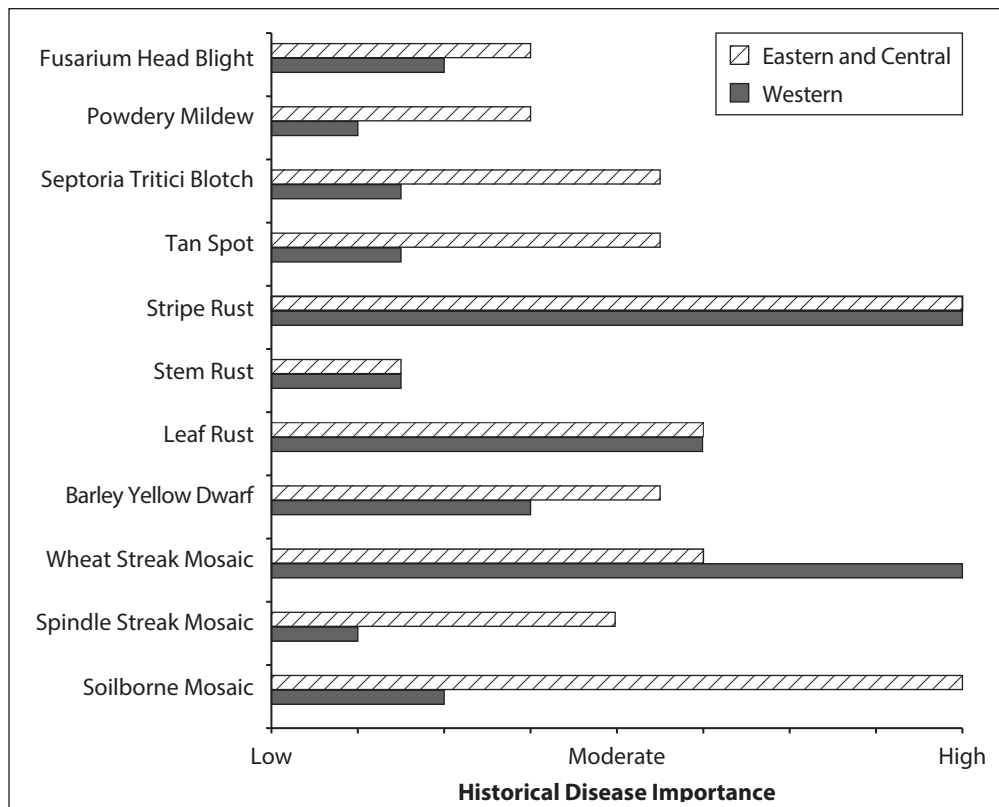
The ratings are intended to help producers select wheat varieties according to their specific needs. The paragraphs below contain suggestions for using this information to minimize the potential for production problems and resulting yield losses. Growers should consult the latest K-State wheat performance test report for additional information about varieties that have yielded well in their area.

Although great efforts were made to confirm the accuracy of these ratings, no guarantee can be made that the information is without error. A variety’s agronomic characteristics are generally stable but can be influenced by unanticipated interactions with production practices or environment. Disease and pest reactions are influenced by regional populations of the pathogens or insects and may vary between years.

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## How to Use the Variety Ratings

**Evaluate how well a variety is adapted for your area.** The agronomic characteristics of a wheat variety influence its ability to provide consistent, high yields. The importance of characteristics such as relative maturity, height, and drought tolerance vary regionally in Kansas. For example, varieties successful in western Kansas tend to have a medium or medium-late maturity and medium height or taller, as well as good drought tolerance (Table 1). In contrast, wheat varieties with early or medium-early maturity, medium or shorter height, and good acid soil tolerance are most successful in central Kansas. Information about the characteristics of



**Figure 1. Regional importance of wheat diseases in Kansas.** The importance of wheat diseases is based on their potential to cause yield loss and how often it reaches damaging levels in different regions of the state. The relative importance of the diseases is the product of historical records of disease losses in Kansas and expert opinion by wheat disease specialists. Not all diseases and insect pests are considered in the figure. Growers may need to adjust their priorities based on previous crop production practices on their farms.

wheat varieties can be found in the variety profiles and the overall listing of agronomic characteristics (Appendix 2).

**Determine which diseases are most important.** The importance of any disease or insect pest depends on its potential to cause yield loss and how often it reaches damaging levels within a given region of the state. In western Kansas, wheat streak complex, leaf rust, and stripe rust are among the most damaging and common diseases (Figure 1). These diseases should be top priorities when selecting wheat varieties for that region. In eastern and central Kansas, the environment is often more conducive for disease development, and additional factors should be considered when selecting a variety. Important diseases to consider in these regions of Kansas include soilborne mosaic, spindle streak mosaic, barley yellow dwarf, leaf rust, stripe rust, tan spot, and Septoria tritici blotch. Wheat streak complex is becoming an increasing concern in this part of the state.

It may be helpful to consider a disease resistance summary that combines the historical estimates of regionally important diseases with the variety disease ratings (Table 2). Varieties with genetic resistance to historically important diseases are considered above average, compared

to more susceptible varieties. Detailed information about a variety's disease and insect reactions can be found in the variety profiles and the overall listing of disease and insect reactions (Appendix 1).

**Determine if an herbicide resistant variety is necessary.** Some producers may select varieties with either Clearfield or CoAXium technologies to manage weed pressure. Additional information about varieties with these technologies can be found in Appendix 2 and 3.

**Table 1.** *Agronomic characteristics of wheat varieties that were successful in Kansas historically.*

Characteristic*	Eastern and Central Kansas	Western Kansas
Maturity	Medium or earlier	Medium-late or earlier
Height	Medium or shorter	Medium or taller
Drought tolerance	Moderately good or good	Good or excellent
Straw strength	Average or better	Average or better
Acid soil tolerance	Moderately tolerant or better	Generally not applicable

\* The agronomic characteristics presented here are based on historical records of varieties that occupied 5 percent or more of the acres within a region during the last 20 years. Varieties with these characteristics are most likely to provide consistent, high yields in a given region of the state.

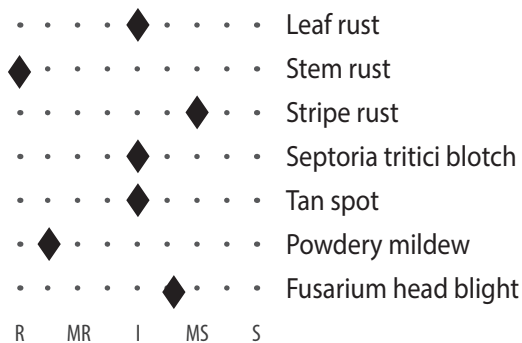
**Table 2. Experimental wheat disease resistance summary.** *The wheat disease resistance summary combines resistance ratings for multiple diseases. It weights each disease relative to its historical regional importance in Kansas. Varieties with genetic resistance to the historically important diseases within a region are ranked above average relative to more susceptible varieties. The summary is intended to facilitate comparisons among varieties. The more complete lists of disease and insect ratings (Appendix 1) should be consulted after narrowing the list of potential varieties.*

Disease Resistance Grouping	Eastern and Central			Western		
<b>Above Average:</b> Varieties have moderate or high levels of genetic resistance to <b>most</b> diseases common in this region	AP Bigfoot	KS Providence	SY Wolf	Canvas	KS Dallas	Oakley CL
	Bob Dole	LCS Chrome	WB4269	Doublestop CL Plus	KS Silverado (W)	Smith's Gold
	Butler's Gold	Rockstar	WB4401	Guardian	Larry	SY Wolf
	Doublestop CL Plus	Showdown	WB4523	Joe (W)	LCS Chrome	Tatanka
	Gallagher	Smith's Gold	WB4699	KS Bill Snyder		
	Green Hammer	Strad CL Plus	Zenda			
<b>Average:</b> Varieties have moderate or high levels of genetic resistance to <b>some</b> of the diseases common in this region	AG Icon	Everest	LCS Revere	AG Icon	KS Hamilton	SY Monument
	AM Cartwright	KanMark	SY Wolverine	AP Bigfoot	KS Hatchett	SY Rugged
	AP EverRock	KS Hatchett	Tatanka	AP Roadrunner	KS Territory	SY Wolverine
	AP Prolific	KS Mako	Uncharted	Danby (W)	KS Western Star	T158
	AP Roadrunner	Larry	WB4458	KanMark	LCS Revere	TAM 114
		LCS Julep		KS Big Bow (W)		Whistler
<b>Below average:</b> Varieties are susceptible to <b>many</b> of the diseases common in this region	AP503 CL2	LCS Valiant	WB4515	Antero (W)	High Country	WB4422
	LCS Mint	T158	WB-Grainfield	Avery	Langin	WB-Grainfield
	LCS Steel AX	WB4422	Winterhawk	Brawl CL Plus	LCS Mint	Winterhawk
				Byrd	LCS Valiant	

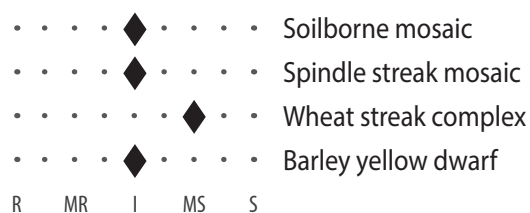
(W) = White wheat varieties

# AP Bigfoot

## Fungal diseases

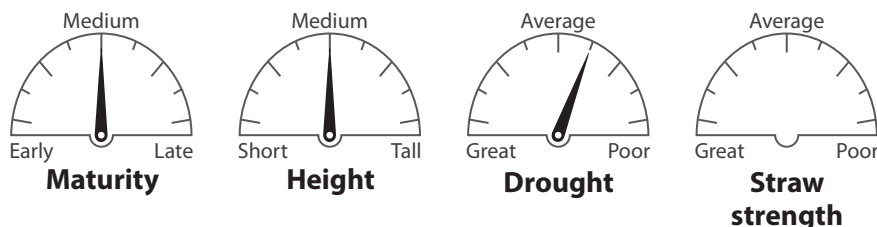


## Viral diseases



R = Resistant; MR = Moderately resistant; I = Intermediate; MS = Moderately susceptible; S = Susceptible

## Agronomic characteristics



**Pedigree:** TAM 112, SY Wolf, and a Colorado experimental line (COO4393).

**Adaptation:** Primarily western Kansas, has the potential to move into central Kansas.

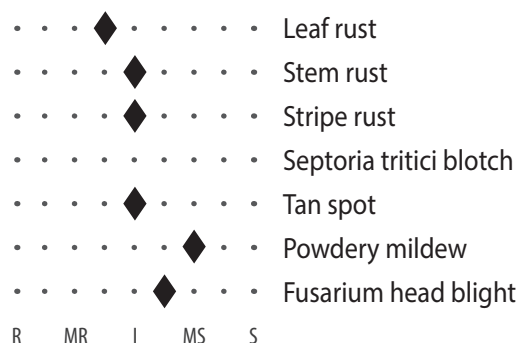
**Strengths:** Good acid soil tolerance, good stem rust and intermediate leaf rust resistance.

**Weaknesses:** Susceptible to Hessian fly, Fusarium head blight (head scab), and stripe rust. Intermediate soilborne mosaic resistance.

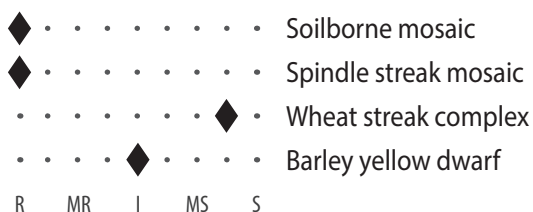
**Comments:** A medium-short, medium-early maturing variety. Its pedigree suggests it should have good drought tolerance. Initially released as a widely adapted variety based on Syngenta's data; however, its yield within K-State testing has been below average.

# AP Prolific

## Fungal diseases

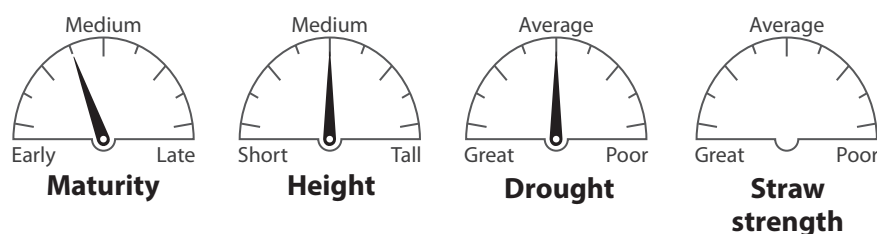


## Viral diseases



R = Resistant; MR = Moderately resistant; I = Intermediate; MS = Moderately susceptible; S = Susceptible

## Agronomic characteristics



**Pedigree:** NA

**Adaptation:** Central Kansas.

**Strengths:** Strong yield potential, good acid soil tolerance, moderately resistant to leaf rust.

**Weaknesses:** Acceptable quality, intermediate for stripe rust, susceptible to wheat streak mosaic complex.

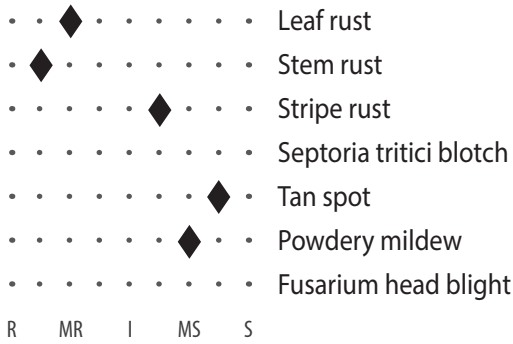
**Comments:** A 2022 release from the AgriPro breeding program with high top end yield potential and strong performance in variety performance tests. Excellent acid soil tolerance. AgriPro suggests decreasing seeding rate by 10% because this is a high-tillering variety.



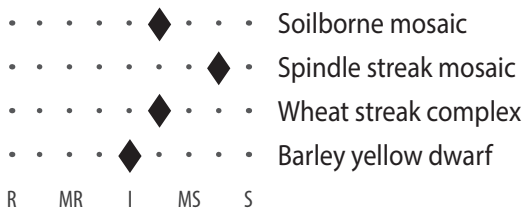


# KS Dallas

## Fungal diseases

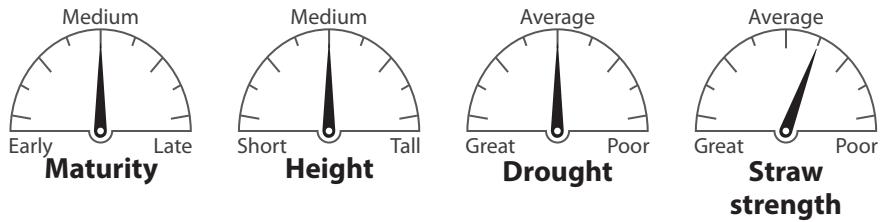


## Viral diseases



R = Resistant; MR = Moderately resistant; I = Intermediate; MS = Moderately susceptible; S = Susceptible

## Agronomic characteristics



**Pedigree:** KS08HW112-6, TX03A0148, and Danby TR.

**Adaptation:** Western Kansas.

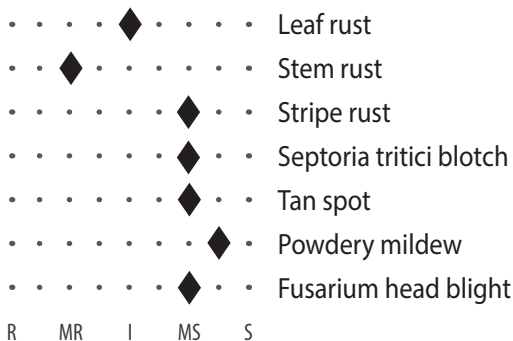
**Strengths:** Good yield potential, drought tolerance, wheat streak mosaic virus resistance up to 70°F (WSM2 gene), medium-long coleoptile.

**Weaknesses:** Susceptible to Hessian fly, moderately susceptible to stripe rust, average straw strength.

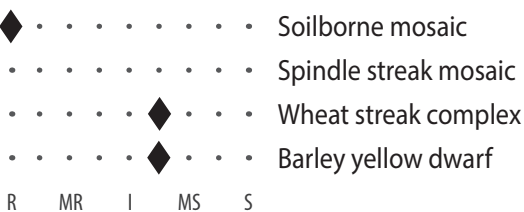
**Comments:** KS Dallas has a strong yield record and medium height and maturity. This variety could be a replacement for Oakley CL, with enhanced wheat streak mosaic virus and intermediate Triticum mosaic virus resistance. We expect good milling and baking qualities from KS Dallas.

# KS Hamilton

## Fungal diseases

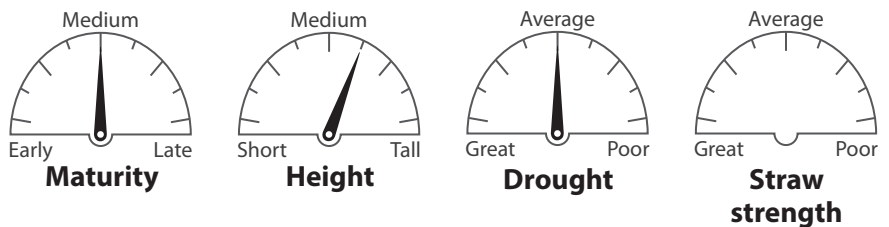


## Viral diseases



R = Resistant; MR = Moderately resistant; I = Intermediate; MS = Moderately susceptible; S = Susceptible

## Agronomic characteristics



**Pedigree:** KS08HW176-4//Bill Brown.

**Adaptation:** Western Kansas and eastern Colorado.

**Strengths:** High yield potential, good tillering potential; and good soilborne mosaic virus and Hessian fly resistance. Intermediate leaf rust resistance.

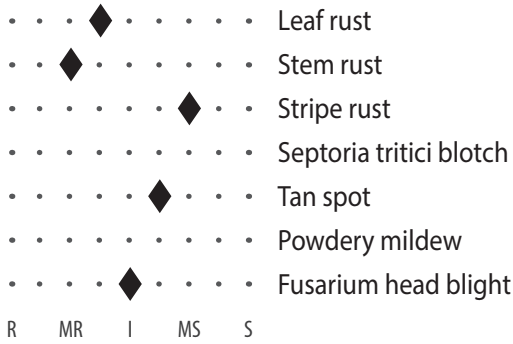
**Weaknesses:** Intermediate acid soil tolerance, intermediate standability, moderately susceptible to stripe rust.

**Comments:** Similar to KS Dallas, KS Hamilton brings superior wheat streak mosaic virus resistance up to 70°F. This variety is medium maturity with acceptable milling and baking qualities.

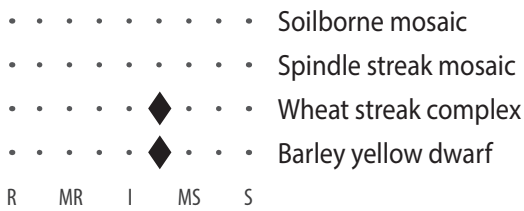


# KS Territory

## Fungal diseases

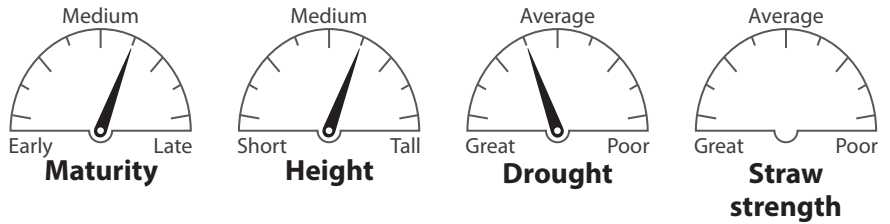


## Viral diseases



R = Resistant; MR = Moderately resistant; I = Intermediate; MS = Moderately susceptible; S = Susceptible

## Agronomic characteristics



**Pedigree:** KS11HW15/TX10A001006.

**Adaptation:** Western third of Kansas into Colorado.

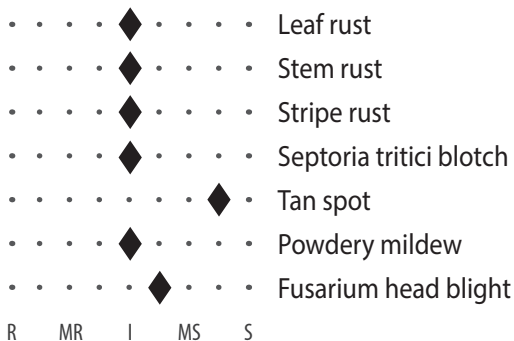
**Strengths:** Wide adaptability across western Kansas, great yield record (similar to KS Dallas), good standability and quality. Resistance to WSMV (65F) and to Triticum mosaic virus (TriMv).

**Weaknesses:** Medium-short coleoptile. Intermediate to acid soils. Moderately susceptible to stripe rust.

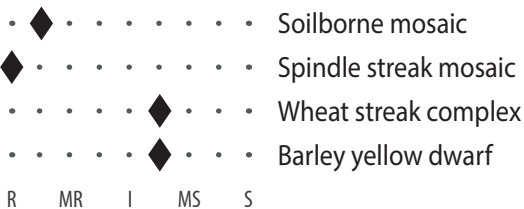
**Comments:** Medium maturity, medium-tall variety with potential to replace many current red wheats such as Tatanka, Oakley CL, KS Dallas, and KS Hamilton. Resistance to WSMV and TriMv giving it one of the strongest virus packages available in western Kansas.

# KS Western Star

## Fungal diseases

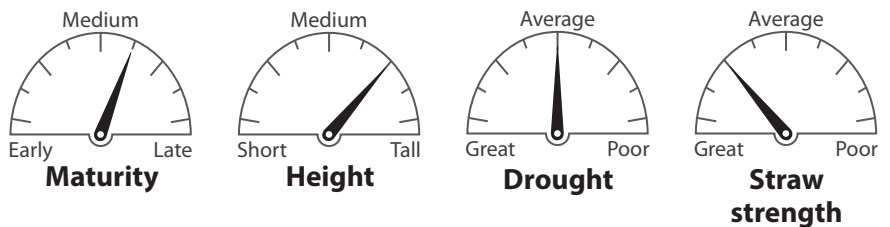


## Viral diseases



R = Resistant; MR = Moderately resistant; I = Intermediate; MS = Moderately susceptible; S = Susceptible

## Agronomic characteristics



**Pedigree:** Byrd and KS05HW121-2.

**Adaptation:** Central and western Kansas.

**Strengths:** High yield potential, good drought tolerance and straw strength, partial resistance to wheat curl mites.

**Weaknesses:** Susceptible to wheat streak complex and Hessian fly, intermediate for leaf and stripe rust.

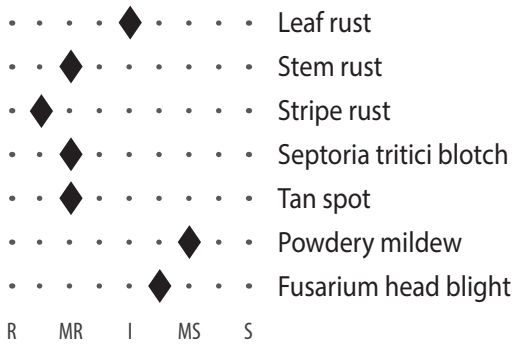
**Comments:** A variety from the K-State Hays wheat breeding program with promising yield performance in western Kansas. Its tolerance to soil borne mosaic virus allows it to perform in central Kansas as well. Medium to medium-early maturity and medium-tall stature. Named after the Western Star Milling Company in Salina, Kansas, this variety has good milling and baking qualities.



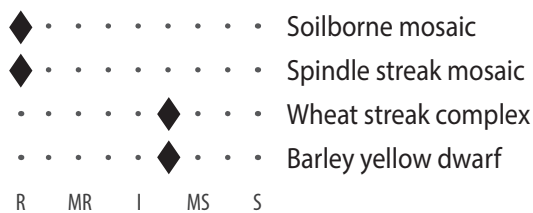


# Rockstar

## Fungal diseases

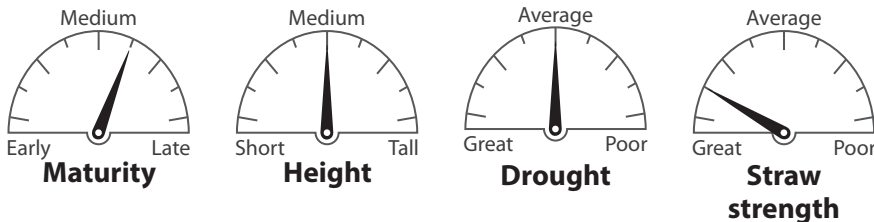


## Viral diseases



R = Resistant; MR = Moderately resistant; I = Intermediate; MS = Moderately susceptible; S = Susceptible

## Agronomic characteristics



**Pedigree:** Fuller, Cutter, Greer, and experimental varieties.

**Adaption:** Central and eastern Kansas.

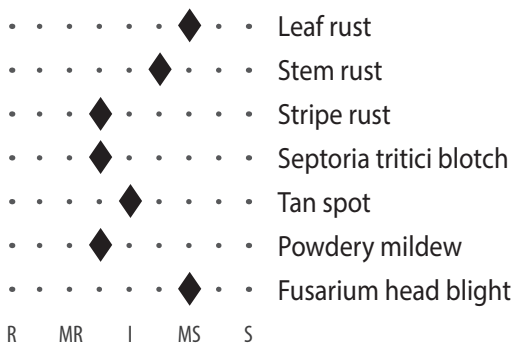
**Strengths:** Great yield record in central and eastern Kansas, excellent overall leaf health with good resistance to stripe rust, tan spot, and Septoria tritici blotch. Good straw strength and good tolerance to acid soils.

**Weaknesses:** Average test weight.

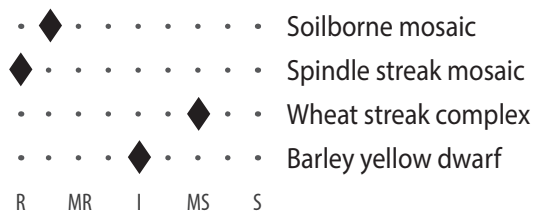
**Comments:** A medium height, medium to medium-late maturing variety (a day earlier than SY Monument) that has shown good performance in central and eastern Kansas. It maintains an extended green canopy coverage well into the grain filling period when other varieties are already showing yellowing of the lower leaves.

# Showdown

## Fungal diseases

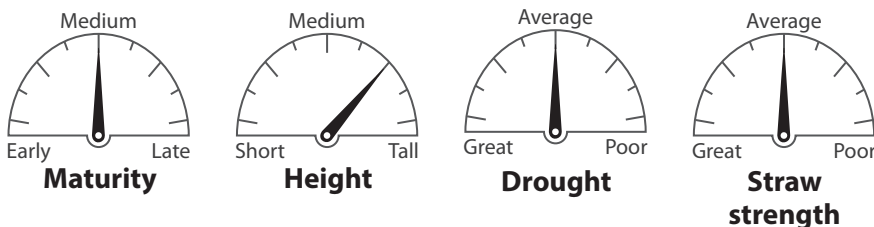


## Viral diseases



R = Resistant; MR = Moderately resistant; I = Intermediate; MS = Moderately susceptible; S = Susceptible

## Agronomic characteristics



**Pedigree:** OK Rising and Agripro experimental varieties.

**Adaption:** South central and central Kansas.

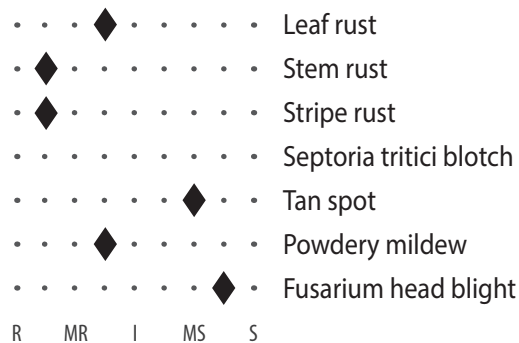
**Strengths:** High yield potential, Hessian fly resistance, good acid soil tolerance.

**Weaknesses:** Moderate susceptibility to leaf and stem rust, taller variety with potential for lodging, below average forage production compared to other OGI varieties.

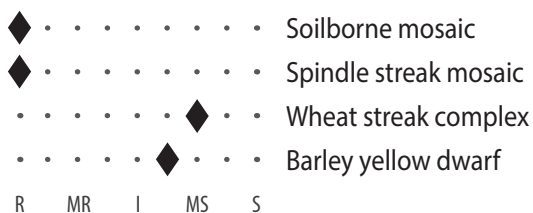
**Comments:** A 2018 release from Oklahoma State, Showdown has medium maturity and a wide adaptability, potentially as far north as central Kansas. While it shows a good recovery from grazing, it requires a greater seeding rate if the intent is forage production.

# Smith's Gold

## Fungal diseases

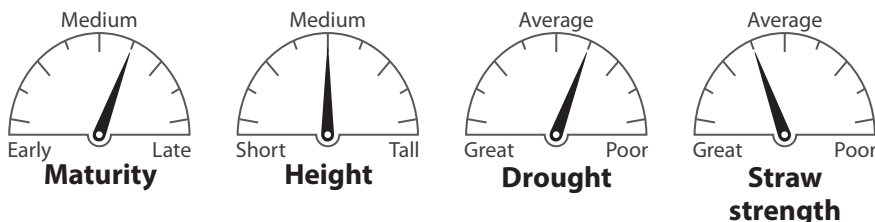


## Viral diseases



R = Resistant; MR = Moderately resistant; I = Intermediate; MS = Moderately susceptible; S = Susceptible

## Agronomic characteristics



**Pedigree:** Gallagher, Oklahoma experimental lines containing TAM 110 and 2174.

**Adaption:** South central and Southwest Kansas.

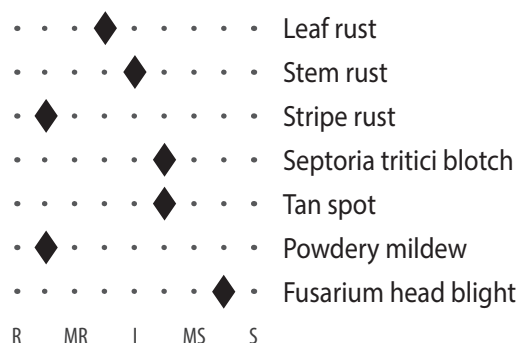
**Strengths:** Grazing potential, stripe rust resistance. Good acid soil tolerance, improved Hessian fly and greenbug resistance, excellent milling and baking characteristics.

**Weaknesses:** Susceptible to tan spot, physiological leaf spot and preharvest sprouting, intermediate tolerance to acid soils.

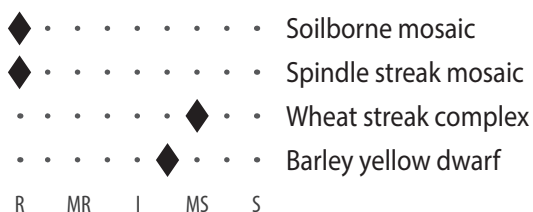
**Comments:** Solid wheat variety for south central Kansas with good grazing potential. May offer some improvements over Gallagher on stripe rust resistance and duration of spring grazing.

# Strad CL Plus

## Fungal diseases

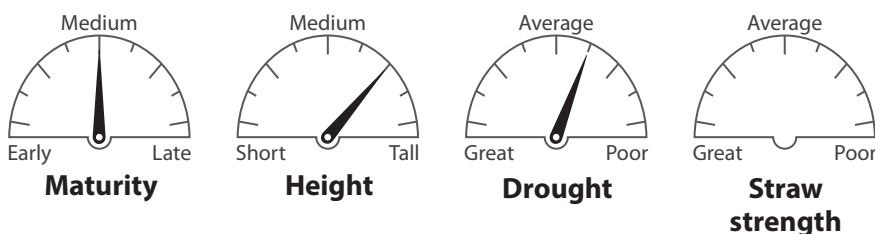


## Viral diseases



R = Resistant; MR = Moderately resistant; I = Intermediate; MS = Moderately susceptible; S = Susceptible

## Agronomic characteristics



**Pedigree:** N91D2308-13/OK03926C//OK03928C.

**Adaptation:** Oklahoma into south central Kansas.

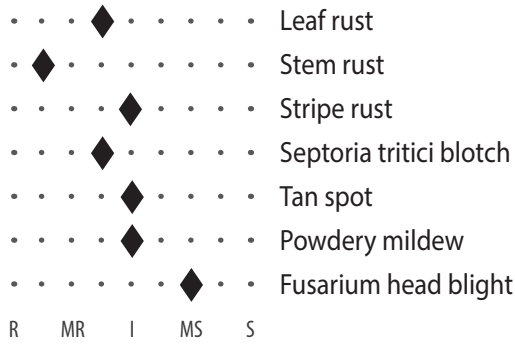
**Strengths:** Good fall growth and early canopy cover for grazing. Good milling and baking properties. Good performance on acid soils. Resistant to stripe rust, moderately resistant to leaf rust.

**Weaknesses:** Standability can be a concern in very high yielding environments. Susceptible to Hessian fly.

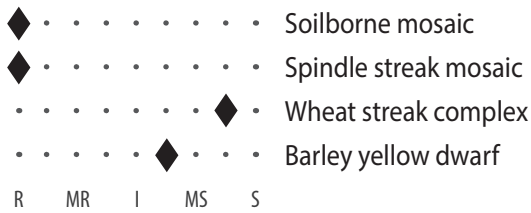
**Comments:** This medium-tall, medium maturity Clearfield variety is being positioned as a replacement for its sibling variety, Doublestop CL Plus. It has slightly earlier maturity and has shown 5 to 10% greater yields in Oklahoma. It has good test weight, although not as good as Doublestop CL Plus.

# SY Monument

## Fungal diseases

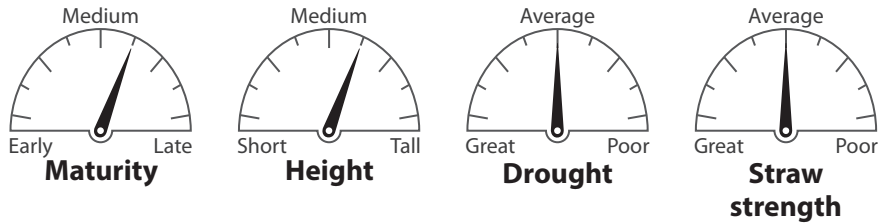


## Viral diseases



R = Resistant; MR = Moderately resistant; I = Intermediate; MS = Moderately susceptible; S = Susceptible

## Agronomic characteristics



**Pedigree:** AgriPro experimental lines.

**Adaptation:** Central and western Kansas, potential wide adaptation across the state.

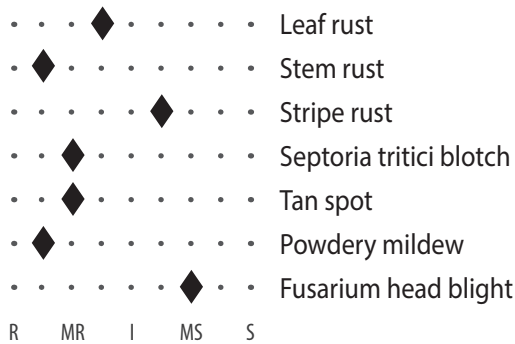
**Strengths:** Good disease package, good test weight, high tillering potential, wide adaptation across the state.

**Weaknesses:** Average straw strength, susceptible to wheat streak complex.

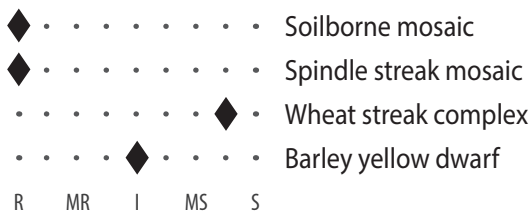
**Comments:** Excellent yield record across Kansas, although its medium-late maturity suggests it is best adapted for northern Kansas. The stripe rust and leaf rust ratings were downgraded to intermediate in 2019. A good option following soybeans in north central Kansas, because the later planting may reduce the risk of lodging.

# SY Wolverine

## Fungal diseases

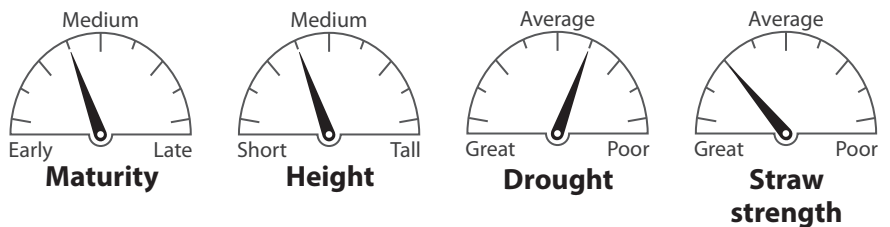


## Viral diseases



R = Resistant; MR = Moderately resistant; I = Intermediate; MS = Moderately susceptible; S = Susceptible

## Agronomic characteristics



**Pedigree:** SY Wolf, Platte, Everest.

**Adaptation:** Central and western Kansas.

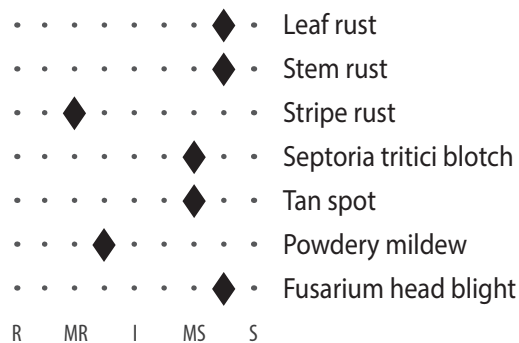
**Strengths:** Strong resistance package for leaf spotting diseases, excellent straw strength, and good drought tolerance.

**Weaknesses:** Susceptibility to acid soils, average baking quality, susceptibility to stripe rust.

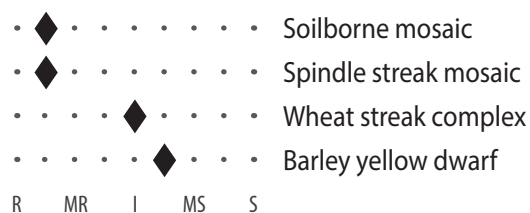
**Comments:** An early maturing variety. Medium-short stature shows great yield potential. A broad area of adaptation. Its great standability makes it a good candidate for irrigation. Leaf spotting disease resistance makes it a good option for wheat after wheat. Can show leaf tip dieback (browning of the flag leaf tip). Its acid soil susceptibility can restrict its use in some central Kansas fields.

# T158

## Fungal diseases

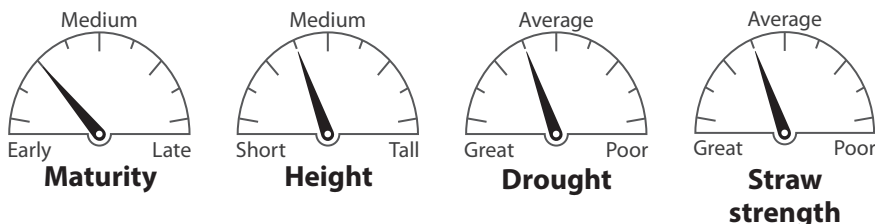


## Viral diseases



R = Resistant; MR = Moderately resistant; I = Intermediate; MS = Moderately susceptible; S = Susceptible

## Agronomic characteristics



**Pedigree:** Kansas experimental lines and T81.

**Adaptation:** Central and western Kansas.

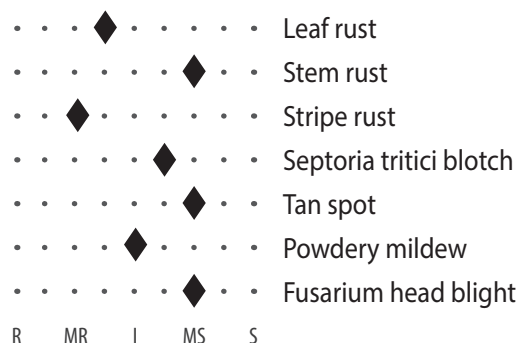
**Strengths:** Good drought tolerance, yield stability, adult plant resistance to stripe rust, intermediate resistance to wheat streak complex.

**Weaknesses:** Susceptible to acid soils, leaf rust, and stem rust.

**Comments:** A good yield record in southwest Kansas and has done well in parts of central Kansas in recent years. Stripe rust resistance is most effective after the heading stages of growth. Generally considered to have good drought tolerance.

# TAM 114

## Fungal diseases

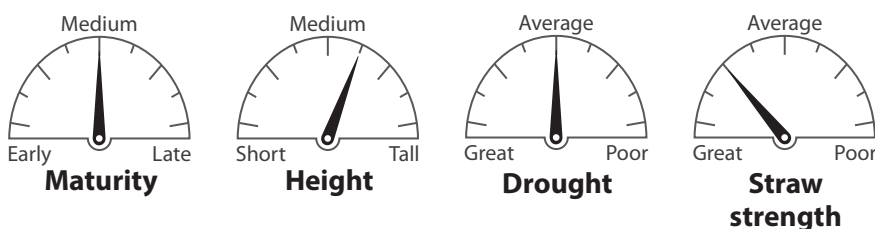


## Viral diseases



R = Resistant; MR = Moderately resistant; I = Intermediate; MS = Moderately susceptible; S = Susceptible

## Agronomic characteristics



**Pedigree:** TAM 111, Texas experimental lines, and TAM 200.

**Adaptation:** Western Kansas.

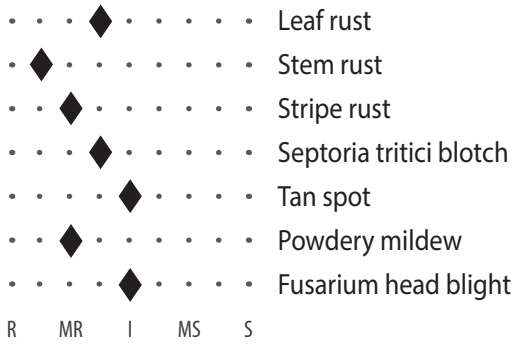
**Strengths:** Good drought tolerance, moderately resistant to leaf rust and stripe rust, good milling and baking characteristics.

**Weaknesses:** Moderately susceptible to wheat streak complex and stem rust.

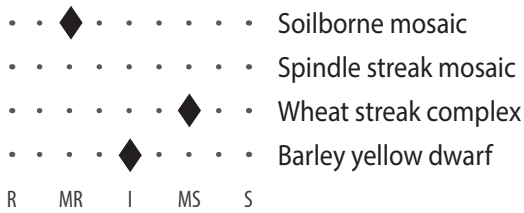
**Comments:** A good yield record in western Kansas. Drought tolerance similar to TAM 111 but better resistance to stripe and leaf rusts. Its stripe rust resistance has been more effective after heading. Good grazing potential with forage yield potential comparable to Duster. More damage from the 2020 spring freeze than other varieties, but this related to earlier maturity and not lack of winter hardiness.

# WB4401

## Fungal diseases

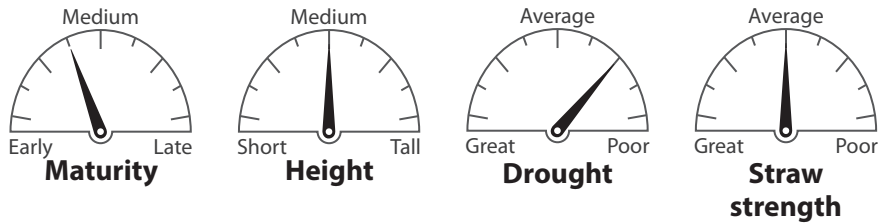


## Viral diseases



R = Resistant; MR = Moderately resistant; I = Intermediate; MS = Moderately susceptible; S = Susceptible

## Agronomic characteristics



**Pedigree:** NA

**Adaptation:** Central and eastern Kansas

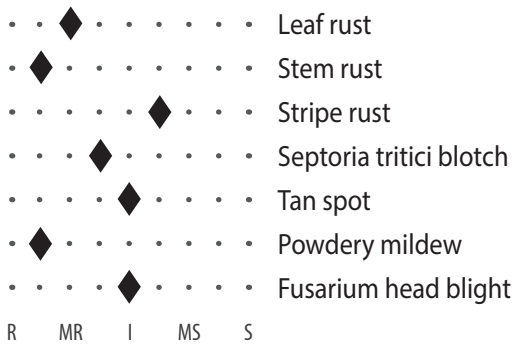
**Strengths:** Great disease package with above average resistance to stripe rust. Scab resistance similar to Zenda (intermediate).

**Weaknesses:** Average straw strength, below average drought tolerance

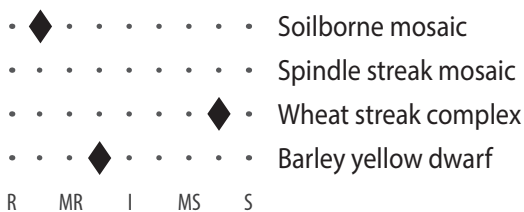
**Comments:** Solid yield performances, good disease resistance and good milling and baking quality make WB4401 a variety worth looking at in central and eastern Kansas. Can break dormancy early so early planting should be avoided. This variety is Certified Seed Only (CSO).

# WB4699

## Fungal diseases

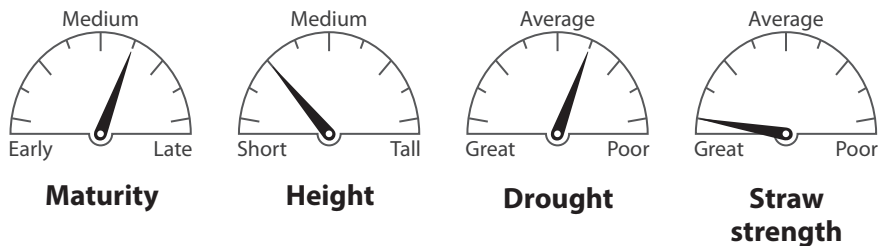


## Viral diseases



R = Resistant; MR = Moderately resistant; I = Intermediate; MS = Moderately susceptible; S = Susceptible

## Agronomic characteristics



**Pedigree:** Duster, Jagger, TAM 111, SY Wolf.

**Adaptation:** Central and eastern Kansas.

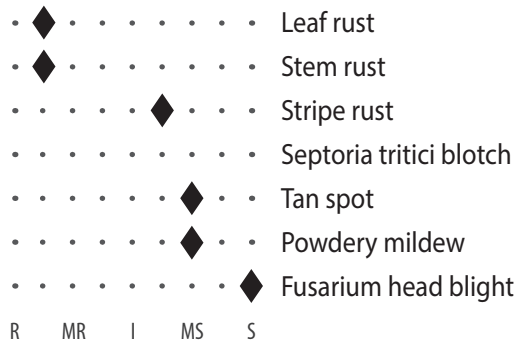
**Strengths:** Great yield potential, strong performance in central and eastern Kansas, intermediate for Fusarium head blight, excellent straw strength, good leaf rust resistance.

**Weaknesses:** Moderate susceptibility to stripe rust, lack of acid soil tolerance, short.

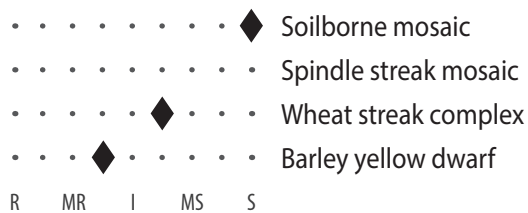
**Comments:** Has a very strong yield record in central and eastern Kansas since its first evaluation in 2019. A good late-maturing option after corn. Holds dormancy for a long period during the winter, so it might avoid some early spring freezes. Does not do well under drought stress so area of adaptation does not extend far west of I-35.

# WB4792

## Fungal diseases

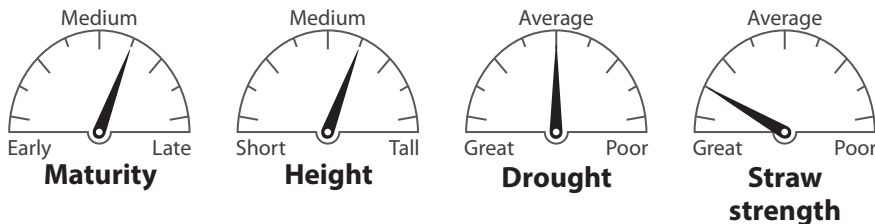


## Viral diseases



R = Resistant; MR = Moderately resistant; I = Intermediate;  
MS = Moderately susceptible; S = Susceptible

## Agronomic characteristics



**Pedigree:** NA.

**Adaptation:** Western Kansas.

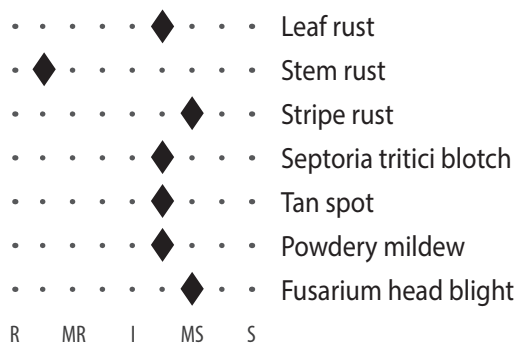
**Strengths:** Very good drought tolerance, excellent standability, excellent yield record.

**Weaknesses:** Susceptible to soilborne mosaic virus and Fusarium head blight.

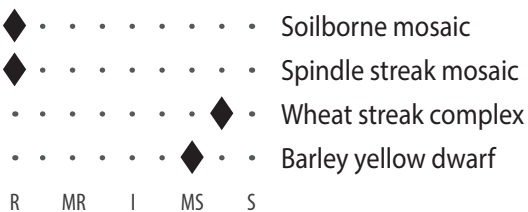
**Comments:** Very good yield record in western Kansas. Breaks dormancy early despite a medium-late maturity for heading. Holds test weight well under heat stress. Susceptibility to soilborne mosaic virus and Fusarium head blight make WB4792 a better fit for western Kansas. A fungicide application may be needed if stripe rust is a concern. It is a certified seed only (CSO) variety.

# WB-Grainfield

## Fungal diseases

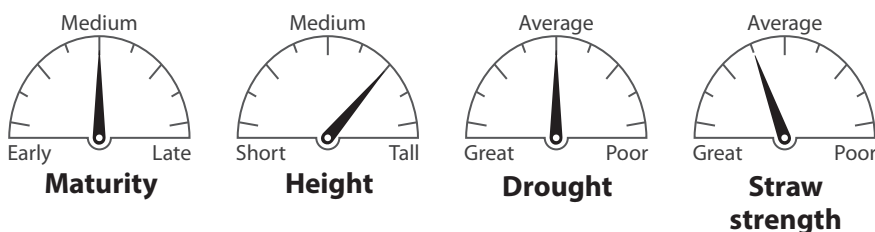


## Viral diseases



R = Resistant; MR = Moderately resistant; I = Intermediate;  
MS = Moderately susceptible; S = Susceptible

## Agronomic characteristics



**Pedigree:** WestBred and K-State experimental lines.

**Adaptation:** Central and western Kansas.

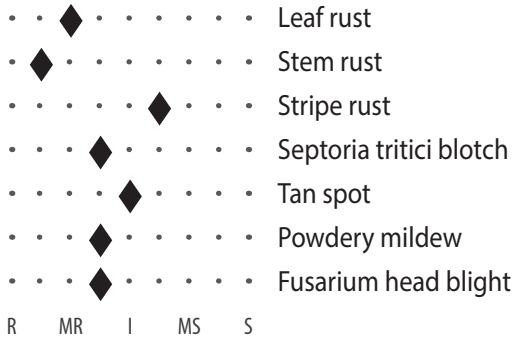
**Strengths:** Good drought tolerance, resistance to leaf rust, intermediate resistance to stripe rust, good shattering reputation.

**Weaknesses:** Moderately susceptible to barley yellow dwarf and wheat streak complex.

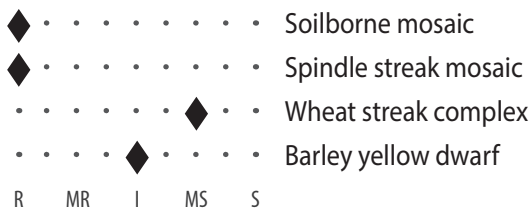
**Comments:** Excellent yield record across Kansas. It has a medium-late maturity for heading, but goes through grain fill rapidly, finishing as a medium to medium-early variety. Good drought tolerance. Stripe rust and leaf rust are adapting to the genetic resistance of WB-Grainfield. This variety may need a fungicide to protect its yield potential when rust diseases are a problem.

# Zenda

## Fungal diseases

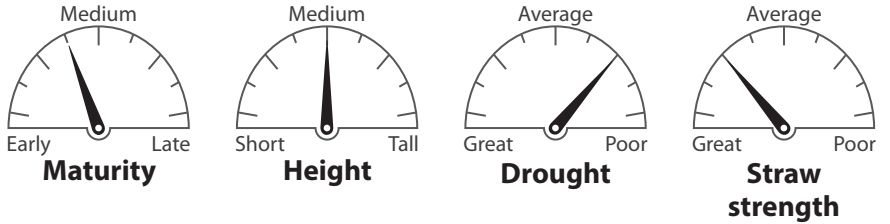


## Viral diseases



R = Resistant; MR = Moderately resistant; I = Intermediate; MS = Moderately susceptible; S = Susceptible

## Agronomic characteristics



**Pedigree:** Overlay sibling, W04-417, and Everest.

**Adaptation:** Central and eastern Kansas.

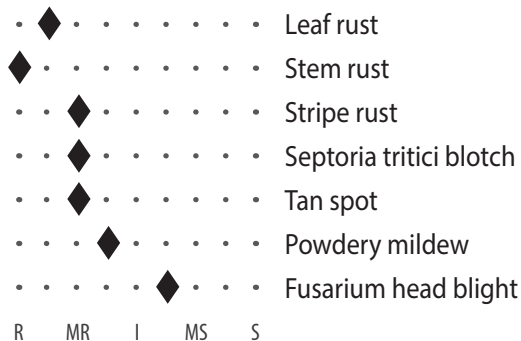
**Strengths:** Moderate resistance to Fusarium head blight, tolerance to acid soils. Excellent yield stability.

**Weaknesses:** Below-average drought tolerance.

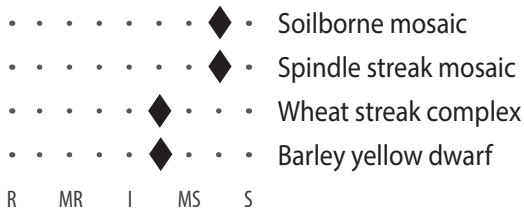
**Comments:** A variety from the Kansas Wheat Alliance with a strong yield record in central Kansas. A step up in baking quality from Everest and has similar resistance to Fusarium head blight. It is more susceptible to barley yellow dwarf than Everest. Stripe rust is adapting to Zenda's genetic resistance, and Zenda's rating for this disease was downgraded in 2020.

# Joe (White)

## Fungal diseases

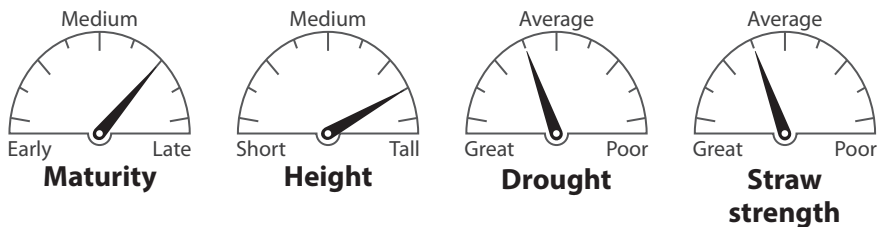


## Viral diseases



R = Resistant; MR = Moderately resistant; I = Intermediate; MS = Moderately susceptible; S = Susceptible

## Agronomic characteristics



**Pedigree:** Jagger, Arlin, Trego, and Colorado experimental lines.

**Adaptation:** Western Kansas.

**Strengths:** Excellent yield potential, resistance to stripe rust and leaf rust, good straw strength.

**Weaknesses:** Moderately susceptible to pre-harvest sprouting, susceptible to soilborne mosaic virus and Hessian fly.

**Comments:** A white wheat with an excellent yield record in western Kansas. Its resistance to stripe rust and wheat streak mosaic virus (wsm2) have been an asset in recent years. Resistance to wheat streak complex is less effective at high temperatures. Field observations suggest that it is susceptible to Triticum mosaic. More susceptible to pre-harvest sprouting than Danby.



**Appendix 1.** Overall listing of disease and insect reactions.

<b>Hard Red Winter Wheat <sup>a</sup></b>												
<b>Variety</b>	<b>Spindle</b>		<b>Wheat</b>	<b>Barley</b>		<b>Septoria</b>			<b>Fusarium</b>			
	<b>Soilborne</b>	<b>Streak</b>	<b>Streak</b>	<b>Yellow</b>	<b>Leaf</b>	<b>Stem</b>	<b>Stripe</b>	<b>Tritici</b>	<b>Tan</b>	<b>Powdery</b>	<b>Head</b>	<b>Hessian</b>
	<b>Mosaic</b>	<b>Mosaic</b>	<b>Complex<sup>*</sup></b>	<b>Dwarf</b>	<b>Rust</b>	<b>Rust</b>	<b>Rust</b>	<b>Blotch</b>	<b>Spot</b>	<b>Mildew</b>	<b>Blight</b>	<b>Fly<sup>b</sup></b>
AG Icon	1	1	7	7	3	2	5		6	6	7	
AM Cartwright	1	1	7	5	4	2	4		3		7	2
AP Bigfoot	5	5	7	5	5	1	7	5	5	2	6	9
AP EverRock	1	1	7	4	4	2	6	7	7	2	6	8
AP Prolific	1	1	8	5	4	5	5		5	7	6	9
AP Roadrunner	1	1	6	4	4	8	5	6	7	2	7	2
Avery	1	1	5 <sup>e</sup>	7	8	8	8		7	3	7	9
Bob Dole	1	1	8	7	3	2	4	4	4	6	6	8
Butler's Gold	1	1		7	3		2	5		6		9
Byrd	2	2	5 <sup>e</sup>	7	8	8	8		7	3	7	9
Canvas	6	7	6 <sup>e</sup>	6	6	2	4		5			8
Duster	1	1	7	4	3	3	5	7	7	3	8	1
Everest	1	1	7	4	3	3	8	5	7	3	4	5
Gallagher	1	1	7	6	3	3	3	5	7	6	7	1
Green Hammer	2	1		5	3	2	5	4	5	7	8	5
Guardian	9	9	6 <sup>de</sup>	7	7	3	5					9
High Country	1	1	7	7	6	2	7	4	6	4	8	9
Jagalene	2	3	6	7	9	2	5	4	7	9	8	6
Jagger	2	4	5	7	9	3	5	3	4	7	7	8
KanMark	7 <sup>e</sup>	1	6	6	2	3	6	6	6	7	8	9
Karl/Karl 92	1	3	9	8	8	6	5	5	3	4	6	9
KS Ahearn	1	1	8	6	3	4	5	5	5	5	8	9
KS Bill Snyder	2	2	6		2	3	4	5			7	9
KS Dallas	6	8	6 <sup>d</sup>	5	3	2	6		8	7		7
KS Hamilton	1		6 <sup>d</sup>	6	5	3	7	7	7	8	7	1
KS Hatchett	1	1	9	6	3	2	7	6	6	8	8	2
KS Mako	2	2	5	7	5	1	5			8	7	9
KS Providence	1	1	7	5	3	4	5	5	4	5	6	9
KS Territory			6 <sup>d</sup>	6	4	3	7		6		5	2
KS Western Star	2	1	6 <sup>e</sup>	6	5	5	5	5	8	5	6	9
Langin	1	1	7 <sup>e</sup>		7	8	3	7	8	7	8	8
Larry	1	1	6	7	7	2	5	6	5	5	7	9
LCS Chrome	1	1	7	7	2	3	5	4	4	6	7	1
LCS Julep	1	1	7	5	7	4	7	6	6	8	6	2
LCS Mint	1	1	6	7	7	6	5	5	5	6	8	9
LCS Revere	1		6	7	7	7	3	7	3	8	6	8
LCS Valiant	1	1	8	5	6	7	6		6	8	6	1
Overley	1	4	5	5	8	2	4	5	5	7	9	8
Paradise	1	1	6	7	5	3	2		4		7	9
Rockstar	1	1	6	6	5	3	2	3	3	7	6	
Showdown	2	1	7	5	7	6	4	4	5	4	7	1
Smith's Gold	1	1	7	6	4	2	2		7	4	8	2
SY Monument	1	1	8	6	4	2	5	4	5	5	7	6
SY Rugged	1	1	7	7	5	2	2	7	7	7	7	8

**Appendix 1. Overall listing of disease and insect reactions.**

**Hard Red Winter Wheat<sup>a</sup>**

Variety	Spindle		Wheat	Barley	Leaf	Stem	Stripe	Septoria		Fusarium		
	Soilborne Mosaic	Streak Mosaic	Streak Complex*	Yellow Dwarf				Rust	Rust	Tritici Blotch	Tan Spot	Powdery Mildew
SY Wolf	2	1	6	6	2	2	6	3	3	5	7	7
SY Wolverine	1	1	7	5	4	2	6	3	3	2	7	
T158	2	2	5 <sup>e</sup>	6	8	8	3	7	7	4	8	9 <sup>c</sup>
TAM 111	8	8	7	7	8	3	8	6	6	6	7	8
TAM 112	8	8	5 <sup>e</sup>	7	8	3	8	5	6	1	8	9
TAM 114	8	8	7	6	4	7	3	6	7	5	7	5 <sup>c</sup>
Tatanka	1	1	7	5	6	2	2	7	7	7	7	9
Uncharted	1	1	9	2	5	1	6	4	5	3	7	8
WB4269	1	1	8	5	4	3	4		7	3	5	7
WB4401	2		7	5	4	2	3	4	5	3	5	4
WB4422	2	2	6		2	1	8	5	4	4	7	6
WB4458	1	1	6	6	7	1	4	7	5	7	9	9
WB4515	1	1	7	5	6	3	6	6	5		8	
WB4523	3	1	8		4	4	3		3	6		6
WB4595				4	4	2	5	6	6	6	6	8
WB4699	2		8	4	3	2	6	4	5	2	5	5
WB4792	9		6	4	2	2	6		7	7	9	4
WB-Grainfield	1	1	8	7	6	2	7	6	6	6	7	8 <sup>c</sup>
Whistler	2	1	7 <sup>e</sup>	7	7	2	6		5	3	7	8
Winterhawk	1	1	6	5	7	8	6	7	6	5	7	8
Zenda	1	1	7	5	3	2	6	4	5	4	4	5

**Hard White Winter Wheat<sup>a</sup>**

Variety	Spindle		Wheat	Barley	Leaf	Stem	Stripe	Septoria		Fusarium		
	Soilborne Mosaic	Streak Mosaic	Streak Complex*	Yellow Dwarf				Rust	Rust	Tritici Blotch	Tan Spot	Powdery Mildew
Antero	4	4	7	7	7	2	6		5		6	4 <sup>c</sup>
Aspen	1	1	7	6	6	3	3	4	5	2	6	6 <sup>c</sup>
Danby	7		6	8	8	2	5	6	8	7	7	9
Joe	8	8	6 <sup>d</sup>	6	2	1	3	3	3	4	6	
KS Big Bow			5	6	5	2	5		7		8	9
KS Silverado	2	2	5	7	3	4	5			7	7	1
KS Venada	7		7	5	3	2	4	4	5	4	4	5
Snowmass	6		5 <sup>d</sup>	7	6	2	7	7			6	9

*a* Rating codes are: 1 – Highly resistant; 3 – Moderately resistant; 5 – Intermediate; 7 – Moderately susceptible; 9 – Highly susceptible. Blanks indicate insufficient information.

*b* Hessian fly ratings are based on results of greenhouse tests with Kansas (Great Plains) biotype of Hessian fly. Hessian fly populations are often a mixture of biotypes thus results can vary among years and locations.

*c* Indicates resistance has been inconsistent in greenhouse testing.

*d* This variety carries a resistance gene that confers temperature sensitive resistance to wheat streak mosaic virus.

*e* This variety carries a resistance gene to the wheat curl mite (the mite that transmits wheat streak mosaic virus and other wheat viruses).

\* There are several viruses that make up the wheat streak mosaic virus complex including wheat streak mosaic virus, Triticum mosaic virus, and wheat mosaic virus (high plains). This rating represents the field reaction when one or more of these viruses are present.

**Appendix 2.** Overall listing of agronomic characteristics.

<b>Hard Red Winter Wheat<sup>a</sup></b>				
<b>Variety</b>	<b>Maturity</b>	<b>Height</b>	<b>Drought Tolerance</b>	<b>Straw Strength</b>
AG Icon	4	6	6	1
AM Cartwright	4	5	7	2
AP Bigfoot	5	5	6	
AP EverRock	4	4	7	3
AP Roadrunner	6	5	6	
AP Prolific	4	5	5	
Avery	6	7	4	5
Bob Dole	4	8	7	5
Butler's Gold	2	4	8	
Byrd	6	7	4	6
Canvas	5	4	5	2
Duster	6	5	6	7
Everest	3	4	7	2
Gallagher	5	5	6	5
Guardian	6	6	5	4
Green Hammer	4	7	5	1
High Country	5	4	6	
Jagalene	5	5	5	3
Jagger	2	5	5	7
KanMark	4	3	6	1
KS Ahearn	5	4	6	3
KS Bill Snyder	5	3	5	
KS Dallas	5	5	5	6
KS Hamilton	5	6	5	
KS Hatchett	3	5	6	7
KS Mako	4	4	5	
KS Providence	5	6	5	
KS Territory	6	6	4	
KS Western Star	6	7	5	3
Langin	4	4	4	7
Larry	5	6	6	3
LCS Chrome	8	7	5	3
LCS Julep	7	6	5	
LCS Mint	7	8	4	6
LCS Revere	3	4	6	
LCS Valiant	4	5	6	4
Overley	2	7	6	3
Paradise	4	5	5	5
Rockstar	6	5	5	2
Showdown	5	7	5	5
Smith's Gold	6	5	6	4
SY Monument	6	6	5	5
SY Rugged	4	4	6	5
SY Wolf	7	6	5	3
SY Wolverine	4	4	6	3
T158	3	4	4	4
TAM 111	6	7	5	3
TAM 112	4	7	4	7
TAM 114	5	6	5	3
TAM 204	6	5		1

<b>Hard Red Winter Wheat<sup>a</sup></b>				
<b>Variety</b>	<b>Maturity</b>	<b>Height</b>	<b>Drought Tolerance</b>	<b>Straw Strength</b>
Tatanka	6	6	6	7
Uncharted	6	6	4	
WB4269	4	4	5	3
WB4401	4	5	7	5
WB4422	5	6	5	3
WB4523	5	2	7	1
WB4595	5	6	6	1
WB4699	6	3	6	1
WB4792	6	6	5	2
WB-Grainfield	5	7	5	4
Winterhawk	5	7	4	3
Whistler	7	8	5	6
Zenda	4	5	7	3

<b>Hard White Winter Wheat<sup>a</sup></b>				
<b>Variety</b>	<b>Maturity</b>	<b>Height</b>	<b>Drought Tolerance</b>	<b>Straw Strength</b>
Antero	6	7	6	4
Aspen	2	2	7	1
Danby	7	7	5	6
KS Big Bow	3	7	5	
KS Silverado	5	5	5	1
KS Venada	6	3	5	5
Joe	7	8	4	4
Stardust	4	6		4

<b>Clearfield Wheat Varieties<sup>a</sup></b>				
<b>Variety</b>	<b>Maturity</b>	<b>Height</b>	<b>Drought Tolerance</b>	<b>Straw Strength</b>
AP503 CL2	5	5	5	3
Doublestop CL Plus	6	8	5	4
Oakley CL	7	7	5	6
Strad CL Plus	5	7	6	
SY 517 CL2	5	5	7	2
SY Achieve CL2	3	6	8	5

<b>CoAXium Technology<sup>a</sup></b>				
<b>Variety</b>	<b>Maturity</b>	<b>Height</b>	<b>Drought Tolerance</b>	<b>Straw Strength</b>
AP18 AX	4	6	7	
Kivari AX	5	6	6	
LCS Atomic AX	3	5	7	5
LCS Helix AX	5	6	6	7
LCS Photon AX	6	7	7	7
LCS Steel AX	8	7	5	
LCS Steel AX	8	7	5	

<sup>a</sup> Maturity: 1 = Early; 5 = Medium; 9 = Late  
 Height: 1 = Short; 5 = Medium; 9 = Tall  
 Drought tolerance: 1 = Excellent; 5 = Good; 9 = Poor  
 Straw strength: 1 = Excellent; 5 = Good; 9 = Poor  
 Blanks indicate insufficient information.  
 (W) White wheat variety

## Clearfield Technology

Clearfield technology is a non-genetically modified, herbicide-resistance technology for wheat and other crops developed by BASF. Varieties with this trait are resistant to Beyond (Imazamox) herbicide, which provides a broad spectrum of grass and broadleaf weed control. Beyond herbicide can help control winter annual grassy weeds, including downy brome, Japanese brome, cheat, and jointed goatgrass but provides only suppression of feral rye. Current Clearfield wheat varieties usually carry a two-gene resistance trait, meaning Beyond herbicide can be applied at the highest labeled rate in combination with methylated seed oil for improved weed control with a high degree of crop safety. Wheat varieties with Clearfield trait are certified seed only.

## CoAXium Technology

The CoAXium wheat production system is a non-genetically modified, herbicide-resistant technology developed by Colorado State University containing AXigen trait conferring resistance to Aggressor (quizalofop-p-ethyl) herbicide. Aggressor herbicide has good foliar activity on winter annual grassy weeds (including feral rye) and can help control ALS-resistant biotypes. CoAXium varieties are currently available from Colorado State University or from Limagrain Cereal Seeds. CoAXium varieties are certified seed only.

Western-adapted CoAXium varieties: Battle AX, Buckhorn AX, Crescent AX, Incline AX, LCS Fusion AX

Broader-adapted CoAXium varieties: AP18 AX, LCS Atomic AX, LCS Helix AX, LCS Photon AX, LCS Steel AX

### Herbicide Resistant Wheat Varieties<sup>a</sup>

Variety	Clearfield Technology			CoAXium Technology					Septoria				Fusarium	
	Soilborne Mosaic	Spindle Streak Mosaic	Wheat Streak Complex*	Barley Yellow Dwarf	Leaf Rust	Stem Rust	Stripe Rust	Septoria Tritici Blotch	Tan Spot	Powdery Mildew	Head Blight	Hessian Fly <sup>b</sup>		
Clearfield Technology														
AP503 CL2	2	5	6	7	8	2	5	4	7	7	7	6		
Byrd CL Plus	2	2	5	7	8	8	8		7	3	7			
Doublestop CL Plus	1	1	6	6	3	2	3	6	6	5	8	9		
Oakley CL	7	7	6 <sup>d</sup>	6	5	2	4	5	6	2	5	9		
Strad CL Plus	1	1	7	6	4	5	2	6	6	2	8	9		
SY 517 CL2	1		8	7	4	2	6	4	3	6	6			
SY Achieve CL2	1	1	7	7	5	2	5	7	6	5	7	9		
CoAXium Technology														
AP18 AX	6	6	7	5	8	3	3	4	4		8	6		
Kivari AX			6 <sup>e</sup>		8	8	8		8		8			
LCS Atomic AX	3	3	7	6	6	9	3			8				
LCS Helix AX	3	3	6	7	8	3	5			3				
LCS Photon AX	3	1	6	6	7	9	3	6	6	3				
LCS Steel AX	1	1		7	7	7	7			3	6	9		

- a Rating codes are: 1 – Highly resistant; 3 – Moderately resistant; 5 – Intermediate; 7 – Moderately susceptible; 9 – Highly susceptible. Blanks indicate insufficient information.
- b Hessian fly ratings are based on results of greenhouse tests with Kansas (Great Plains) biotype of Hessian fly. Hessian fly populations are often a mixture of biotypes thus results can vary among years and locations.
- c Indicates resistance has been inconsistent in greenhouse testing.
- d This variety carries a resistance gene that confers temperature sensitive resistance to wheat streak mosaic virus.
- e This variety carries a resistance gene to the wheat curl mite (the mite that transmits wheat streak mosaic virus and other wheat viruses).
- \* There are several viruses that make up the wheat streak mosaic virus complex including wheat streak mosaic virus, Triticum mosaic virus, and wheat mosaic virus (high plains). This rating represents the field reaction when one or more of these viruses are present.

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