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.

### 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.

#### 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 mosaic, 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.

It may be helpful to consider a disease resistance summary that combines the historical records of important diseases with the variety disease ratings (Table 2). Varieties with genetic resistance to historically important diseases are ranked 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.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Eastern and Central Kansas</th>
<th>Western Kansas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maturity</td>
<td>Medium or earlier</td>
<td>Medium-late or earlier</td>
</tr>
<tr>
<td>Height</td>
<td>Medium or shorter</td>
<td>Medium or taller</td>
</tr>
<tr>
<td>Drought tolerance</td>
<td>Moderately good or good</td>
<td>Good or excellent</td>
</tr>
<tr>
<td>Straw strength</td>
<td>Average or better</td>
<td>Average or better</td>
</tr>
<tr>
<td>Acid soil tolerance</td>
<td>Moderately tolerant or better</td>
<td>Generally not applicable</td>
</tr>
</tbody>
</table>

* 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.

<table>
<thead>
<tr>
<th>Disease Resistance Grouping</th>
<th>Eastern and Central</th>
<th>Western</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above Average: Varieties have moderate or high levels of genetic resistance to most diseases common in this region</td>
<td>AP Bigfoot, BobDole, Butler’s Gold, Doublestop CL Plus, Gallagher, Green Hammer, AG Icon, AM Cartwright, AP EverRock, AP Roadrunner, Everett</td>
<td>Canvas, Doublestop CL Plus, Guardian, Joe (W), AG Icon, AM Cartwright, AP EverRock, AP Roadrunner, Everett</td>
</tr>
<tr>
<td>Average: Varieties have moderate or high levels of genetic resistance to some of the diseases common in this region</td>
<td>APS03 CL2, LCS Mint, LCS Steel AX</td>
<td>AP Bigfoot, AP Roadrunner, Danby (W), KanMark, KS Big Bow (W)</td>
</tr>
<tr>
<td>Below average: Varieties are susceptible to many of the diseases common in this region</td>
<td>APS03 CL2, LCS Mint, LCS Steel AX</td>
<td>AP Bigfoot, AP Roadrunner, Danby (W), KanMark, KS Big Bow (W)</td>
</tr>
</tbody>
</table>

(W) = White wheat varieties
Avery

Fungal diseases

- Leaf rust
- Stem rust
- Stripe rust
- Septoria tritici blotch
- Tan spot
-Powdery mildew
- Fusarium head blight

Viral diseases

- Soilborne mosaic
- Spindle streak mosaic
- Wheat streak mosaic
- Barley yellow dwarf

Pedigree: Byrd and TAM 112
Adaptation: Western Kansas.

Strengths: Drought tolerance, intermediate resistance to wheat curl mite and greenbug. Good winterhardiness and milling and baking characteristics.

Weaknesses: Susceptible to all rust diseases, intermediate straw strength.

Comments: Slightly taller, later, and better yield potential than Byrd. Will likely need a fungicide to protect yield in years when rust diseases are a problem. Resistance to wheat curl mite could reduce the risk of severe wheat streak mosaic virus.
### Byrd

**Fungal diseases**
- Leaf rust
- Stem rust
- Stripe rust
- Septoria tritici blotch
- Tan spot
- Powdery mildew
- Fusarium head blight

**Agronomic characteristics**
- Maturity: Medium
- Height: Medium
- Drought: Average
- Straw strength: Great

**Pedigree:** TAM 112, CSU experimental lines, Ike, and Halt.

**Adaptation:** Western Kansas.

**Strengths:** Good drought tolerance, good yield potential, good milling and baking characteristics, intermediate resistance to wheat curl mite and wheat streak mosaic.

**Weaknesses:** Average test weight and straw strength. Susceptible to stripe rust, leaf rust, and stem rust.

**Comments:** Drought tolerance is key to the success of this variety. Highly susceptible to rust diseases. Foliar fungicides may be needed to maintain its yield potential. Smaller seed size than many varieties. May require adjustments in planting rate to avoid plant populations that are too high.

### Everest

**Fungal diseases**
- Leaf rust
- Stem rust
- Stripe rust
- Septoria tritici blotch
- Tan spot
- Powdery mildew
- Fusarium head blight

**Agronomic characteristics**
- Maturity: Medium
- Height: Medium
- Drought: Average
- Straw strength: Great

**Pedigree:** Pioneer experimental lines with the white wheat Betty.

**Adaptation:** Central and eastern Kansas.

**Strengths:** Resistance to Hessian fly, moderate resistance to barley yellow dwarf and Fusarium head blight, acid soil tolerance, excellent straw strength.

**Weaknesses:** Susceptible to stripe rust, poor milling and baking characteristics.

**Comments:** A medium to medium-short variety with early maturity. Fall tiller formation is important to ensure yield potential. Resistance to Fusarium head blight makes it a great option to follow corn in central and eastern Kansas.
**Gallagher**

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### Fungal diseases

- Leaf rust
- Stem rust
- Stripe rust
- Septoria tritici blotch
- Tan spot
- Powdery mildew
- Fusarium head blight

<table>
<thead>
<tr>
<th></th>
<th>R</th>
<th>MR</th>
<th>I</th>
<th>MS</th>
<th>S</th>
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</thead>
</table>

### Viral diseases

- Soilborne mosaic
- Spindle streak mosaic
- Wheat streak mosaic
- Barley yellow dwarf

<table>
<thead>
<tr>
<th></th>
<th>R</th>
<th>MR</th>
<th>I</th>
<th>MS</th>
<th>S</th>
</tr>
</thead>
</table>

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

---

### Agronomic characteristics

- Maturity: Medium (Early), Medium (Late)
- Height: Short (Early), Tall (Late)
- Drought: Great (Early), Poor (Late)
- Straw strength: Great (Early), Poor (Late)

---

**Pedigree:** Duster and OSU experimental with Pioneer 2180.

**Adaptation:** South central Kansas.

**Strengths:** Yield potential, Hessian fly tolerance, acid soil tolerance, excellent grazing potential, good drought tolerance.

**Weaknesses:** Possible physiological leaf spot in some environments, moderately susceptible to Fusarium head blight.

**Comments:** Probably best adapted to southern Kansas. A good option for grazing, but it reaches first hollow stem earlier than Duster, leaving less time for grazing in the spring. Moderate levels of stripe rust resistance have helped this variety maintain its yield potential.

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**KS Ahearn**

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### Fungal diseases

- Leaf rust
- Stem rust
- Stripe rust
- Septoria tritici blotch
- Tan spot
- Powdery mildew
- Fusarium head blight

<table>
<thead>
<tr>
<th></th>
<th>R</th>
<th>MR</th>
<th>I</th>
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</thead>
</table>

### Viral diseases

- Soilborne mosaic
- Spindle streak mosaic
- Wheat streak mosaic
- Barley yellow dwarf

<table>
<thead>
<tr>
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<th>MR</th>
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</tr>
</thead>
</table>

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

---

### Agronomic characteristics

- Maturity: Medium (Early), Medium (Late)
- Height: Short (Early), Tall (Late)
- Drought: Great (Early), Poor (Late)
- Straw strength: Great (Early), Poor (Late)

---

**Pedigree:** KS040477K-12/Gallagher.

**Adaptation:** Central Kansas corridor.

**Strengths:** Excellent straw strength, high yield potential, very good grazing potential, good resistance to leaf rust and intermediate resistance to stripe rust

**Weaknesses:** Intermediate on acid soils, average grain quality, susceptible to scab, susceptible to wheat streak mosaic virus.

**Comments:** KS Ahearn is a strong choice in south central Kansas, particularly in grazing systems. Yield performance has been strong across years and locations. It carries the 1B.1R translocation from Gallagher, which can improve drought tolerance and bring some disease resistance.
### KS Dallas

**Fungal diseases**
- R S MS IMR R S MS IMR
  - Leaf rust
  - Stem rust
  - Stripe rust
  - Septoria tritici blotch
  - Tan spot
  - Powdery mildew
  - Fusarium head blight

**Viral diseases**
- R S MS IMR R S MS IMR
  - Soilborne mosaic
  - Spindle streak mosaic
  - Wheat streak mosaic
  - Barley yellow dwarf

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

**Adaptation**: Western Kansas.

**Strengths**: Good yield potential, drought tolerance, wheat streak mosaic 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**
- R S MS IMR R S MS IMR
  - Leaf rust
  - Stem rust
  - Stripe rust
  - Septoria tritici blotch
  - Tan spot
  - Powdery mildew
  - Fusarium head blight

**Viral diseases**
- R S MS IMR R S MS IMR
  - Soilborne mosaic
  - Spindle streak mosaic
  - Wheat streak mosaic
  - Barley yellow dwarf

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

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

**Strengths**: High yield potential, good tillering potential; and good wheat streak mosaic virus, 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 resistance up to 70°F. This variety is medium maturity with acceptable milling and baking qualities.
KS Hatchett

Fungal diseases
- Leaf rust
- Stem rust
- Stripe rust
- Septoria tritici blotch
- Tan spot
- Powdery mildew
- Fusarium head blight

Viral diseases
- Soilborne mosaic
- Spindle streak mosaic
- Wheat streak mosaic
- Barley yellow dwarf

Agronomic characteristics

Pedigree: Duster, Overley, CYMMIT spring wheat.

Adaptation: Central Kansas corridor.

Strengths: Great yield potential, high stability of performance, strong leaf rust package, excellent tillering capacity, moderate tolerance to acid soils, Hessian fly and soilborne mosaic virus resistance.

Weaknesses: Susceptible to Fusarium head blight, stripe rust, and wheat streak mosaic. Below average straw strength.

Comments: An early maturing variety, with high tillering ability makes KS Hatchett a candidate to follow soybeans where late sowing results in fewer tillers. Maturity makes it more appropriate for south central Kansas, it performed well in the central corridor. Very good resistance to leaf and stem rusts and good test weight.

KS Providence

Fungal diseases
- Leaf rust
- Stem rust
- Stripe rust
- Septoria tritici blotch
- Tan spot
- Powdery mildew
- Fusarium head blight

Viral diseases
- Soilborne mosaic
- Spindle streak mosaic
- Wheat streak mosaic
- Barley yellow dwarf

Agronomic characteristics

Pedigree: Karl 92 and 37% CYMMIT spring wheat.

Adaptation: Central and parts of western Kansas.


Weaknesses: Intermediate response to acid soils and to stripe rust. Below average, but acceptable quality.

Comments: Medium maturity, medium height variety carrying the 1B.1R translocation, which provides above average drought tolerance and expands its area of adaptation through parts of western Kansas. Intermediate stripe rust resistance can help to delay fungicide applications for a one-shot scab-targeted fungicide application at flowering.
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).


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.

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 mosaic virus 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.
**Langin**

**Fungal diseases**
- Leaf rust
- Stem rust
- Stripe rust
- Septoria tritici blotch
- Tan spot
- Powdery mildew
- Fusarium head blight

**Agronomic characteristics**

<table>
<thead>
<tr>
<th>Maturity</th>
<th>Height</th>
<th>Drought</th>
<th>Straw strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early</td>
<td>Medium</td>
<td>Great</td>
<td>Poor</td>
</tr>
<tr>
<td>Late</td>
<td>Medium</td>
<td>Poor</td>
<td>Poor</td>
</tr>
</tbody>
</table>

**Viral diseases**
- Soilborne mosaic
- Spindle streak mosaic
- Wheat streak mosaic
- Barley yellow dwarf

**Pedigree:** Byrd and a University of Colorado experimental line containing Hatcher.

**Adaptation:** Western Kansas.

**Strengths:** Drought tolerance, stripe rust resistance, and partial resistance to wheat curl mites. Good milling and baking characteristics.

**Weaknesses:** Susceptible to leaf rust and stem rust.

**Comments:** Early maturing variety with above-average drought tolerance and a good yield record in western Kansas. Langin has better stripe rust resistance than Byrd or Avery, but it is vulnerable to leaf rust and stem rust. Resistance to wheat curl mite could help slow the spread of wheat streak mosaic.

**LCS Revere**

**Fungal diseases**
- Leaf rust
- Stem rust
- Stripe rust
- Septoria tritici blotch
- Tan spot
- Powdery mildew
- Fusarium head blight

**Agronomic characteristics**

<table>
<thead>
<tr>
<th>Maturity</th>
<th>Height</th>
<th>Drought</th>
<th>Straw strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early</td>
<td>Medium</td>
<td>Great</td>
<td>Poor</td>
</tr>
<tr>
<td>Late</td>
<td>Medium</td>
<td>Poor</td>
<td>Poor</td>
</tr>
</tbody>
</table>

**Viral diseases**
- Soilborne mosaic
- Spindle streak mosaic
- Wheat streak mosaic
- Barley yellow dwarf

**Pedigree:** T158 progeny.

**Adaptation:** Central and western Kansas.

**Strengths:** Early emergence with high tillering potential, above average stripe rust resistance, moderately susceptible to scab, soil-borne mosaic resistance.

**Weaknesses:** Weak on leaf rust. Acceptable milling and baking qualities.

**Comments:** A medium-short variety with agronomics similar to T158 with a broader adaptation due to improved acid soil tolerance. Certified seed only (CSO).
**Rockstar**

**Fungal diseases**

- Leaf rust
- Stem rust
- Stripe rust
- Septoria tritici blotch
- Tan spot
- Powdery mildew
- Fusarium head blight

**Agronomic characteristics**

- Maturity: Average
- Height: Average
- Drought: Poor
- Straw strength: Poor

**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**

- Leaf rust
- Stem rust
- Stripe rust
- Septoria tritici blotch
- Tan spot
- Powdery mildew
- Fusarium head blight

**Agronomic characteristics**

- Maturity: Medium
- Height: Short
- Drought: Great
- Straw strength: Medium

**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
- - - ♦ - - - - Leaf rust
- ♦ - - - - - - Stem rust
- ♦ - - - - - - Stripe rust
- - - - ♦ - - - Septoria tritici blotch
- - - - ♦ - - - Tan spot
- - - - ♦ - - - Powdery mildew
- - - - ♦ - - - Fusarium head blight

Viral diseases
- - - - - - - Soilborne mosaic
- - - - - - - Spindle streak mosaic
- - - - - - - Wheat streak mosaic
- - - - ♦ - - - Barley yellow dwarf

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
- - - ♦ - - - - Leaf rust
- ♦ - - - - - - Stem rust
- - - - ♦ - - - Stripe rust
- - - - ♦ - - - Septoria tritici blotch
- - - - - - - Tan spot
- - - - ♦ - - - Powdery mildew
- - - - ♦ - - - Fusarium head blight

Viral diseases
- - - - - - - Soilborne mosaic
- - - - - - - Spindle streak mosaic
- - - - - - - Wheat streak mosaic
- - - - ♦ - - - Barley yellow dwarf

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**
- Leaf rust
- Stem rust
- Stripe rust
- Septoria tritici blotch
- Tan spot
- Powdery mildew
- Fusarium head blight

**Agronomic characteristics**

<table>
<thead>
<tr>
<th>Maturity</th>
<th>Height</th>
<th>Drought</th>
<th>Straw strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium</td>
<td>Medium</td>
<td>Average</td>
<td>Average</td>
</tr>
</tbody>
</table>

**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, moderate susceptibility to wheat streak mosaic virus.

**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**
- Leaf rust
- Stem rust
- Stripe rust
- Septoria tritici blotch
- Tan spot
- Powdery mildew
- Fusarium head blight

**Agronomic characteristics**

<table>
<thead>
<tr>
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<th>Height</th>
<th>Drought</th>
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<tbody>
<tr>
<td>Medium</td>
<td>Medium</td>
<td>Average</td>
<td>Average</td>
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</table>

**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

<table>
<thead>
<tr>
<th>Fungal diseases</th>
<th>Agronomic characteristics</th>
</tr>
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<tbody>
<tr>
<td>- - - - - - - - - - - - - - - - - - - - - - - - - - - -</td>
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</tr>
<tr>
<td>• Leaf rust</td>
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<td>• Stem rust</td>
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<tr>
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<td>• Tan spot</td>
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<tr>
<td>• Powdery mildew</td>
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<tr>
<td>• Fusarium head blight</td>
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<tr>
<td>R MR I MS S</td>
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</table>

**Fungal diseases**

- Leaf rust
- Stem rust
- Stripe rust
- Septoria tritici blotch
- Tan spot
- Powdery mildew
- Fusarium head blight

**Viral diseases**

- Soilborne mosaic
- Spindle streak mosaic
- Wheat streak mosaic
- Barley yellow dwarf

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

### TAM 114

<table>
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</table>

**Fungal diseases**

- Leaf rust
- Stem rust
- Stripe rust
- Septoria tritici blotch
- Tan spot
- Powdery mildew
- Fusarium head blight

**Viral diseases**

- Soilborne mosaic
- Spindle streak mosaic
- Wheat streak mosaic
- Barley yellow dwarf

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

**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 mosaic.

**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.

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**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 mosaic 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.
WB4269

Fungal diseases
- - ♦ - - - - - - Leaf rust
- ♦ - - - - - - - - Stem rust
- - ♦ - - - - - - Stripe rust
- - - ♦ - - - - Septoria tritici blotch
- - - - ♦ - - - Tan spot
- - - - - ♦ - - Powdery mildew
- - - - - - ♦ - Fusarium head blight

Viral diseases
♦ - - - - - - - Soilborne mosaic
♦ - - - - - - - Spindle streak mosaic
♦ - - ♦ - - - - Wheat streak mosaic
♦ - - - ♦ - - - Barley yellow dwarf

Pedigree: NA.
Adaptation: Central and eastern Kansas.
Strengths: Improved Fusarium head blight resistance, good yield potential, excellent straw strength, good leaf rust and stripe rust resistance.
Weaknesses: Susceptible to wheat streak mosaic virus.
Comments: Above average yield record in central and eastern Kansas. A good early-maturing option to be planted after corn because of its intermediate resistance to Fusarium head blight. It is a certified seed only (CSO) variety.

WB4699

Fungal diseases
- ♦ - - - - - - Leaf rust
- - ♦ - - - - - - Stem rust
- - ♦ - - - - - - Stripe rust
- - - ♦ - - - - Septoria tritici blotch
- - - ♦ - - - - Tan spot
- - - - ♦ - - - Powdery mildew
- - - - ♦ - - - Fusarium head blight

Viral diseases
- ♦ - - - - - - Soilborne mosaic
- - - - - - - Spindle streak mosaic
- - - - ♦ - - - Wheat streak mosaic
- - - - ♦ - - - Barley yellow dwarf

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**
-  ♦  ♦  ♦  ♦  ♦  ♦  Leaf rust
-  ♦  ♦  ♦  ♦  ♦  ♦  Stem rust
-  ♦  ♦  ♦  ♦  ♦  ♦  Stripe rust
-  ♦  ♦  ♦  ♦  ♦  ♦  Septoria tritici blotch
-  ♦  ♦  ♦  ♦  ♦  ♦  Tan spot
-  ♦  ♦  ♦  ♦  ♦  ♦  Powdery mildew
-  ♦  ♦  ♦  ♦  ♦  ♦  Fusarium head blight

**Agronomic characteristics**
-  ♦  ♦  ♦  ♦  ♦  ♦  Maturity: Medium
-  ♦  ♦  ♦  ♦  ♦  ♦  Height: Medium
-  ♦  ♦  ♦  ♦  ♦  ♦  Drought: Average
-  ♦  ♦  ♦  ♦  ♦  ♦  Straw strength: Average

**Pedigree:** NA.

**Adaptation:** Western Kansas.

**Strengths:** Very good drought tolerance, excellent standability, excellent yield record, resistance to wheat streak mosaic virus.

**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.

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WB-Grainfield

**Fungal diseases**
-  ♦  ♦  ♦  ♦  ♦  ♦  ♦  Leaf rust
-  ♦  ♦  ♦  ♦  ♦  ♦  Stem rust
-  ♦  ♦  ♦  ♦  ♦  ♦  Stripe rust
-  ♦  ♦  ♦  ♦  ♦  ♦  Septoria tritici blotch
-  ♦  ♦  ♦  ♦  ♦  ♦  Tan spot
-  ♦  ♦  ♦  ♦  ♦  ♦  Powdery mildew
-  ♦  ♦  ♦  ♦  ♦  ♦  Fusarium head blight

**Agronomic characteristics**
-  ♦  ♦  ♦  ♦  ♦  ♦  Maturity: Medium
-  ♦  ♦  ♦  ♦  ♦  ♦  Height: Medium
-  ♦  ♦  ♦  ♦  ♦  ♦  Drought: Average
-  ♦  ♦  ♦  ♦  ♦  ♦  Straw strength: Average

**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 mosaic.

**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**
- - - - - - - Leaf rust
- - - - - - - Stem rust
- - - - - - - Stripe rust
- - - - - - - Septoria tritici blotch
- - - - - - - Tan spot
- - - - - - - Powdery mildew
- - - - - - - Fusarium head blight

**Viral diseases**
- - - - - - - Soilborne mosaic
- - - - - - - Spindle streak mosaic
- - - - - - - Wheat streak mosaic
- - - - - - - Barley yellow dwarf

<table>
<thead>
<tr>
<th>R</th>
<th>MR</th>
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</table>
**Agronomic characteristics**

**Pedigree:** Overley 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**
- - - - - - - Leaf rust
- - - - - - - Stem rust
- - - - - - - Stripe rust
- - - - - - - Septoria tritici blotch
- - - - - - - Tan spot
- - - - - - - Powdery mildew
- - - - - - - Fusarium head blight

**Viral diseases**
- - - - - - - Soilborne mosaic
- - - - - - - Spindle streak mosaic
- - - - - - - Wheat streak mosaic
- - - - - - - Barley yellow dwarf

| R | MR | I | MS | S |
**Agronomic characteristics**

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

**Adaptation:** Western Kansas.

**Strengths:** Excellent yield potential, resistance to wheat streak mosaic, stripe rust, 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 have been an asset in recent years. Resistance to wheat streak mosaic 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.

<table>
<thead>
<tr>
<th>Variety</th>
<th>Soilborne Mosaic</th>
<th>Spindle Streak Mosaic</th>
<th>Wheat Streak Mosaic</th>
<th>Barley Yellow Dwarf</th>
<th>Leaf Rust</th>
<th>Stem Rust</th>
<th>Stripe Rust</th>
<th>Septoria Tritici Blotch</th>
<th>Tan Spot</th>
<th>Powdery Mildew</th>
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## Appendix 1. Overall listing of disease and insect reactions.

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*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).

### Hard White Winter Wheat

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## Appendix 2. Overall listing of agronomic characteristics.

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### Clearfield Wheat Varieties

<table>
<thead>
<tr>
<th>Variety</th>
<th>Maturity</th>
<th>Height</th>
<th>Drought Tolerance</th>
<th>Straw Strength</th>
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<td>Antero</td>
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<td>Danby</td>
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### CoAXium Technology

<table>
<thead>
<tr>
<th>Variety</th>
<th>Maturity</th>
<th>Height</th>
<th>Drought Tolerance</th>
<th>Straw Strength</th>
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<td>AP18 AX</td>
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<td>LCS Steel AX</td>
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</table>

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* 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

<table>
<thead>
<tr>
<th>Variety</th>
<th>Clearfield Technology</th>
<th>CoAXium Technology</th>
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**Herbicide Resistant Wheat Varieties**

<table>
<thead>
<tr>
<th>Variety</th>
<th>Soilborne Mosaic</th>
<th>Spindle Mosaic</th>
<th>Wheat Streak Mosaic</th>
<th>Barley Yellow Dwarf</th>
<th>Leaf Rust</th>
<th>Stem Rust</th>
<th>Stripe Rust</th>
<th>Septoria Tritici Blotch</th>
<th>Tan Spot</th>
<th>Powdery Mildew</th>
<th>Fusarium Head Blight</th>
<th>Hessian Fly</th>
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<tbody>
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*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).