

Resistance to Pests. KS Silverado has resistance to wheat streak mosaic virus, leaf rust, Hessian fly, and soilborne mosaic virus. It is moderately resistant to stem rust and wheat blast. It has intermediate resistance to *Triticum* mosaic virus. It is moderately susceptible to head scab, barley yellow dwarf virus, and powdery mildew. With the appearance of a new race of stripe rust in 2019, it lost its intermediate resistance to stripe rust and became moderately susceptible. A summary of pest resistance for KS Silverado is presented in Table 1.

Area of Adaptation. KS Silverado had very competitive yield in central Kansas (Table 2). Along with its good straw strength and preharvest sprouting tolerance, it can adapt well in central Kansas; however, it is not recommended to be planted it after corn due to its susceptibility to head scab. KS Silverado also had very competitive yield under irrigation in western Kansas (Table 3). It will be a good variety for irrigated fields. Although KS Silverado yielded 2 to 3 bushels less than Joe in most years under dryland production in western Kansas (Table 3), it will be a good complementary white variety for dryland production in western Kansas when considering its features that Joe does not have, including good baking qualities, preharvest sprouting tolerance, good straw strength, and early maturity. It is expected that KS Silverado will have a broad adaptation in Kansas and its neighboring states. Due to the lack of stripe rust resistance, fungicide application is recommended.

Milling and Baking Characteristics. KS Silverado has good test weight, and good milling and baking qualities. It has good baking quality for both white and whole flour. In general, its grain protein content is similar to Joe. Its flour extraction rate is over three percentage points more than Joe. KS Silverado has better mixing tolerance and higher water absorption than Joe in white flour baking tests.

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KS Silverado
Hard White
Winter Wheat

KS Silverado is a hard white winter wheat variety developed and released by the Kansas Agricultural Experiment Station in 2019. Foundation seeds were distributed to Kansas registered seed producers in 2019. Registered/certified seeds have been available since the fall of 2020.

Origin and Development. KS Silverado was selected from a top cross of KS05HW122-5-2//KS05HW15-2-2/KS06HW46-3 through a modified bulk breeding method. In its pedigree, all three parental lines are hard white breeding lines developed by the K-State wheat breeding program at Hays. The cross was made in 2008 and its F₁ was planted in the 2009 crop year. The F₂ and F₃ populations were grown in the field in 2010 and 2011. Individual heads were selected from the F₃ generation and planted as head rows at the F₄ generation in 2012. Superior head rows were advanced to an unreplicated yield trial in 2013, and one of them became KS Silverado. KS Silverado has been tested in replicated yield trials since 2015. KS Silverado was tested in the Kansas Intrastate Nursery in 2016, 2017, 2018 and 2019. In 2018 and 2019, KS Silverado was tested in the Kansas Winter Wheat Performance Test with its experimental line name of KS14HW106-6-6. KS Silverado was released in August 2019. The development of KS Silverado was supported by the Kansas Wheat Commission and Kansas Wheat Alliance.

Agronomic Characteristics. KS Silverado is an awned, white-glumed, hard white-seeded winter wheat. It has medium early maturity with a heading date similar to T158 and about four days earlier than Joe. It is medium short, which is similar to T158 and 4 to 5 inches shorter than Joe. Its straw strength is good, which is similar to SY Monument. KS Silverado has good winter-hardiness and its coleoptile length is medium short. It has moderate tolerance to grain shattering, which is similar to Joe. It has intermediate tolerance to acid soil. It has good tolerance to preharvest sprouting, which is similar to Danby. Ratings for agronomic characteristics of KS Silverado and other varieties are given in Table 1.

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Table 2. Yield (bushel) summary for KS Silverado and check varieties in Kansas Intrastate Nursery in central Kansas.

Entry	Class	2017	2018	2019	3 Year Avg
Larry	HRW	78.4	57.6	55.5	64.1
KS Silverado	HWW	79.8	56.3	57.3	63.8
SY Monument	HRW	79.3	54.1	58.5	62.3
Joe	HRW	76.6	54.0	62.5	61.6
Zenda	HRW	81.3	50.9	57.5	60.8
Gallagher	HRW	82.6	50.0	59.9	60.8
KS Venada	HWW	73.9	52.8	57.6	59.7
WB4458	HRW	74.0	53.0	45.5	59.2
Trial Mean		78.3	51.3	58.3	60.2
Locations		6	12	1	19

Table 3. Yield (bushel) summary for KS Silverado and check varieties in Kansas Intrastate Nursery in western Kansas.

Entry	Class	2016 Dryland	2017 Dryland	2018 Dryland	2019 Dryland	4 Year Dryland Avg	Irrigated Avg*
Joe	HWW	93.8	101.2	56.1	102.5	84.7	119.6
Tatanka	HRW	92.9	97.2	57.8	89.8	82.3	126.3
KS Silverado	HWW	90.8	98.3	54.4	82.8	79.8	130.2
WB-Grainfield	HRW	88.4	97.1	48.8	82.1	76.9	119.1
Danby	HWW	80.6	90.3	58.0	86.1	76.4	117.9
SY Monument	HRW	86.8	85.3	50.0	89.1	75.1	113.5
Trial Mean		84.5	91.8	52.6	87.5	76.4	122.0
Locations		7	5	7	3	22	3

*Irrigation tests were conducted in 2016 and 2019 at Colby, KS, and 2017 at Garden City, KS.

Table 1. Agronomic and pest resistance characteristics for KS Silverado and other varieties.

Variety	Class ¹	Coleoptile length	Winter hardiness	Maturity	Lodging resistance	Grain shattering	Sprouting tolerance	Test weight	Acid soil	SBMV ³	WSMV ⁴	BYDV ⁵	Stripe rust	Leaf rust	Stem rust	Head scab	Powdery mildew	Hessian fly
KS Silverado	HRW	6 ²	3	1	2	4	3	3	5	1	3	7	7	2	3	7	7	1
Tatanka	HRW	5	2	5	6	1	2	3	3	1	7	5	3	6	2	7	7	9
WB-Grainfield	HRW	5	1	5	3	3	--	5	3	1	8	7	7	6	2	7	6	8
SY Monument	HRW	3	1	7	2	2	--	6	2	1	7	6	7	4	2	7	5	6
T158	HRW	5	1	1	5	2	--	4	7	2	5	6	2	8	8	7	4	9
Byrd	HRW	3	2	6	4	2	3	4	3	2	5	7	8	8	8	7	--	9
Joe	HWW	7	3	7	4	4	7	3	7	8	3	6	3	2	1	6	4	9
Danby	HWW	5	3	7	4	1	3	2	7	7	5	8	5	8	2	7	7	9

¹HRW: hard red winter; HWW: hard white winter

²Ratings are based on 1-9 scale where 1=longest, most resistance or the best and 9=shortest, most susceptible or poorest, except for maturity where 1=earliest and 9=latest.

³SBMV – Soilborne mosaic virus

⁴WSMV – Wheat streak mosaic virus

⁵BYDV – Barley yellow dwarf virus

-- Not rated.