Agronomic Characteristics. Joe is an awned, tan chaffed, hard, white-seeded winter wheat variety. It is medium late in maturity, heading about one or two days earlier than Danby. It is medium tall in height and has good straw strength. Joe has good winter-hardiness and its coleoptile length is medium. It has good tolerance to grain shattering. Joe is moderately susceptible to preharvest sprouting and susceptible to acid soil. Ratings for agronomic characteristics of Joe and other varieties are given in Table 1.

Resistance to Pests. Joe is resistant to the currently prevalent races of leaf, stripe, and stem rusts in the Great Plains. It also has wheat streak mosaic virus resistance with the *Wsm2* gene. Joe is moderately resistant to powdery mildew, intermediate to barley yellow dwarf virus and *Fusarium* head blight (head scab), and moderately susceptible to soilborne mosaic virus. Joe is susceptible to Hessian fly, greenbug, and Russian wheat aphid. A summary of pest resistance for Joe is presented in Table 1.

Area of Adaptation. Joe has performed well across Kansas and eastern Colorado in last three years, with its strongest performance under dryland and irrigated production in western Kansas (Table 2). Joe exhibited good dryland drought tolerance during the drought years 2013 and 2014. It is expected that Joe is well adapted to western Kansas and eastern Colorado; however, Joe is not recommended for central and eastern Kansas due to its susceptible reactions to preharvest sprouting, acid soil, and soilborne mosaic virus.

Milling and Baking Characteristics. Joe has an average test weight and acceptable to good milling and baking quality. In general, its grain protein content is about 13 percent, which is about half of a percent less than Danby. The flour extraction rate and loaf volume of Joe are similar to those of Danby. Joe has longer mixing time and better mixing tolerance than Danby; however, Joe has lower baking absorption than Danby.

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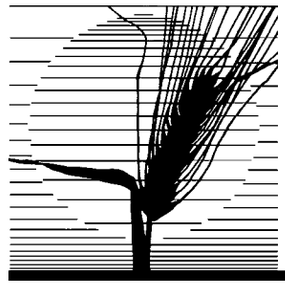

K-STATE
Research and Extension

Joe Hard White Winter Wheat

Joe is a new, hard white winter wheat variety developed and released by the Kansas Agricultural Experiment Station. Foundation seed was distributed to Kansas registered seed producers in 2015. Foundation, registered, and certified seed will be available in the fall of 2016. Joe is named after one of K-State's retired wheat breeders, Joe Martin, who contributed greatly to hard white winter wheat development.

Origin and Development. Joe is selected from the two-way cross of KS04HW101-3/KS04HW119-3 through a modified bulk breeding method. Both parental lines KS04HW101-3 and KS04HW119-3 are hard white experimental lines developed by the K-State wheat breeding program at Hays. The pedigree of KS04HW101-3 includes Jagger, Arlin, and KS92WGRC15. Jagger and Arlin are hard red winter wheat varieties released by the Kansas Agricultural Experiment Station. KS92WGRC15 is a hard red winter germplasm line released by the K-State Wheat Genetics Resource Center as a source of resistance to leaf rust. The pedigree of KS04HW119-3 includes Trego*2/CO960293. Trego is a hard white winter wheat variety with preharvest sprouting tolerance released by the Kansas Agricultural Experiment Station. CO960293 is a hard red winter experimental line with wheat streak mosaic virus resistance developed by Colorado State University. The cross of KS04HW101-3/KS04HW119-3 was made in the fall of 2005 and its F_1 was planted in the spring of 2006 in the greenhouse. The F_2 and F_3 populations were grown in the field at

Hays, KS, in 2007 and 2008, respectively. The F_4 head rows were grown in the field at Hays, KS, in 2009. Joe has been tested in yield trials since 2010. Joe was tested under the experimental designation of KS11HW39 or its reselections (KS11HW39-5, KS11HW39-5-4) in replicated yield trials since 2012. Joe was tested in the Kansas Intrastate Nursery in 2013, 2014, and 2015. In 2015, Joe was tested in both the Kansas Winter Wheat Performance Tests and the Colorado State University Uniform Variety Performance Test. Joe was also entered in the 2014 and 2015 Southern Region Performance Nursery. KS11HW39-5-4 was released as Joe in September 2015. The development of Joe was partially supported by the Kansas Wheat Commission and Kansas Wheat Alliance.

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Table 2. *Yield (bu/a) summary for Joe and selected check varieties in Kansas Intrastate Nursery locations in western Kansas.*

Entry	Class	2013 Dryland	2014 Dryland	2015 Dryland	3-Year Dryland Avg	Irrigated Avg*
Joe	HWW	49.8	64.9	76.3	63.7	103.7
Clara CL	HWW	50.0	54.9	65.9	56.9	84.2
Danby	HWW	45.8	57.3	61.6	54.9	87.4
TAM 111	HRW	42.4	55.4	46.3	48.0	81.5
Trial Mean		41.7	56.7	57.6	51.8	84.1
Locations		6	4	7	17	3

*Irrigation tests were conducted in 2013, 2014, at 2015 at Colby, KS.

Table 1. *Agronomic and pest resistance characteristics for Joe and other varieties.*

Variety	Class[1]	Coleoptile length	Winter hardiness	Maturity	Lodging resistance	Grain shattering	Sprouting tolerance	Test weight	SBMV[3]	WSMV[4]	BYDV[5]	Stripe[6] rust	Leaf rust	Stem rust	Head scab	Tan spot	Powdery mildew	Hessian fly
Joe	HWW	5[2]	3	7	3	2	7	4	8	2	5	2	2	2	6	--	4	9
Danby	HWW	5	3	8	4	2	3	2	7	5	8	5	8	2	7	8	7	9
Clara CL	HWW	5	3	7	3	2	4	3	4	2	7	8	2	2	5	7	--	4
Tiger	HWW	5	4	8	4	3	9	4	2	6	7	9	2	3	8	7	5	2
Antero	HWW	5	3	6	3	2	5	4	4	8	7	3	7	2	--	5	--	6
Byrd	HRW	3	2	6	3	2	--	4	2	7	7	8	7	8	7	7	--	9
TAM 111	HRW	3	5	8	3	2	2	3	8	7	7	8	8	3	7	6	6	5

[1]HRW: hard red winter; HWW: hard white winter
[2]Ratings are based on 1-9 scale where 1=most resistance or the best and 9=most susceptible or poorest, except for maturity where 1=earliest and 9=latest and coleoptile length where 1=longest and 9 = shortest.
[3]SBMV – Soilborne mosaic virus.
[4]WSMV – Wheat streak mosaic virus.
[5]BYDV – Barley yellow dwarf virus.
[6]Stripe rust ratings are based on reactions to the 2010 and 2012 races.
-- Not rated.