

Table 3. Test weight (lbs/bu) of Fuller and Jagger in K-State breeding nurseries.

	2002	2003	2004	2005	2006
Fuller	60.4	62.6	58.7	60.5	58.8
Jagger	58.2	59.4	56.7	59.6	58.1

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Fuller Hard Red Wheat

Fuller is a new hard red winter wheat variety developed cooperatively by the Kansas Agricultural Experiment Station and the Agricultural Research Service, United States Department of Agriculture. Foundation seed of Fuller was distributed to Kansas registered seed growers for fall planting in 2006. Foundation and registered seed will be available for fall planting in 2007. Fuller is named for Herbert Fuller Roberts, a professor of botany who first began selection for improved varieties of hard winter wheat in Kansas in 1906. One of those selections became 'Kanred', the first improved wheat variety released by K-State. The name was chosen in honor of the Centennial Celebration of the Department of Agronomy at Kansas State University.

Origin and development. Fuller is a hard red winter wheat selected from a population with an unknown pedigree. It is highly likely that the pedigree includes Jagger and experimental lines from USDA-ARS with leaf rust resistance genes transferred from wild relatives of wheat. F2 seed was planted in the field for the 1997 crop year at Manhattan, Kan. The population was advanced as a bulk to the F4 generation, which was grown at Manhattan, Kan., in 1999. Individual spikes were pulled from the F4 population and grown as head rows during the 2000 crop year. KS00F5-14-7 was selected as a head row in 2000. In 2001, KS00F5-14-7 was entered in the "short-row" yield trial, nonreplicated test grown at Manhattan and Hutchinson, Kan. Based on performance, it

was advanced to the Preliminary Yield Trials at Hutchinson and Manhattan in 2002. In 2003, KS00F5-14-7 was tested in the Advanced Yield Trials at six sites across Kansas and was advanced to the Kansas Intrastate Nursery, an elite test grown at 17 locations in Kansas in 2004, 2005, and 2006. This line was also tested in the Southern Regional Performance Nursery in 2006 and was released as 'Fuller' by the Kansas State University Agricultural Experiment Station in July 2006. Financial grants from the Kansas Wheat Commission and the Kansas Crop Improvement Association provided partial support for the development of Fuller.

Agronomic characteristics. Fuller is a bronze-chaffed, semi-dwarf hard winter wheat, most closely resembling Jagger. It is medium in height with average straw strength and excellent yield potential (Table 1). Fuller is early maturing, heading a day later than Jagger with test weight patterns superior to Jagger. Fuller has fair to good winterhardiness and a medium-long coleoptile. Fuller is also more tolerant to shattering than Jagger.

Resistance to pests. Fuller has been highly resistant to leaf rust and stripe rust throughout its testing. Fuller is resistant to soil-borne mosaic virus and spindle streak mosaic virus. It

is also moderately resistant to stem rust, speckled leaf blotch, and tan spot and moderately tolerant to wheat streak mosaic virus. Fuller is moderately susceptible to powdery mildew and low pH soils and is susceptible to Fusarium head blight, greenbug, Russian wheat aphid, and Hessian fly.

Area of adaptation. Fuller has performed well across Kansas. Its speckled leaf blotch and tan spot resistance make it suitable for continuous wheat production. The improved tolerance to shattering also makes it a viable option as an early maturing hard red winter wheat for western Kansas. Due to its average straw strength, Fuller is not recommended for irrigated production. It is not suited to low soil pH conditions.

Milling and baking quality. Fuller has good milling and baking quality. Its test weight and thousand kernel weight has been superior to Jagger, resulting in higher flour extraction rates compared to Jagger. The flour protein content of Fuller has been similar to Jagger. In 4 years of bake tests, Fuller has had longer mix times and tolerances, but slightly lower loaf volumes than Jagger. Bake absorptions of Fuller have been about 1 percent lower than Jagger.

Table 1. Agronomic and pest resistance characteristics of Fuller¹.

	Maturity	Test weight	Winter-hardiness	Coleoptile length	Lodging resistance	Shatter resistance	Powdery mildew	Leaf rust	Stem rust	Speckled leaf blotch	Tan spot	SBMV	WSMV	Hessian fly
Fuller	1	4	4	6	5	3	5	2	5	3	4	1	4	9
Jagger	1	5	5	6	5	5	7	9	5	3	4	2	4	9
Overley	1	3	5	5	4	7	8	7	3	4	4	1	4	9
Jagalene	2	2	3	6	3	4	9	9	2	4	7	2	3	9

¹ Rated on a scale of 1 to 9. Except for maturity (where 1 means earliest and 9 means latest), 1-3 is good or resistant, 4-6 average or intermediate and 7-9 is poorest or susceptible.

SBMV-Soilborne mosaic virus

WSMV-Wheat streak mosaic virus

Table 2. Yield summary (bu/a) for Fuller and selected varieties from the Kansas Intrastate Nurseries.

	'04 Central	'04 West	'04 State	'05 Central	'05 West	'05 State	'06 Central	'06 West	'06 State	3-Year West Avg	3-Year Central Avg	3-Year State Avg
Fuller	47.4	52.2	50.0	62.5	64.5	63.7	54.8	41.5	48.9	54.1	54.3	54.2
Jagger	44.1	47.2	45.8	53.4	59.6	57.1	56.8	48.7	53.2	52.2	51.3	51.8
Overley	45.6	53.6	49.9	64.1	58.8	60.9	53.9	36.0	46.0	51.2	53.8	52.4
Jagalene	49.0	53.1	51.2	48.5	54.5	52.1	55.0	39.4	48.1	50.2	51.0	50.6

Yield of Fuller and checks (bu/a) from 2004-2006. Central Kansas locations included Hutchinson ('04, '05, '06), Gypsum ('04, '05, '06), Hesston ('04, '05, '06), Caldwell ('04), Belleville ('04, '05), Manhattan ('06) and Everest ('06). Western Kansas locations included Hays ('04, '05, '06), Garden City ('04, '05, '06), Osborne Co. ('04, '05), Ford Co. ('04, '05), Ness Co. ('04, '05, '06), St. John ('04), Colby ('05), Graham Co. ('06).