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'WENDY'

A WEST RIVER HARD WHITE WINTER WHEAT



SOUTH DAKOTA STATE UNIVERSITY
Agricultural Experiment Station
U.S. Department of Agriculture



'WENDY'

A WEST RIVER HARD WHITE WINTER WHEAT

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Wendy was developed by the South Dakota Agricultural Experiment Station and released to seed producers in August 2004 on the basis of its white grain color, good noodle quality, excellent winter survival, earliness, and high yield potential in South Dakota and the northern Great Plains region. Wendy was named in memory of Wendy Wickersham, secretary for South Dakota Wheat Inc. from 2003–2004.

Origin and breeding history

Wendy was selected from the cross SD89333/Abilene made in 1992. The cross was advanced to the F₃ generation as a bulk population. Seed harvested from the F₃ bulk was sorted for white kernel color in 1995. The bulk of selected white kernels was grown in the greenhouse in 1996. Single heads were harvested from the selected F₄ bulk and planted in the field as head rows in fall 1996. Wendy was derived as an F_{4:5} line in 1997. Wendy was evaluated as SD97W604 in the South Dakota Early Yield Trial (EYT) nursery in 1998. It was advanced beyond the Preliminary Yield Trial (PYT) to the South Dakota Advanced Yield Trial (AYT) in 1999 due to superior performance. It was tested in the South Dakota Crop Performance Testing (CPT) Variety Trial between 2000 and 2004, in the Northern Regional Performance

Nursery during 2001 and 2002, and in the Southern Regional Performance Nursery in 2004.

Breeder seed of Wendy originated from a composite of 200 F_{10:11} head rows selected in 2002 based on visual uniformity and white kernel color purity. Wendy has been uniform for all morphological characters (such as maturity and plant height) during the last four generations of increase. Wendy contains 0.14% hard red grain. It also contains red and tall white off-types in the frequency of 0.05% and 0.01%, respectively.

The South Dakota Foundation Seed Stocks Division (Plant Science Department, South Dakota State University) had foundation seed of Wendy available to seed producers for planting during Fall 2004. Seed classes will be Breeder, Foundation, Registered, and Certified. Wendy was submitted for plant variety protection under P.L. 910577 with the Title V certification option.

Characteristics

Wendy is an awned, white-glumed, early maturing, semi-dwarf variety. It has green foliage at anthesis. Its spike is tapered, inclined, and mid-dense. Its glume size is medium, and the glume shoulder has a wanting shape. Its beak is medium in length with an acumi-

nate tip. Its kernels are white, hard textured, and elliptical in shape with a collarless short brush, rounded cheeks, and a shallow crease.

Wendy is early maturing, one day earlier than Expedition. Wendy's winter survival is good to excellent (similar to Harding). It has a short coleoptile and excellent straw strength (similar to Wesley). Wendy has fair to good pre-harvest sprouting resistance (similar to Trego). Because of its level of sprouting resistance, Wendy will be best adapted to areas west of the Missouri River in South Dakota.

Agronomic performance and quality

Wendy has a very good yield potential (Tables 1 and 2). In western South Dakota it has on average yielded 5 bu/a better than the location test averages for both 2003 and for 3 years (2001–03). At eastern locations, it yielded 4 bu/a higher than the location test averages for 2003 and yielded equal to the location test averages for 3 years. It has consistently out-yielded the two hard white wheat varieties NuPlains and Trego. Except for the Wall and Oelrichs test sites in 2003, Wendy was comparable or significantly higher in yield than NuPlains and Trego over all locations. Likewise, the same yield trend occurred over the longer 3-year period. In 2003 Wendy was in the top performance group for test weight (61 lb/bu) and intermediate group for grain protein (13.5%). Wendy has very good milling and fair baking quality characteristics in predictive testing.

Wendy was tested in the Wheat Quality Council in 2003. It was slightly better than Crimson and had good milling and acceptable bread baking quality characteristics. In tests conducted by the Asian Products Collaborative (APC) Project, coordinated by the U.S. Wheat Associates and the Wheat Marketing Center in 2003, Wendy was similar or better than Australian standards for Korean steamed buns, modified Chinese northern type steamed bread, and Chinese raw noodles.

Table 1. A comparison of Wendy hard white winter wheat yields (bu/a) with other popular hard red and hard white winter wheat varieties at seven western South Dakota locations.

	Wall		Bison		Hayes		Martin		Sturgis		Oelrichs		Kennebec	
	'03	3-yr	'03	3-yr	'03	3-yr	'03	3-yr	'03	3-yr	'03	3-yr	'03	3-yr
	bu/a													
Hard red wheats:														
Alliance	44	37	53	54	69	55	44	71	55	73				
Arapahoe	36	36	53	57	68	59	46	65	55	78				
Crimson	42	37	53	38	60	50	40	69	54	66				
Expedition	39	35	55	58	68	56	44	72	57	82				
Jagalene	35		55	62	68		44	77		89				
Nekota	42	36	51	52	60	57	42	70	56	68				
Wesley	44	38	52	62	71	61	41	65	55	80				
Hard white wheats:														
Wendy	40	34	57	64	68	57	45	66	52	90				
NuPlains	44	37	49	50	58	52	41	64	52	60				
Trego	38	34	57	55	70	56	43	70	55	74				

Table 2. A comparison of Wendy hard white winter wheat yields with other popular hard red and hard white winter wheat varieties at five eastern South Dakota locations and state averages for yield(bu/a), bushel weight (BuWt), and protein (Prot).

	Brookings		Highmore		Platte		Pierre		Tripp Co.		2003		
	'03	3-yr	'03	3-yr	'03	3-yr	'03	3-yr	'03	3-yr	Yield bu/a	BuWt lb	Prot.# pct
Hard red:													
Alliance	71	67	50	38	55	.	37	.	41	47	55	58	13.2
Arapahoe	85	73	57	43	60	.	38	.	45	42	57	59	13.7
Crimson	85	70	48	37	55	.	42	.	47	41	54	61	14.4
Expedition	79	67	51	35	64	.	37	.	46	48	58	60	13.5
Jagalene	90	.	58	.	65	.	33	.	46	.	60	61	13.3
Nekota	79	66	49	35	62	.	34	.	49	43	55	60	12.9
Wesley	83	72	55	38	66	.	36	.	43	45	58	59	14.0
Hard white:													
Wendy	90	70	51	34	73	.	36	.	50	48	61	61	13.5
NuPlains	87	66	50	37	51	.	38	.	45	38	53	61	13.8
Trego	76	70	52	35	61	.	33	.	43	44	56	60	13.1

Brookings, Highmore, Wall, Platte, Pierre, Kennebec, and Tripp County locations.

Disease resistance

Wendy has moderate resistance to stem rust. It has been confirmed to be homogeneous for the 1BL.1RS wheat-rye translocation based on SDS-PAGE gel analysis. It is moderately susceptible to leaf rust and wheat streak mosaic virus and is susceptible to the Great Plains bio-type of Hessian fly. It has exhibited intermediate reaction to wheat soil-borne mosaic virus.

Table 3. A comparison of Wendy hard white winter wheat origins, traits, and disease reactions with other hard red and hard white wheat varieties tested in 2003.

	Origin	Traits#					Disease Reaction+						PVP*
		Rel hdg	Ldg Res	End use Qty	Wntr Hardy Rtg	Cole- optile Pct##	Wht Strk Msc	Tan Spot	Str	Rust\$ Lf	Stm		
Hard red wheats:													
Alliance	NE-93	2	G	AB	G	76	MS	VS	MR	S	MS	MS	Yes
Arapahoe	NE-88	3	F	GB	G-E	83	S	S	MS	MR	MR	MR	Yes
Crimson	SD-97	5	G	GB	G-E	110	MR	R	MR	S	MS	MS	Yes
Expedition	SD-02	0	F	EB	G-E	88	S	MS	MS	MS	R	MS	Yes
Jagalene	AP-02	3	E	-	G	92	MS	MR	MR	MR	MR	MR	Yes
Nekota	NE/SD-94	2	G	GB	G	87	MS	MR	S	S	MR	MR	No
Wesley	NE-98	2	E	AB	G-E	79	S	MR	MR	MS	R	MS	No
Hard white wheats:													
Wendy	SD-04	-1	E	GN	G-E	66	MS	R	MR	MS	MR	MR	**
NuPlains	NE-99	3	G	A	G	72	S	S	MS	MS	MS	MS	Yes
Trego	KS-99	3	F-G	E	F-G	80	S	MS	S	MR	R	MR	Yes

@ End-use: B= baking and N= noodle quality.

E= excellent, A= acceptable, F= fair, G=good, P=poor. ##Percent of Harding (3.2").

+ R= resistant, MR= moderately resist., M= intermediate, MS= mod. susceptible, S= susc., VS= very susc..

\$ Rusts: Stripe= str, leaf= lf, and stem= stm.

* Plant variety protection (PVP), title V, certification option - to be sold by variety name only as a class of certified seed.

** PVP application pending or anticipated.



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