

Registration of 'Wendy' Wheat

'Wendy' (Reg. no. CV-991, PI 638521) hard white winter wheat (*Triticum aestivum* L.) was developed by the South Dakota Agricultural Experiment Station and released to seed producers in August 2004. Wendy was released on the basis of its white grain color, excellent winter survival, earliness, and high yield potential in South Dakota and the northern Great Plains region. Wendy has been named in memory of Wendy Wickersham, secretary for South Dakota Wheat Inc. from 2003 to 2004.

Wendy was derived from the cross SD89333/'Abilene' (PI 511307) made in 1992. SD89333 is an experimental line from South Dakota State University with the pedigree 'Gent' (CItr17293) (Wells et al., 1977)/'Siouxland' (PI 483469) (Schmidt et al., 1985). Wendy was developed by means of the bulk breeding method. The cross (coded X92259) 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 coded X92259W and was grown in the greenhouse in spring 1996. Single heads were harvested from this selected F₄ bulk and planted in the field as head-rows in fall 1996. Wendy was derived as an F_{4,5} line selected by S.D. Haley in 1997. Wendy was evaluated as SD97W604 in the South Dakota Early Yield Trial nursery in 1998. It was advanced to the South Dakota Advanced Yield Trial 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.

Wendy is an awned, white-glumed, early maturing, semi-dwarf hard white winter wheat. Wendy has green foliage at anthesis. The spike is tapered, inclined, and middense. The glume size is medium, and the glume shoulder has a wanting shape. The beak is medium in length with an acuminate tip. Kernels are white, hard textured, and elliptical in shape with a collarless short brush, rounded cheeks, and a shallow crease.

In 16 site-years of testing between 2002 and 2004 in the South Dakota CPT, Wendy was the earliest maturing wheat (146 d to heading from 1 January), 1 d earlier than 'Expedition' (PI 629060), 3 d earlier than 'Wesley' (PI 605742), and 6 d earlier than 'Harding' (PI 608049) (LSD0.05, 1 d). Plant height (75 cm) of Wendy is similar to Wesley and 15 cm less than Harding. The winter survival of Wendy is good to excellent (93%) similar to Harding (94%). Wendy has a short coleoptile (60 mm; 86% of Wesley; 75% of Expedition; and 67% of Harding). No lodging of Wendy was observed in these trials. Wendy has fair to good preharvest sprouting resistance (3.7 score; 1 = highly resistant to 9 = highly susceptible), similar to 'Trego' (PI 612576) (3.4), higher than 'Millennium' (PI 613009) (5.0) and 'Jerry' (PI 632433) (8.0), and lower than Expedition (1.9) and 'Nekota' (PI 584997) (1.0). Based on its level of sprouting resistance, Wendy is best adapted to areas west of the Missouri River in South Dakota, where it is usually dry during harvest.

In 31 site-years of testing in the South Dakota CPT, grain yield of Wendy (3534 kg ha⁻¹) was greater than Expedition (3413 kg ha⁻¹), Trego (3405 kg ha⁻¹), and 'Arapahoe' (PI 518591) (3395 kg ha⁻¹); equivalent to Millennium (3625 kg ha⁻¹), Harding (3468 kg ha⁻¹), and Wesley (3451 kg ha⁻¹); and less than 'Jagalene' (3663 kg ha⁻¹) (LSD 0.05, 121 kg ha⁻¹). Wendy had similar grain volume weight to Trego (764 kg m⁻³), higher than Wesley (745 kg m⁻³), and lower than Jagalene (775 kg m⁻³) (LSD 0.05, 4 kg m⁻³).

Wendy is homogeneous for the 1BL.1RS wheat-rye translocation based on SDS-PAGE gel analysis. Wendy was found

to be resistant to moderately resistant to stem rust (caused by *Puccinia graminis* Pers.:Pers. f. sp. *tritici* Eriks. & E. Henn.) pathotypes APTHS, TPMK, QTHJ, TTTT, RCRS, RTQQ, BRRTS, and QFCS, similar to Trego, and has been postulated to carry genes *Sr24* and *Sr31* based on tests conducted by the USDA Cereal Disease Laboratory, St. Paul, MN, in 2002 and 2004. Wendy ranged from moderately resistant (30% severity; similar to Nekota) to susceptible (40% severity, similar to 'Roughrider' [CItr17439]) to leaf rust (caused by *Puccinia triticina* Eriks.) in field tests conducted by the USDA Cereal Disease Laboratory, St. Paul, MN, in 2002. Wendy was tested in a blast-inoculated *Wheat streak mosaic virus* (WSMV) nursery in Brookings, SD, between 2003 and 2005. Yield losses of Wendy, Trego, and 'Wahoo' (PI 619098) due to WSMV were 27.7, 28.7, and 21.4%, respectively. Wendy is susceptible to the Great Plains biotype of Hessian fly [*Mayetiola destructor* (Say)] based on seedling tests. Wendy was found to be susceptible (severe mosaic and/or severe stunting) to *Wheat soilborne mosaic virus*.

Composite milling and bread baking properties of Wendy were determined in 2001 and 2002 in cooperative baking tests conducted by the USDA-ARS Hard Winter Wheat Quality Laboratory in Manhattan, KS. Milling scores were very good while baking scores were poor. Relative to the hard white check cultivars Trego and 'Nuplains' (PI 605741), Wendy had medium-sized kernels (28.2 vs. 29.0 and 25.7 mg, respectively). Flour extraction of Wendy, Trego, and Nuplains was 672, 667, and 673 g kg⁻¹, respectively. Flour ash of Wendy was similar to Trego (4.2 g kg⁻¹) and slightly lower than Nuplains (4.3 g kg⁻¹). Flour protein of Wendy (112 g kg⁻¹) was lower than Nuplains (115 g kg⁻¹) and higher than Trego (110 g kg⁻¹). In bread baking tests, bake absorption of Wendy (585 g kg⁻¹) was lower than both Nuplains (615 g kg⁻¹) and Trego (612 g kg⁻¹), while its loaf volume was similar to Nuplains (0.88 L) and higher than Trego (0.85 L). Wendy had lower mixograph tolerance (1.0) than both Trego (2.5) and Nuplains (3.0) (0 = unacceptable, 4 = acceptable, 6 = outstanding). Wendy had a lower mixograph mix time (3.7 min) than Trego (4.1 min) and Nuplains (5.1 min). Wendy was evaluated in the Wheat Quality Council tests in 2003. Its quality was slightly better than that of 'Crimson' (PI 601818) and it had good milling and acceptable bread baking quality characteristics. Wendy has low grain polyphenol oxidase (PPO) levels [3.2, lower than Trego (4.0); 1–9 scale, lower is better]. Wendy was entered into the Asian Products Collaborative (APC) Project, coordinated by the U.S. Wheat Associates and the Wheat Marketing Center in 2003. It was tested against a chukamen commercial noodle flour control from Japan. The Chinese raw noodle sheet color (L value, higher is better) of Wendy and the control flour at 24 h was 77.8 and 76.5, respectively, and the decrease in noodle brightness (L value) of Wendy and the control flour between 0 and 24 h was 6.3 and 7.1 units, respectively. Noodle hardness of Wendy (1162 g) was less than the control flour (1245 g) and the APC minimum target level of 1200 g.

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-glumed and tall white-glumed 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, Brookings, SD) 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 U.S. Plant Variety Protection under P.L. 910577 with the certification option.

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