

**NEBRASKA AGRICULTURAL EXPERIMENT STATION
UNIVERSITY OF NEBRASKA-LINCOLN
DEPARTMENT OF AGRONOMY**

**UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
WASHINGTON, D. C.**

RELEASE OF HARRY HARD RED WINTER WHEAT

Harry is a hard red winter wheat (*Triticum aestivum* L.) cultivar developed cooperatively by the Nebraska Agricultural Experiment Station and the USDA-ARS and released in 2002 by the developing institutions. Harry was released primarily for its superior adaptation to rainfed wheat production systems in western Nebraska. The name Harry was chosen to honor Mr. Harry Cullan, deceased, who was a proponent of well adapted cultivars and certified seed production in western Nebraska.

Harry was selected from the cross NE90614/NE87612 which was made in 1991. The pedigree of NE90614 is Brule/4/Parker*4/Agent//Beloterkovskaia 198/Lancer /3/Newton/Brule. The pedigree of NE87612 is Newton//Warrior*5/Agent/3/Agate sib. The F₁ to F₃ generations were advanced using the bulk breeding method. Harry is an F₃-derived line that was selected in the F₄ generation.

Harry was evaluated as NE97689 in Nebraska yield nurseries starting in 1998, in the Northern Regional Performance Nursery in 2000 and 2001, and in Nebraska cultivar performance trials in 2000 to 2002. In the Nebraska cultivar performance trials, it has performed well throughout most of Nebraska but is best adapted to western Nebraska. The average Nebraska rainfed yield of Harry of 3310 kg ha⁻¹ (28 environments from 2001 to 2002) was greater than the yields of Wesley (3160 kg ha⁻¹), and Culver (3230 kg ha⁻¹), but was lower than Millennium (3440 kg ha⁻¹), Wahoo (3430 kg ha⁻¹), and Alliance (3380 kg ha⁻¹). In its primary area of adaptation (western NE), Harry (17 environments from 2000 to 2002) has yielded 3000 kg ha⁻¹, which was greater than Wesley (2650 kg ha⁻¹), Culver (2770 kg ha⁻¹), Millennium (2890 kg ha⁻¹), Wahoo (2910 kg ha⁻¹), and Alliance (2880 kg ha⁻¹). Harry was tested in the Northern Regional Performance Nursery in 2000 and 2001. It ranked first of 33 entries in 2000 (12 environments) and 4th of 30 entries in 2001 (12 environments) and averaged 520 kg ha⁻¹ more grain yield than 'Abilene' and 750 kg ha⁻¹ more grain yield than Nekota. Harry has acceptable performance under irrigation, but other wheat cultivars with superior performance, especially with better straw strength (described below), would be recommended.

Other measurements of performance from comparison trials show that Harry is late in maturity (147 d after Jan. 1, data from observations in NE), about 2.2 d and 3.6 d later flowering than Arapahoe and 'Wesley', respectively. Harry is a semi-dwarf wheat cultivar and has a short coleoptile (41 mm) similar to Arapahoe (45 mm), Millennium (44 mm), and Wahoo (47 mm); but shorter than Cougar (67 mm), a semi-dwarf line with a different semi-dwarfing gene that does not affect coleoptile length, and Pronghorn (64 mm), a conventional height wheat cultivar. The mature plant height of Harry (79 cm) is 6 cm shorter than Arapahoe and 6 cm taller than Wesley. Harry has moderate straw strength (25% lodged), similar to Arapahoe (25%

lodged), but lower than Wesley (2% lodged). The winter hardiness of Harry is good to very good, similar to Abilene and comparable to other winter wheat cultivars adapted and commonly grown in Nebraska.

Harry is moderately resistant to stem rust (caused by *Puccinia graminis Pers.: Pers. f. sp. tritici* Eriks & E. Henn; most likely containing *Sr6*, *Sr17*, and *Sr24*; data provided by D. McVey at the USDA Cereal Disease Laboratory). It is also moderately resistant to leaf rust (caused by *P. triticina* Eriks.; most likely contains *Lr24*, and possibly other leaf rust resistance genes; data provided by D. McVey at the USDA Cereal Disease Laboratory), and Hessian fly (*Mayetiola destructor* Say, similar to Arapahoe, and most likely contains the Marquillo-Kawvale genes for resistance; data provided by J. Hatchett and Ming-Shun Chen, USDA and Kansas State University). It is susceptible to wheat soilborne mosaic virus and wheat streak mosaic virus, but may contain a low level of tolerance to barley yellow dwarf virus (data obtained from the Uniform Winter Wheat Northern Regional Performance Nursery, 2000-2001 and field observations in NE).

Harry is a genetically lower in grain volume weight (72.0 kg hl^{-1}), which is lower than Arapahoe (75.0 kg hl^{-1}) and Wesley (74.7 kg hl^{-1}), Culver (74.3 kg hl^{-1}), Millennium (76.3 kg hl^{-1}), and Alliance (74.5 kg hl^{-1}). The milling and baking properties of Harry were determined for six years by the Nebraska Wheat Quality Laboratory. In these tests, Arapahoe was used as a check cultivar. The average wheat and flour protein content of Harry (130 and 119 g kg^{-1}) was lower than Arapahoe (143 and 131 g kg^{-1}). The average flour extraction on the Buhler Laboratory Mill for Harry (687 g kg^{-1}) was lower than Arapahoe (712 g kg^{-1}). The flour ash content (42 g kg^{-1}) was lower than Arapahoe (43 g kg^{-1}). Dough mixing properties of Harry were acceptable, but slightly weaker than Arapahoe. Average baking absorption was slightly less than Arapahoe. The average loaf volume of Harry (885 cm^3) was less than Arapahoe (937 cm^3). The scores for the internal crumb grain and texture were good, which was slightly better than Arapahoe. The overall end-use quality characteristics for Harry should be acceptable to the milling and baking industries.

In positioning Harry, based on performance data to date, it should be well adapted to most rainfed wheat production systems in western Nebraska and in adjacent states with similar growing seasons where its later maturity and full season grain filling capabilities are favored except in times of drought. Being a later maturity wheat may explain its exceptional performance in the Northern Regional Performance Nursery where later wheat genotypes (by Nebraska standards) are preferred. Where it is adapted, Harry should be a good replacement for Arapahoe, Windstar, and 2137 as it has a higher yield potential and similar or superior disease and insect resistances. Harry is genetically complementary to 2137, Alliance, Buckskin, Jagger, Pronghorn, Windstar. It is non-complementary to Arapahoe, Culver, Millennium, Niobrara, and Vista.

Harry is an awned, white-glumed cultivar. Its field appearance is most similar to Alliance. After heading, the canopy is moderately open and upright. The flag leaf is erect and twisted at the boot stage. The foliage is green to yellow green with a waxy bloom on the lag leaf, leaf sheath, and a light waxy bloom on the spike at anthesis. The leaves are pubescent. The spike is tapering to oblong in shape, narrow, mid-long, and middense. The glume is midlong and midwide, and the glume shoulder is midwide and square to rounded. The beak is medium long to long in length with an acuminate tip. The spike is erect to inclined at maturity. Kernels are red

colored, hard textured, midlong, and elliptical in shape. The kernel has no collar, a large brush of short length, rounded cheeks, large germ, and a midwide and middeep crease.

Harry has been uniform and stable since 2000. Less than 0.5 % of the plants were rogued from the Breeder's seed increase in 2000. The rogued variant plants were taller in height (10 - 15 cm) or were awnless with red chaff. Up to 1% (10:1000) variant plants may be encountered in subsequent generations. The Nebraska Crop Improvement Association and Mr. Roger Hammons provided technical assistance in describing the cultivar characteristics and accomplishing technology transfer. The Nebraska Foundation Seed Division, Department of Agronomy and Horticulture, University of Nebraska-Lincoln, Lincoln, NE 68583 had foundation seed available to qualified certified seed enterprises in 2002. The U.S. Department of Agriculture will not have seed for distribution. The seed classes will be Breeder, Foundation, Registered, and Certified. The Registered seed class will be a nonsalable seed class. Harry will be submitted for registration and trade marking. A research and development fee will be assessed on all certified seed sales. Small quantities of seed for research purposes may be obtained from the corresponding author and the Department of Agronomy and Horticulture, University of Nebraska-Lincoln for at least 5 yr from the date of this release. Harry was developed with partial financial support from the Nebraska Wheat Development, Utilization, and Marketing Board.

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Approval

Director, Nebraska Agricultural
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date

Administrator, Agricultural Research Service
United States Department of Agriculture
Washington, D. C.

date