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UNIVERSITY OF NEBRASKA-LINCOLN  
DEPARTMENT OF AGRONOMY AND HORTICULTURE**

**WYOMING AGRICULTURAL EXPERIMENT STATION  
UNIVERSITY OF WYOMING  
DEPARTMENT OF PLANT SCIENCES**

**and**

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

**RELEASE OF GOODSTREAK HARD RED WINTER WHEAT**

Goodstreak 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 and the Wyoming Agricultural Experiment Station. Goodstreak was released primarily for its superior adaptation to rainfed wheat production systems in western Nebraska where conventional height wheat cultivars with long coleoptiles are needed for good emergence and harvest in low moisture conditions. The name was chosen because the area in which it will most likely be grown is known as “Goodstreak” because the grasslands were better than the surrounding areas. In this area, drought is common and “Goodstreak” is an indication that water use efficient annual crops, such as wheat can be grown.

Goodstreak was selected from the cross SD3055/KS88H164//NE89646 that was made in 1991. The pedigree of SD3055 is ND604/SD2971 where ND604 is Len//Butte/ND526 and SD2971 is Agent/3/ND441//Waldron/Bluebird/4/Butte/5/Len. The pedigree of KS88H164 is Dular/Eagle//2\*Cheney/Larned /3/TAM107. The pedigree of NE89646 is Colt \*2/Patrizanka. The F<sub>1</sub> to F<sub>3</sub> generations were advanced using the bulk breeding method. Goodstreak is an F<sub>3</sub>-derived line that was selected in the F<sub>4</sub> generation.

Goodstreak was evaluated as NE97465 in Nebraska yield nurseries starting in 1997, in the Southern Regional Performance Nursery in 2000 and 2001, and in Nebraska cultivar performance trials in 2001 and 2002. In the Nebraska cultivar performance trials, it has performed extremely well throughout most of Nebraska but is best adapted to western Nebraska. The average Nebraska rainfed yield of Goodstreak of 3280 kg/ha (28 environments) was less than the grain yields of Millennium (3440 kg ha<sup>-1</sup>), Wahoo (3430 kg ha<sup>-1</sup>) and Alliance (3380 kg ha<sup>-1</sup>), but greater than Culver (3230 kg ha<sup>-1</sup>), Wesley (3160 kg ha<sup>-1</sup>), and Arapahoe (3180 kg ha<sup>-1</sup>). In western NE and WY (12 environments), Goodstreak (2690 kg ha<sup>-1</sup>) was similar in yield to Pronghorn (2710 kg ha<sup>-1</sup>) and superior to Buckskin (2500 kg ha<sup>-1</sup>). Goodstreak, Pronghorn, and Buckskin are conventional height wheat cultivars. Goodstreak was tested in the Southern Regional Performance Nursery in 2000 and 2001. It ranked 38<sup>th</sup> of 45 entries in 2000 (32 environments) and 15<sup>th</sup> of 43 entries in 2001 (32 environments) and averaged 40 kg ha<sup>-1</sup> less

grain yield than TAM 107. Goodstreak has not performed well under irrigation and is not recommended for use in irrigated production systems.

Other measurements of performance from comparison trials show that Goodstreak is medium in maturity (142 d after Jan. 1, data from observations in NE), about 1 d earlier flowering than Buckskin and 1.5 d later flowering than Pronghorn. Goodstreak has a long coleoptile (62 mm), as expected for a conventional height wheat cultivar, and is similar in length to Pronghorn (64 mm) and slightly shorter than Buckskin (70 mm), but longer than semi-dwarf wheat cultivars such as Arapahoe (45 mm), and Millennium (44 mm). The mature plant height of Goodstreak (94 cm) is 7 cm taller than Millennium and 21 cm taller than Wesley. Goodstreak has good straw strength (9% lodged), which is better than Arapahoe (25% lodged), but lower than Wesley (2% lodged). The winter hardiness of Goodstreak is good to very good, and comparable to other winter wheat cultivars adapted and commonly grown in Nebraska.

Goodstreak is moderately resistant to stem rust (caused by *Puccinia graminis Pers.: Pers. f. sp. tritici* Eriks & E. Henn; most likely containing *Sr6* and an unknown gene; data provided by D. McVey at the USDA Cereal Disease Laboratory), and Hessian fly (*Mayetiola destructor* Say, superior to Arapahoe, data provided by J. Hatchett and Ming-Shun Chen, USDA and Kansas State University). Goodstreak is susceptible to leaf rust (caused by *P. triticina* Eriks.; may contain an unknown gene; data provided by D. McVey at the USDA Cereal Disease Laboratory), wheat soilborne mosaic virus, wheat streak mosaic virus, and barley yellow dwarf virus (data obtained from the Uniform Winter Wheat Southern Regional Performance Nursery, 2000-2001 and field observations in NE).

Goodstreak has good grain volume weight ( $76.7 \text{ kg hl}^{-1}$ ) similar to Pronghorn and Millennium, and is superior to Arapahoe ( $75.0 \text{ kg hl}^{-1}$ ) and Wesley ( $74.8 \text{ kg hl}^{-1}$ ). The milling and baking properties of Goodstreak were determined for five 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 Goodstreak ( $137$  and  $118 \text{ g kg}^{-1}$ ) was lower than Arapahoe ( $143$  and  $131 \text{ g kg}^{-1}$ ). In the low rainfed environments of western NE and WY the average wheat protein content of Goodstreak ( $135 \text{ g kg}^{-1}$ ) was higher than Pronghorn ( $130 \text{ g kg}^{-1}$ ) and Buckskin ( $130 \text{ g kg}^{-1}$ ). The average flour extraction on the Buhler Laboratory Mill for Goodstreak ( $708 \text{ g kg}^{-1}$ ) was similar to Arapahoe ( $712 \text{ g kg}^{-1}$ ). The flour ash content ( $43 \text{ g kg}^{-1}$ ) was similar to Arapahoe ( $43 \text{ g kg}^{-1}$ ). Dough mixing properties of Goodstreak are acceptable, but weaker than Arapahoe. Average baking absorption was slightly better than Arapahoe. The average loaf volume of Goodstreak ( $912 \text{ cm}^3$ ) was less than Arapahoe ( $937 \text{ cm}^3$ ). The scores for the internal crumb grain and texture were good, which was similar to Arapahoe. The overall end-use quality characteristics for Goodstreak should be acceptable to the milling and baking industries.

In positioning Goodstreak, based on performance data to date, it is best adapted to low rainfed wheat production systems where conventional height wheat cultivars are grown. Where it is adapted, Goodstreak should be a good replacement for Buckskin as it has higher yield potential, similar straw strength, and superior disease and insect resistances. Goodstreak is genetically complementary to 2137, Alliance, Buckskin, Culver, Jagger, Millennium, Niobrara, Pronghorn, Vista, and Windstar.

Goodstreak is an awned, white-glumed cultivar. Its field appearance is most similar to Buckskin. After heading, the canopy is moderately closed and upright. The flag leaf is erect and twisted at the boot stage. The foliage is light green to yellow green with a light waxy bloom at anthesis. The leaves are glabrous. The spike is tapering in shape, narrow, and midlong. The

glume is glabrous, midlong and narrow, and the glume shoulder is midwide to wide and square to oblique. The beak is medium in length with an acuminate to acute tip. The spike is usually inclined to nodding at maturity. Kernels are red colored, hard textured, short to midlong, and elliptical in shape. The kernel has no collar, a large brush of medium length, rounded cheeks, large germ, and a narrow and shallow crease.

Goodstreak 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 (7 - 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. Goodstreak will be submitted for registration and plant variety protection under P. L. 10577 with the certification option. 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 release. Goodstreak was developed with partial financial support from the Nebraska Wheat Development, Utilization, and Marketing Board.

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### Approval

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**Director, Nebraska Agricultural  
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**Administrator, Agricultural Research Service  
United States Department of Agriculture  
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