

**UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
WASHINGTON, D.C. 20250**

AND

**NEBRASKA AGRICULTURAL EXPERIMENT STATION
UNIVERSITY OF NEBRASKA
LINCOLN, NEBRASKA 68583**

AND

**SOUTH DAKOTA AGRICULTURAL EXPERIMENT STATION
SOUTH DAKOTA STATE UNIVERSITY
BROOKINGS, SOUTH DAKOTA 57007**

AND

**WYOMING AGRICULTURAL EXPERIMENT STATION
UNIVERSITY OF WYOMING
LARAMIE, WYOMING 82071**

RELEASE OF NUPLAINS HARD WHITE WINTER WHEAT

The Agricultural Research Service, United States Department of Agriculture, and the Nebraska Agricultural Experiment Station in cooperation with the Agricultural Experiment Stations of South Dakota and Wyoming announce the release of the new hard white winter wheat (*Triticum aestivum* L.) cultivar 'Nuplains' (PI 605741). Nuplains was released for its breadmaking quality and white grain color combined with adaptation, grain yield potential, and disease resistance for production in the north central Great Plains.

Nuplains was selected from the cross 'Abilene'/KS831872 made in 1987. The pedigree of KS831872 is 'Plainsman V'/'Newton'/'Arthur 71' high protein selection. Nuplains is an F₅-derived line from a single head reselection of an F₃ derived line (N92L207) that resulted from a single plant selected in 1990. Nuplains was selected in the F₆ as a headrow and given the experimental line number N94L205 in 1994. Breeder seed of Nuplains originates from a composite of twenty-eight F₉ derived headrows which were selected for uniformity in plant type and white grain color in 1998.

Nuplains is an awned, white-glumed, semidwarf cultivar with straw strength superior to 'Arapahoe'. Plant height of Nuplains has averaged 3 cm shorter than '2137' and 10 cm shorter than Arapahoe. It has a short coleoptile, similar to 'Jagger' and 'TAM 107'. Winterhardiness is adequate for Nebraska growing

conditions; less than 'Alliance' and Arapahoe, similar or slightly less than 'Karl 92', but superior to 'Oro Blanco', 'Rio Blanco' and Jagger. Nuplains is a medium maturing cultivar under Nebraska conditions, with heading date averaging 2 to 3 days earlier than Arapahoe.

Nuclains has exhibited adult-plant and seedling resistance to stem rust (caused by *Puccinia graminis Pers.: Pers.*) based on seedling and field tests conducted by the USDA Cereal Disease Laboratory. Nuclains is moderately susceptible to current races of leaf rust (caused by *Puccinia recondita Roberge ex Desmaz.*) and is susceptible to soilborne mosaic virus, wheat streak mosaic virus, the Great Plains biotype of Hessian fly (*Mayetiola destructor (Say)*), and the Russian wheat aphid (*Diuraphia noxia (Mordvilko)*).

Nuclains was tested in Nebraska breeding nurseries starting in 1994 and in the Western Plains Regional Performance Nursery in 1998. It was tested in the Nebraska Fall Sown Cereal Variety Trials statewide in 1998 and 1999. In 30 site-years of Nebraska state variety trials, grain yield of Nuclains averaged 4149 kg ha⁻¹, similar to that for Arapahoe at 4129 kg ha⁻¹, but less than 2137 at 4539 kg ha⁻¹. Test weight of Nuclains averaged 777 kg m⁻³, compared with 755 kg m⁻³ for Arapahoe and 769 kg m⁻³ for 2137. Nuclains appears to be best suited for dryland production areas in south central and southwest Nebraska and to similar production areas in adjacent states. It has also shown promise for use in irrigated production systems in southwest and western Nebraska.

The milling and baking properties of Nuclains were determined by the Nebraska Wheat Quality Laboratory and by the USDA-ARS Grain Marketing and Production Research Center at Manhattan, KS. Grain protein content of Nuclains has been similar to Arapahoe. Nuclains has mellow dough mixing properties, similar to its parent Abilene, with acceptable mixing tolerance. On average, mixing time and tolerance ratings were slightly lower than those for Arapahoe. Bake absorption of Nuclains has been higher than for Arapahoe. Loaf volume, internal, and external loaf appearance have been equal or superior to Arapahoe, suggesting acceptable bread quality characteristics. Nuclains was evaluated by commercial milling and baking companies through the Wheat Quality Council in 1998-99. It was found to have acceptable end-use quality for commercial bread applications and was generally rated as similar to 'Scout 66' in dough handling characteristics and baking performance.

Nuclains was evaluated for use in Asian noodle products by the Wheat Marketing Center, Portland, OR. In Taiwanese raw and Hokkien style noodle evaluations, Nuclains has received acceptable ratings for dough handling, machining properties, and noodle texture. Noodle color ratings for Nuclains varied, but were generally considered as less than desirable due to discoloration after 24 hrs of storage. Nuclains has been shown to have intermediate levels of Polyphenol Oxidase activity, higher than 'Platte', but less than 'Arlin'.

Grain samples from 1997 and 1998 were provided to USDA-GIPSA for classification purposes. Grain color of Nuplains was considered as acceptable for the hard white wheat class. Nuplains possesses an intermediate level of resistance to weather-induced pre-harvest sprouting. Falling number evaluations conducted on grain samples from 13 Nebraska locations in 1999 showed that Nuplains has superior sprouting resistance compared with the hard white wheats 'Betty' and Arlin. Sprouting resistance of Nuplains was considered comparable to Rio Blanco and 'Trego', but less than resistance observed among hard red winter wheat varieties such as Arapahoe or 2137.

The Breeder seed class of Nuplains will be maintained by the Nebraska Foundation Seed Division, Department of Agronomy, University of Nebraska-Lincoln, Lincoln, NE 68583. Other recognized seed classes are Foundation, Registered, and Certified as per AOSCA standards. By agreement, the Nebraska Seed Certification procedures provide that the Registered seed class is nonsaleable. Nuplains will be submitted for registration and U.S. Plant Variety Protection under Public Law 10577 with the certification (Title V) option. Seed of Nuplains has been deposited in the USDA National Small Grains Collection, Aberdeen, Idaho. It is requested that the source of this material be acknowledged in future usage by wheat breeding and genetics programs.

Director, Agricultural Experiment Station
University of Nebraska

Date

Director, Agricultural Experiment Station
South Dakota State University

Date

Director, Agricultural Experiment Station
University of Wyoming

Date

Administrator, Agricultural Research Service
U.S. Department of Agriculture

Date