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and

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

RELEASE OF WAHOO HARD RED WINTER WHEAT

Wahoo is a hard red winter wheat (*Triticum aestivum* L.) cultivar developed cooperatively by the Nebraska Agricultural Experiment Station and the USDA-ARS. It was jointly released in 2001 by the developing institutions and Wyoming Agricultural Experiment Station. Wahoo was selected from the cross Arapahoe/Abilene//Arapahoe which was made in 1988. Wahoo was released primarily for its superior adaptation to rainfed wheat production systems in eastern Nebraska and broad adaptation to rainfed wheat production systems in Wyoming and Nebraska.

Wahoo is an awned, white-glumed cultivar. Its field appearance is most similar to 'Arapahoe'. After heading, the canopy is moderately open and upright. The flag leaf is erect and twisted at the boot stage. The foliage is green with a waxy bloom at anthesis. The leaves are pubescent. The spike is tapering in shape, mid-long, and middense. The glume is midlong and narrow, and the glume shoulder is narrow and square. The beak is medium to long in length with an acuminate tip. The spike is usually nodding at maturity. Kernels are red colored, hard textured, midlong, and elliptical in shape. The kernel has no collar, a large brush of medium length, rounded cheeks, midsize germ, and a midwide and shallow crease.

Wahoo was performance tested as NE94654 in Nebraska yield nurseries starting in 1995 and in the Northern Regional Performance Nursery in 1998 and 1999, and in Nebraska cultivar performance trials in 1999 and 2000. In two years of testing in Nebraska cultivar performance trials, it has performed extremely well throughout most of Nebraska, but it is best adapted to eastern Nebraska. It also performed well in Wyoming. The average Nebraska rainfed yield of Wahoo (27 environments) was 3620 kg/ha (53.8 bu/a) that compares favorably to Alliance (3550 kg/ha, 52.7 bu/a), Culver (3510 kg/ha, 52.2 bu/a) and Millennium (3580 kg/ha, 53.3 bu/a). In Wyoming (9 environments) it averaged 2590 kg/ha (38.6 bu/a) which was superior to Buckskin (2390 kg/ha, 35.6 bu/a) and Pronghorn (2380 kg/ha, 35.4 bu/a). Wahoo has not performed well under irrigation and is not recommended for use in irrigated production systems. Wahoo was tested in the Northern Regional Performance Nursery in 1998 and 1999. It ranked 16th of 28 entries in 1998 (17 environments) and 6th of 29 entries in 1999 (18 environments) and averaged 225 kg/ha (3 bu/a) higher yielding than 'Abilene'. The main advantages Wahoo has when compared to most other available wheat cultivars, within its area of adaptation, is its high grain yield and broad adaptation in rainfed production systems.

Other measurements of performance from comparison trials show that Wahoo is medium in maturity, about 0.5 d earlier flowering than Arapahoe and similar but slightly later than Wesley.

However, Wahoo tends to be more variable in its flowering date than either Arapahoe or Wesley. Wahoo has a longer length coleoptile (53 mm) for a semi-dwarf wheat, longer than Arapahoe (50 mm), and Millennium (43 mm); but shorter than Cougar (76 mm), a semi-dwarf line with a different semi-dwarfing gene that does not affect coleoptile length. The mature plant height of Wahoo (36 in, 92 cm) is 2 in (5 cm) shorter than Arapahoe and 2 in (5 cm) taller than Wesley. Wahoo has moderate straw strength, similar to Arapahoe, but lower than Wesley, Alliance, and Millennium. The winter hardiness of Wahoo is good to very good, similar to Abilene and comparable to other winter wheat cultivars adapted and commonly grown in Nebraska.

Wahoo is moderately resistant to stem rust (caused by *Puccinia graminis Pers. : Pers. f. sp. tritici* Eriks & E. Henn; most likely containing *Sr6* and *Sr24*), leaf rust (caused by *P. triticina* Eriks.; most likely contains *Lr16*, *Lr24*, and possibly other leaf rust resistance genes), and Hessian fly (*Mayetiola destructor* Say, similar to Arapahoe, and most likely contains the Marquillo-Kawvale genes for resistance), and susceptible to wheat soilborne mosaic virus, wheat streak mosaic virus, and barley yellow dwarf virus. Wahoo is a genetically lower in grain volume weight (57.2 lbs/bu, 73.8 kg/hl) similar to Arapahoe and Wesley, but lower than Culver, Millennium, Alliance, and Pronghorn. The milling and baking properties of Wahoo were determined for six years by the Nebraska Wheat Quality Laboratory. In these tests, Arapahoe and Scout 66 were used as check cultivars. The average wheat protein content of Wahoo was similar to Scout 66 and lower than Arapahoe. The average flour extraction on the Buhler Laboratory Mill for the Wahoo was similar to Scout 66, and higher than Arapahoe. The flour ash content was higher than both check varieties. The average flour protein content was less than both check varieties. Dough mixing properties of Wahoo were similar to Arapahoe and stronger than Scout 66. Average baking absorption was slightly less than the check varieties. The average loaf volume of Wahoo was similar to Scout 66, and less than Arapahoe. The scores for the internal crumb grain and texture were good, which was similar to Arapahoe, but less than Scout 66. The overall end-use quality characteristics for Wahoo should be acceptable to the milling and baking industries. In preliminary noodle quality tests, noodles made from Wahoo discolor less over time than noodles made from flour from most other hard red winter wheat varieties. Noodle discoloration is an undesirable trait in the marketplace.

In positioning Wahoo, based on performance data to date, it should be well adapted to most rainfed wheat production systems, with average or above average yield potential in most of Nebraska. It has performed exceptionally well in eastern Nebraska and should be grown there as a medium maturity wheat variety. It should perform well in similar growing areas in adjacent states. Where it is adapted, Wahoo should be a good replacement for Arapahoe as it has a higher yield potential, similar straw strength, and similar disease and insect resistances. Wahoo is genetically complementary to 2137, Alliance, Jagger, Pronghorn, and Windstar. It is non-complementary to Arapahoe (one of its parents), Culver, Millennium, Niobrara, and Vista.

Wahoo has been uniform and stable since 1999. Less than 0.5 % of the plants were rogued from the Breeder's seed increase in 1999. 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 provided technical assistance in describing the cultivar characteristics and accomplishing technology transfer. The Nebraska Foundation Seed Division, Department of Agronomy, University of Nebraska-Lincoln, Lincoln, NE 68583 had foundation seed available to qualified certified seed enterprises in 1999. 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. Wahoo will be submitted for registration and plant variety protection under P. L. 10577 with the certification option.

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Approval

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**Administrator, Agricultural Research Service
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date