

2002

## Registration of 'Wahoo' Wheat

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Baenziger, P. Stephen; Moreno-Sevilla, B.; Graybosch, Robert A.; Krall, J. M.; Shipman, M. J.; Elmore, Roger Wesley; Klein, R. N.; Baltensperger, D. D.; Nelson, Lenis Alton; McVey, D. V.; Watkins, John E.; and Hatchett, J.H., "Registration of 'Wahoo' Wheat" (2002). *Agronomy & Horticulture -- Faculty Publications*. 599.  
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Published in *Crop Science* 42 (2002), pp. 1752–1753.

## Registration of ‘Wahoo’ Wheat

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‘Wahoo’ (Reg. no. CV-920, PI 619098) 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 2000 by the developing institutions and the Wyoming Agricultural Experiment Station. Wahoo was released primarily for its superior adaptation to rainfed (syn. nonirrigated) wheat production regions in eastern Nebraska and broad adaptation to rainfed wheat production regions in Wyoming and Nebraska. Where it is adapted, Wahoo should be a good replacement cultivar for ‘Arapahoe’ (Baenziger et al., 1989). Wahoo is genetically complementary to ‘2137’, ‘Alliance’, ‘Buckskin’, ‘Jagger’, ‘Pronghorn’, and ‘Windstar’. It is noncomplementary to ‘Abilene’ (PI 511307), Arapahoe, ‘Culver’, ‘Millennium’, ‘Niobrara’, and ‘Vista’.

Wahoo was selected from the cross Arapahoe\*2/Abilene, which was made in 1988. The F1 was grown greenhouse and the F2 and the to F3 generations were advanced by the bulk breeding method at Mead, NE. Wahoo is an F3:4 line that was visually selected for its phenotypic uniformity and perceived agronomic merit, winter survival, maturity, and general resistance to diseases observed in the field. From the F5 to release, the line was advanced with yearly rouging to remove phenotypic variants.

Wahoo was evaluated as NE94654 in Nebraska yield nurseries starting in 1995, in the Northern Regional Performance Nursery in 1998 and 1999, and in Nebraska cultivar performance trials in 1999 and 2000. In the Nebraska cultivar performance trials, it has performed well throughout most of Nebraska and Wyoming, yet is best adapted to eastern Nebraska. The average Nebraska rainfed yield of Wahoo of 3620 kg ha<sup>-1</sup> (27 environments) was greater than the yields of Alliance (3550 kg ha<sup>-1</sup>), Culver (3510 kg ha<sup>-1</sup>), and Millennium (3580 kg ha<sup>-1</sup>). In Wyoming, Wahoo yielded an average of 2590 kg ha<sup>-1</sup> (9 environments), which was superior to Buckskin (2390 kg ha<sup>-1</sup>) and Pronghorn (2380 kg ha<sup>-1</sup>). 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<sup>-1</sup> more yield than Abilene. Wahoo 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 Wahoo is medium in maturity (140 d after 1 January, data from observations in Nebraska), 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 semidwarf wheat, longer than Arapahoe (50 mm) and Millennium (43 mm), but shorter than the semidwarf cultivar Cougar (76 mm), which is believed to have a different semidwarfing gene that does not affect coleoptile length (e.g., Rht8). The mature plant height of Wahoo (92 cm) is 5 cm shorter than Arapahoe and 5 cm taller than Wesley. Wahoo has moderate straw strength (29% lodged), similar to Arapahoe (30% lodged), but is weaker than Wesley (11% lodged). The winter hardiness of Wahoo is good to very good, similar to that of Abilene and comparable to that of other winter wheat cultivars adapted and commonly grown in 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 oblong in shape, midlong, and middense. The glume is long 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 ovate in shape. The kernel has no collar, a large brush of long length, rounded cheeks, midsize germ, and a midwide and shallow crease.

Wahoo is moderately resistant to stem rust (caused by *Puccinia graminis* Pers.: Pers. f. sp. *tritici* Eriks & E. Henn; most likely possessing Sr6 and Sr24; data provided by D. McVey, USDA Cereal Disease Laboratory), leaf rust (caused by *P. tritricina* Eriks.; most likely possesses Lr16, 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 conferred by the Marquillo-Kawvale genes (H18 and another unknown gene) for resistance; data provided by J. Hatchett, USDA and Kansas State University]. It is susceptible to Wheat soilborne mosaic virus, Wheat streak mosaic virus, and Barley yellow dwarf virus (data obtained from the Uniform Winter Wheat Northern Regional Performance Nursery, 1998-1999 and field observations in NE).

Wahoo is genetically low in grain volume weight (73.8 kg hL<sup>-1</sup>) being similar to Arapahoe (74.1 kg hL<sup>-1</sup>) and Wesley (74.3 kg hL<sup>-1</sup>), but lower than Culver (74.9 kg hL<sup>-1</sup>), Millennium (75.6 kg hL<sup>-1</sup>), Alliance (75.6 kg hL<sup>-1</sup>), and Pronghorn (76.6 kg hL<sup>-1</sup>). The milling and baking properties of Wahoo were determined for 6 yr by the Nebraska Wheat Quality Laboratory. In these tests, Arapahoe and 'Scout 66' were used as check cultivars. The average wheat and flour protein content of Wahoo (126 and 114 g kg<sup>-1</sup>) was similar to Scout 66 (126 and 117 g kg<sup>-1</sup>) and lower than Arapahoe (131 and 118 g kg<sup>-1</sup>). The average flour extraction on the Buhler Laboratory Mill for Wahoo (728 g kg<sup>-1</sup>) was similar to Scout 66 (729 g kg<sup>-1</sup>), and higher than Arapahoe (720 g kg<sup>-1</sup>). The flour ash content (42 g kg<sup>-1</sup>) was higher than Scout 66 and Arapahoe (37 g kg<sup>-1</sup> and 39 g kg<sup>-1</sup>, respectively). Dough mixing properties of Wahoo were similar to Arapahoe and stronger than Scout 66. Average baking water absorption was slightly less than the check varieties. The average loaf volume of Wahoo (888 cm<sup>3</sup>) was similar to Scout 66 (888 cm<sup>3</sup>), and less than Arapahoe (911 cm<sup>3</sup>). The scores for the internal crumb grain and texture were good, and 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 Arapahoe, Scout 66, and most other hard red winter wheat varieties.

Wahoo has been uniform and stable since 1999. Less than 0.5% of the plants were rogued from the Breeder 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 and Horticulture, 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 U.S. Plant Variety Protection under P. L. 10577 with the certification option. 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 publication.

#### **References**

Baenziger, P.S. 1989. Registration of 'Arapahoe' wheat. *:. Crop Sci.* 29:832.

#### **Footnotes**

Wahoo was developed with partial financial support from the Nebraska Wheat Development, Utilization, and Marketing Board. Cooperative investigations of the Nebraska Agric. Res. Div., Univ. of Nebraska, and USDA-ARS. Contribution no. 13485 from the Nebraska Agric. Res. Div. Registration by CSSA.

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