

### Registration of 'Pierce' Durum Wheat

'Pierce' (Reg. no. CV-937, PI 632366) spring durum wheat (*Triticum turgidum* L. var. *durum* Desf.) was developed by the North Dakota Agricultural Experiment Station in cooperation with USDA-ARS and released in June 2001. Pierce was named after a large durum-producing county in North Dakota. Pierce was released on the basis of its high grain yield, high grain volume, and quality.

Pierce was tested as D941038 and was selected from the cross D86117/D88289 made in 1991. The parent D86117 was derived from the cross 'Monroe'/D87209 (Cantrell et al., 1986). The pedigree of D87209 is D74111/'Cando' (Citr 17438). D88289 was derived from the cross D8189/D81141. D8189 was derived from the cross D68111/'Rugby'(Citr 17284)/'Ward'(Citr 15892)/3/'Vic'(Citr 17789). D81141 was derived from the cross D72114/'Edmore' (Citr 17748)//D781. Pierce was developed by the pedigree breeding method and was bulked in the F<sub>5</sub> generation as an F<sub>4</sub>-derived line in 1994. One thousand F<sub>4,9</sub> heads were selected from quality drill strips at Langdon, ND, for seed purification. Heads were threshed individually and seeded as head rows at Langdon in 1999. Nonuniform rows were discarded and the remaining rows were bulk harvested as Breeder seed.

Pierce is a daylength-sensitive durum wheat that is similar in heading date (62 d from seeding to when approximately 50% of the plants had heads completely emerged from the boot) to 'Maier' (Elias and Miller, 2000a) and 1 d later than 'Munich' (Elias et al., 1997). Pierce has an average plant height of 92 cm, which is 3 cm taller than Maier and 14 cm taller than the semidwarf cultivar Plaza (Elias et al., 2001b). The culm of Pierce is white and the peduncle is slightly recurved. Pierce has midlong spikes that are awned, oblong, lax, and inclined. The awns are white and 12 to 13 cm long. The glumes are glabrous, white, long, and wide. The kernels are amber, hard, midlong, and elliptical; the germ is large; the crease is midwide and shallow; and the brush is short.

On the basis of 32 location-years of testing in the Uniform Regional Durum Nursery (URDN) from 1998 to 2000, the mean grain yield of Pierce (3696 kg ha<sup>-1</sup>) was 4.6% higher than 'Ben' (3534 kg ha<sup>-1</sup>) (Elias and Miller, 1998) and 2.4% higher than Maier (3608 kg ha<sup>-1</sup>). In those same trials, Pierce had a 766.4 kg m<sup>-3</sup> grain volume weight which was 14.2 and 2.1 kg m<sup>-3</sup> greater than Maier and Ben, respectively. Pierce had a 30.6 mg kernel weight which was lower than Maier (31.8 mg) and Ben (36.0 mg). On the basis of 17 location-years in the North Dakota Research Extension Centers' varietal trials from 1998 to 2000, Pierce had a higher grain yield (3790 kg ha<sup>-1</sup>) than Maier (3642 kg ha<sup>-1</sup>) and Ben (3635 kg ha<sup>-1</sup>). In those same trials, Pierce had a 779.2 kg m<sup>-3</sup> grain volume weight, which was similar to Ben (780.5 kg m<sup>-3</sup>) and greater than Maier (771.5 kg m<sup>-3</sup>).

Grain samples from quality drill strips grown at 18 sites-years (1998–2000) were tested for durum wheat quality at North Dakota State University (NDSU). The semolina extraction rate of Pierce (61.1%) on the Buhler-Miag laboratory mill at the Department of Cereal and Food Sciences, North Dakota State University, is lower than Ben (62.7%). Pierce has very strong gluten mixing characteristics (classification: 7.0) as estimated by mixograph, identical to Maier (7.0) and stronger than Ben (6.0). Semolina protein of Pierce was 131 g kg<sup>-1</sup>, which is identical to 'Mountrail' (Elias and Miller, 2000b) and similar to 'Lebsock' (130 g kg<sup>-1</sup>) (Elias et al., 2001a) but lower than Maier (138 g kg<sup>-1</sup>). Pasta produced from Pierce has a color score of 9.5 which is similar to Maier (9.6) and higher than Mountrail (9.1).

Pierce was evaluated at the USDA-ARS, Northern Crop

Science Laboratory, Fargo, ND, for wheat stem rust (caused by *Puccinia graminis* Per.:Pers. f. sp. *tritici* Eriks. & E. Henn) and was found to be highly resistant to pathotypes Pgt-QCCJ,-QTHJ,-RTQQ,-TMLK,-TPMK, and-HPHJ. Pierce has exhibited adult plant resistance to leaf rust (caused by *P. triticina* Eriks.) similar to Munich and Plaza when evaluated in the URDN at Langdon from 1998 to 2000. Pierce has a moderate level of resistance to tan spot [caused by *Pyrenophora tritici-repentis* (Died.) Drechs], which is similar to Maier and Mountrail. Pierce is moderately susceptible to Fusarium head blight (caused by *Fusarium graminearum* Schwabe), which is similar to Ben and Munich.

Breeder seed will be maintained by the Seedstocks Project, Agricultural Experiment Station, North Dakota State Univ., Fargo, ND 58105-5051. Pierce is protected under the U.S. Plant Variety Protection Act for Foundation, Registered, and Certified seed classes (PVP Certificate no. 200300035). Small quantity of seed may be obtained from the corresponding author for research purposes.

E.M. ELIAS,\* F.A. MANTHEY, AND J.D. MILLER

### Acknowledgments

The authors thank D.M. Williams, (Dep. of Plant Sciences, NDSU, Fargo) for seed maintenance; B.L. Hinsz, and J.H. Osborne, (Dep. of Cereal Science, NDSU, Fargo) for field plot quality evaluations; G.A. Hareland (USDA-ARS, Fargo) for Uniform Regional Durum Nursery quality evaluations; L.J. Francl (Dep. Of Plant Pathology, NDSU, Fargo) for tan spot evaluations; and R.W. Stack (Dep. of Plant Pathology, NDSU, Fargo) for Fusarium head blight evaluations.

### References

- Cantrell, R.G., J.W. Dick, J.D. Miller, and J.S. Quick. 1986. Registration of 'Monroe' durum wheat. *Crop Sci.* 26:200.  
 Elias, E.M., J.D. Miller, and L.J. Francl. 1997. Registration of 'Munich' durum wheat. *Crop Sci.* 37:290.  
 Elias, E.M., and J.D. Miller. 1998. Registration of 'Ben' durum wheat. *Crop Sci.* 38:895.  
 Elias, E.M., and J.D. Miller. 2000a. Registration of 'Maier' durum wheat. *Crop Sci.* 40:1498–1499.  
 Elias, E.M., and J.D. Miller. 2000b. Registration of 'Mountrail' durum wheat. *Crop Sci.* 40:1499–1500.  
 Elias, E.M., J.D. Miller, and F.A. Manthey. 2001a. Registration of 'Lebsock' durum wheat. *Crop Sci.* 41:2007–2008.  
 Elias, E.M., J.D. Miller, and F.A. Manthey. 2001b. Registration of 'Plaza' durum wheat. *Crop Sci.* 41:2008.

E.M. Elias, Dep. of Plant Sciences, North Dakota State Univ., Fargo, ND, 58105; F.A. Manthey, Dep. Of Cereal Science, North Dakota State Univ., Fargo, ND, 58105, J.D. Miller, USDA-ARS, Northern Crop Science Lab., Fargo, ND 58105. Registration by CSSA. Accepted 30 Nov. 2003. \*Corresponding author (elias.elias@ndsu.nodak.edu).

Published in *Crop Sci.* 44:1025 (2004).

### Registration of 'Anchor' Wheat

'Anchor' (Reg. no. CV-939, PI 632275) hard red winter wheat (*Triticum aestivum* L.) was developed by the Colorado Agricultural Experiment Station and released to seed producers in August 2002. Anchor was released on the basis of its resistance to the Russian wheat aphid [RWA, *Diuraphis noxia* (Mordvilko)] and its adaptation to dryland production in eastern Colorado and the west-central Great Plains.

Anchor was selected from the crosses and backcrosses 'Akron'/'Halt'//4\*Akron made between 1994 and 1998. Halt (PI 584505; Quick et al., 1996b) and Akron (PI 584504; Quick et al., 1996a) are cultivars released by Colorado State Univer-

sity in 1994. After each generation of backcrossing, progeny were screened for RWA resistance in standard greenhouse screening tests (Nkongolo et al., 1989) and resistant plants were used as parents for the next backcross. BC<sub>4</sub>F<sub>1</sub> plants were screened for RWA resistance in fall 1998, and resistant plants were increased by self pollination in the greenhouse during winter 1998-1999. Vernalized seedlings of BC<sub>4</sub>F<sub>1,2</sub> lines were grown in a hand-transplanted field nursery in the San Luis Valley, CO, during summer 1999. Eighty-five BC<sub>4</sub>F<sub>1,3</sub> lines, including Ankor (assigned experimental number CO99508), were harvested in early September 1999 and planted in unreplicated trials at three dryland locations in eastern Colorado in late Sept. 1999. Ankor was advanced from preliminary yield trials in 1999 to the dryland Colorado Uniform Variety Performance Trials (Colorado UVPT) in 2001 and 2002. Breeder seed of Ankor originated from a composite of 281 BC<sub>4</sub>F<sub>3,4</sub> headrows selected from headrow purification for RWA resistance and visual uniformity in Yuma, AZ, during 2001.

Ankor is an awned, white-chaffed, medium maturity, semi-dwarf hard red winter wheat. Ankor has very lax, recurved, and tapering heads with white awns. Ankor has white glumes that are medium long and medium wide with oblique shoulders and acuminate beaks. Ankor has kernels that are ovate, red, and hard textured with a short non-collared brush, a rounded cheek, a wide and shallow crease, and a dark brown phenol reaction. Ankor has a semierect juvenile plant growth habit, and flag leaves that are erect and not twisted.

Ankor has medium maturity, 145 d to heading from 1 January, similar to Akron and about 4 d later than 'Prairie Red' (PI 605390). Plant height of Ankor is medium-short (76.5 cm), 4.3 cm taller than Prairie Red and similar to Akron. Coleoptile length of Ankor (76.3 mm,  $n = 6$  observations) is slightly less than Prairie Red (86.2 mm) and similar to Akron (79.9 mm). The straw strength of Ankor is good (3.7 score, 1 = erect to 9 = flat,  $n = 3$  replications), slightly better than Akron (5.7 score) as determined on the basis of limited evaluation and observation in the 2002 Colorado Irrigated Variety Performance Trial (IVPT). On the basis of field evaluations under natural infection in Colorado and cooperative evaluations through the USDA Regional Testing Program, Ankor is moderately resistant to stem rust (caused by *Puccinia graminis* Pers.:Pers. f. sp. *tritici* Eriks & E. Henn., races RRTS and TPMK), susceptible to leaf rust (caused by *P. triticina* Eriks., field composite of prevalent races), and susceptible to both *Wheat streak mosaic virus* and Barley yellow dwarf virus. Ankor is susceptible to the Great Plains biotype of Hessian fly [*Mayetiola destructor* (Say)] and greenbug [*Schizaphis graminum* (Rondani)]. Resistance to RWA in Ankor is conditioned by the *Dn4* resistance gene. Average resistance scores for Ankor (2.0 score, 1 = very resistant to 5 = very susceptible,  $n = 7$  observations) in standard greenhouse seedling screenings tests are lower than the recurrent parent Akron (4.9 score).

Ankor was tested at 17 trial locations of the dryland Colorado UVPT during 2001, 2002, and 2003. Grain yields of Ankor (2943 kg ha<sup>-1</sup>) were slightly higher than Prairie Red (2886 kg ha<sup>-1</sup>;  $P > 0.05$ ) and Halt (2874 kg ha<sup>-1</sup>;  $P > 0.05$ ) and similar to Akron (2936 kg ha<sup>-1</sup>;  $P > 0.05$ ). Grain volume weight of Ankor (741 g L<sup>-1</sup>) was similar to Akron (742 g L<sup>-1</sup>), Prairie Red (740 g L<sup>-1</sup>), and Halt (739 g L<sup>-1</sup>). Ankor was tested at three locations of the Colorado IVPT in 2002. In these trials, Ankor (5301 kg ha<sup>-1</sup>) had higher yield than Akron (4670 kg ha<sup>-1</sup>;  $P > 0.05$ ), Prairie Red (4918 kg ha<sup>-1</sup>;  $P > 0.05$ ), and 'Yumar' (PI 605388; 5012 kg ha<sup>-1</sup>;  $P > 0.05$ ).

Milling and bread baking characteristics of Ankor were determined from composite samples of grain from multiple

locations in 2000 and 2001 and four single-location evaluations from the 2001 growing season. Relative to its recurrent parent Akron, Ankor had higher grain volume weight (727 vs. 721 g L<sup>-1</sup>), kernel weight (24.8 vs. 23.6 mg kernel<sup>-1</sup>), and percent large kernels (36.3 vs. 27.5% kernels that do not pass a Tyler #7 sieve, 2.92 mm openings), lower mixograph mixing tolerance score (2.3 vs. 3.5; 0 = unacceptable to 6 = excellent scale), and shorter mixograph mixing time (2.9 min vs. 3.6 min). Ankor and Akron were similar for flour protein concentration (Ankor 117 g kg<sup>-1</sup> vs. Akron 121 g kg<sup>-1</sup>), mixograph water absorption (Ankor 609 g kg<sup>-1</sup> vs. Akron 614 g kg<sup>-1</sup>), flour ash (Ankor and Akron both 4.3 g kg<sup>-1</sup>), Quadromat Senior flour extraction (Ankor 661 g kg<sup>-1</sup> vs. Akron 658 g kg<sup>-1</sup>), and pup loaf volume (Ankor 0.88 L vs. Akron 0.92 L) and crumb grain score (Ankor 3.9 score vs. Akron 4.0; 0 = unacceptable to 6 = excellent scale).

The Colorado Agricultural Experiment Station will maintain Breeder seed of Ankor. Multiplication and distribution rights of other classes of pedigreed seed have been transferred from the Colorado Agric. Exp. Stn. to the Colorado Wheat Research Foundation, 7100 S. Clinton St., Suite 120, Centennial, CO 80112. Ankor has been approved for U.S. Plant Variety Protection under P.L. 91-577 with the certification option. Small quantities of seed for research purposes may be obtained from the corresponding author for at least 5 years from the date of this publication.

S.D. HALEY,\* J.S. QUICK, J.J. JOHNSON, F.B. PEAIRS, J.A. STROMBERGER, S.R. CLAYSHULTE, B.L. CLIFFORD, J.B. RUDOLPH, O.K. CHUNG, AND B.W. SEABOURN

#### Acknowledgments

Ankor was developed with financial support from Colorado Agric. Exp. Stn. Projects 795 and 646, the Colorado Wheat Administrative Committee, and the Colorado Wheat Research Foundation.

#### References

- Nkongolo, K.K., J.S. Quick, W.L. Meyer, and F.B. Peairs. 1989. Russian wheat aphid resistance of wheat, rye, and triticale in greenhouse tests. *Cereal Res. Commun.* 17:227-232.
- Quick, J.S., G.E. Ellis, R.M. Normann, J.R. Stromberger, J.F. Shanahan, and K. Lorenz. 1996a. Registration of Akron wheat. *Crop Sci.* 36:211.
- Quick, J.S., G.E. Ellis, R.M. Normann, J.A. Stromberger, J.F. Shanahan, F.B. Peairs, J.B. Rudolph, and K. Lorenz. 1996b. Registration of Halt wheat. *Crop Sci.* 36:210.

S.D. Haley, J.S. Quick, J.J. Johnson, J.A. Stromberger, S.R. Clayshulte, and B.L. Clifford, Soil and Crop Sciences Dep., Colorado State Univ., Fort Collins, CO 80523; F.B. Peairs and J.B. Rudolph, Bioagricultural Sciences and Pest Management Dep., Colorado State Univ., Fort Collins, CO 80523; O.K. Chung and B.W. Seabourn, USDA/ARS/Grain Marketing and Production Research Center/Hard Winter Wheat Quality Laboratory, 1515 College Avenue, Manhattan, KS 66502. Registration by CSSA. Accepted 30 Nov. 2003. \*Corresponding author (scott.haley@colostate.edu).

Published in *Crop Sci.* 44:1025-1026 (2004).

#### Registration of 'Jerry' Wheat

'Jerry' hard red winter wheat (*Triticum aestivum* L.) (Reg. no. CV-940, PI 632433) was developed by the North Dakota Agricultural Experiment Station in cooperation with the USDA-ARS and released in July 2001. Jerry was named after Gerald (Jerry) Johnson who was the research technician on the winter wheat breeding program at North Dakota State