Registration of ‘Ulen’ Wheat

‘Ulen’ is a hard red spring wheat (Triticum aestivum L.) (Reg. no. CV-984, PI 639921) cultivar developed and released by the Minnesota Agricultural Experiment Station in cooperation with USDA-ARS in January 2005. Ulen was released on the basis of its high grain yield, high grain protein content, and early maturity. Ulen was named after a town in its region of adaptation in northwest Minnesota.

Ulen was derived from the cross MN92044/HJ98, made in 1994. The unreleased experimental line MN92044 has the pedigree ‘Grandin’/Nordic’. Grandin (PI 531005) was developed and released from North Dakota State University in 1989 and Nordic (PI 506405) was developed and released by Nickerson American Plant Breeders, Inc. in 1986. The cultivar HJ98 (Busch et al., 2000) was released by the Minnesota Agricultural Experiment Station in cooperation with USDA-ARS in 1998.

The F₂ population producing Ulen was selected for resistance to leaf rust (caused by Puccinia triticina Eriks.) and stem rust (caused by Puccinia graminis Pers.: Pers.) resistance in a field planting at St. Paul in 1995. The F₂ generation was advanced by single seed descent in a greenhouse. The selection resulting in Ulen was a single plant selected for leaf and stem rust resistance and acceptable plant height from an F₄ headrow in 1996 and this seed was increased in a winter nursery in Arizona during 1996 and 1997. This selection was tested under the experimental designation MN97803 in yield trials from 1997 through 2001 and following purification as MN97803-A in 2002 through 2004. The purification process was initiated in 2000 when 100 heads from F₄₉ plants of MN97803 were harvested and grown as individual headrows in a winter increase in Arizona. Ninety-five of these rows were selected based on uniformity of height. The 95 selections were evaluated for agronomic characteristics at St. Paul in 2001. Sixty-one were selected based on uniformity of heading date, height, and straw strength and equal amounts of seed from each selection were bulked to form MN97803-A.

MN97803-A and MN97803 were evaluated in replicated yield trials in 2002. No differences (P > 0.05) in grain yield between MN97803 and MN97803-A were identified, although MN97803-A was more uniform for plant height than MN97803. Off-type plants that are approximately 10 cm taller occur in MN97803-A at a frequency of about 3 in 10,000.

Approximately 1000 kg of Breeder seed of MN97803-A was produced in 2002 by the Minnesota Crop Improvement Association and further increased in Minnesota in 2003 and 2004. MN97803-A was released as Ulen in 2005.

Ulen has erect juvenile plant growth, a recurved flag leaf, white glumes with an oblique shoulder and an acuminate beak. The spike is awned, middense, and tapering. The kernel is red and ovate in shape with angular cheeks and a narrow, middeep crease. The brush on the kernel has a collar and is medium in length.

Ulen was tested as MN97803 and MN97803-A in Minnesota 13 environments from 2001 thru 2003. Ulen averaged 3496 kg ha⁻¹ produced by the check cultivar (2375) syn. Pioneer 2375) and ‘Verde’ (PI 592561, PI 592561 respectively. Ulen has medium straw strength, a lodging rating of 2.5 on a scale of 0 (erect) to 9 (lodged) in environments at which lodging occurred from 2001 thru 2004. Ulen has LOD 0.56% higher than check ‘Wheaton’ (PI 469271, Busch et al., 1984) averaged 13 kg ha⁻¹, 146 g kg⁻¹, and loaf volume of 211 cm³ when using a baking recipe including 100 g of flour. Compared to HJ98, Ulen is 15 kg m⁻³ higher (significant at P < 0.01) in grain weight, 10 g kg⁻¹ higher (P < 0.01) in grain protein, and similar (P > 0.05) in loaf volume. Compared to Oxen, Ulen is 13 kg m⁻³ higher (P < 0.01) in grain yield, 2.0 d earlier (P > 0.05) in physiological maturity and scored for preharvest sprouting in tests using intact spike, physiological maturity and scored for preharvest sprouting.

Ulen has LOD 0.56% higher than check ‘Oxen’ (PI 596770), the most widely adapted cultivar and averages 87 cm, 4 cm taller than HJ98 and 0.5 d earlier than ‘Oxen’ (PI 596770), the most widely adapted cultivars in the region have resistant ratings (Lr10 and Lr23. Seedling plants of Ulen are resistant to common races such as THBJ, TDBJ, and MBBG. Ulen is moderately resistant in field plots to a mixture of common leaf rust races, which indicated that it has adult plant resistance genes. Field reaction to the foliar disease Septoria tritici blotch (caused by Septoria tritici Roberge ex Desmaz.) was determined for research purposes may be obtained from J. A. Anderson.

The USDA Spring Wheat Quality Laboratory evaluated bread-making properties of Ulen using 13 environments from 2001 thru 2003. Ulen has LOD 0.56% higher (significant at P < 0.01) in grain weight, 10 g kg⁻¹ higher (P < 0.01) in grain protein, and similar (P > 0.05) in loaf volume. Ulen’s average mixograph score was 1-to-9 scale (1 = weakest, 9 = strongest) whereas HJ98 and Oxen were rated 3.5 and 3.4, respectively. (P > 0.05). Ulen is rated as moderately susceptible to Fusarium head blight, lodging, and leaf blight disease (caused by Pyrenophora tritici-repentis (Died.) Drechs.) and Septoria tritici (Pers.: Pers.) resistance and stem rust at the seedling and adult plant stages. Since the beginning of field evaluation, no stem rust has been found on low seedling infection types to races MBBG, Ulen was postulated to have seedling leaf rust resistance genes Lr10 and Lr23. Seedling plants of Ulen are resistant to common races such as THBJ, TDBJ, and MBBG. Ulen is moderately resistant in field plots to a mixture of common leaf rust races, which indicated that it has adult plant resistance genes. Field reaction to the foliar disease Septoria tritici blotch (caused by Septoria tritici Roberge ex Desmaz.) was determined for research purposes may be obtained from J. A. Anderson.

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