REGISTRATIONS OF CULTIVARS

Registration of ‘Oklee’ Wheat

‘Oklee’ is a hard red spring wheat (Triticum aestivum L.) (Reg. no. CV-963, PI 634553) developed and released by the Minnesota Agricultural Experiment Station in cooperation with USDA-ARS in January 2003. It was named after a town in its region of adaptation in northwest Minnesota. Oklee was released on the basis of its high grain yield, high grain volume weight, high grain protein content, and early maturity. In addition, Oklee has moderate resistance to Fusarium head blight (FHB, caused primarily by Fusarium graminearum Schwabe).

Oklee was derived from the cross ‘2375’/SBF0670, made by the former Pioneer Hi-Bred spring wheat breeding program in the USA. The cultivar 2375 (PI 601477, syn. Pioneer 2375) has the pedigree Olaf//Era/Sugamuxi 68/3/Chris/ND487//Lark and was widely grown in Minnesota during the mid-1990s due to its moderate resistance to FHB. SBF0670 is an unreleased line whose pedigree contains hard red spring lines once prominent in the region including ‘Chris’ (CIttr 13751, Heiner and Johnston, 1967), ‘Era’ (CIttr 13986, Heiner and McVey, 1971), and ‘Butte’.

The F₂ population producing Oklee was selected for 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 1993. The F₃ generation was advanced by single seed descent in a greenhouse. The selection resulting in Oklee was selected from a single plant in an F₄ headrow in 1994 and this seed was increased in a winter nursery in Arizona during 1994 and 1995. This selection was tested under the experimental designation MN95002 in trials from 1995 through 2000 and following purification as MN95002-A in 2001 and 2002. The purification process was initiated in 1999 when 100 heads from F₄ plants of MN95002 were harvested and grown as individual headrows in a winter increase in Arizona. Eighty of these rows were selected based on uniformity of height among and within rows. All selections were similar for other morphological and seed characteristics. The 80 selections were evaluated for agronomic characteristics, and reaction to Fusarium head blight, leaf rust, and stem rust at St. Paul in 2000. No significant differences in disease reaction were observed among the 80 lines. Nineteen of the 80 selections were discarded due to delayed heading and/or shorter height. Equal amounts of seed from the remaining 61 selections were bulked to form MN95002-A. MN95002-A and MN95002 were evaluated in replicated yield trials in 2001 and 2002. No significant differences (P = 0.05) in grain yield between MN95002 and MN95002-A were identified, although MN95002-A was more uniform for plant height and heading date than MN95002. Off-type plants that are approximately 10 cm taller occur in MN95002-A at a frequency of about 3 in 10 000. Approximately 1000 kg of Breeder seed of MN95002-A was produced in 2001 by the Minnesota Crop Improvement Association and further increased in California field nurseries, similar to the resistance of 2375. In 11 FHB environments in the Uniform Regional Hard Red Spring Wheat Nursery in 1998 and 1999 and yield 3456 kg ha⁻¹ compared to an average of 3032 kg ha⁻¹ produced by the check cultivars, 2375, Verde (PI 601477, Busch et al., 1996), respectively. Oklee has strong straw and a lodging rating of 2.3 on a scale of 0 (erect) to 9 (lodged) in 21 environments. Lodging occurred from 1998 thru 2002. By comparison, the cultivars 2375, Oxen, and Verde had lodging ratings of 2.6, and 2.1, respectively.

Oklee has moderate resistance to FHB in most of the field nurseries, similar to the resistance of check cultivars from 1998 through 2001. Oklee averaged increased spikelets, 16.7% visually scabby kernels, 8.8 kg mg⁻¹ of the mycotoxin deoxynivalenol (DON). In the same trials, the resistant check ‘BacUp’ (PI 596533, Busch et al., 1998) and the susceptible check ‘Wheaton’ (PI 469271, Busch et al., 1996) had 61.8% diseased spikelets, 8.5 and 45.5% of 38.3 mg kg⁻¹ DON, respectively. Oklee is currently prevalent races of stem rust as seedling in greenhouse tests and as adults in field tests with Oklee is moderately susceptible in seedling plants to leaf rust races THBJ that is the most common race in the spring wheat area in Minnesota and the Dakotas, but is resistant to most other leaf rust races. Adult plants of Oklee are moderately resistant to prevalent races of FHB. Oklee is moderately resistant to the race 1 isolate PTVI of tan spot [caused by Pyrenophora tritici Drechs.] based on greenhouse assays. Fungal foliar diseases tan spot and Septoria tritici (caused by Septoria tritici Roberge ex Desmaz.) is less than 2375.

The USDA Spring Wheat Quality Laboratory evaluated bread-making properties of Oklee from 17 yield trial plots from 1998 through 2000. The average grain volume weight of 78.84 kg hL⁻¹ of 150 g kg⁻¹, and loaf volume of 202.5 cm³. Oklee is 1.35 kg hL⁻¹ higher in grain protein, and 6% stronger than 2375 and 0.6 d earlier than Oxen (PI 601477, syn. Pioneer 2375) is a semidwarf cultivar and averages 75 cm as Oxen, and is 3 cm shorter than 2375 in height. In 35 Minnesota trials conducted from 1998 through 2001, Oklee yielded 3664 kg ha⁻¹ compared to 2375 and 3825 kg ha⁻¹ for Oxen. Oklee had 29 environments in the Uniform Regional Hard Red Spring Wheat Nursery in 1998 and 1999 and yielded 3456 kg ha⁻¹ compared to an average of 3032 kg ha⁻¹ produced by the check cultivars, 2375, and 3825 kg ha⁻¹ for Oxen.