Registration of ‘Pembina’ Soybean

‘Pembina’ soybean [Glycine max (L.) Merr.] (Reg. no. CV-478, PI 638510) was developed by the North Dakota Agricultural Experiment Station, North Dakota State University, and released on 18 Jan. 2005. Pembina has high yield for its early maturity (relative maturity 00.5) and is iron efficient and resistant to lodging. Although unverified, Pembina appears to contain a major allele that provides resistance to Phytophthora sojae M.J. Kaufmann & J.W. Gerdemann Race 4. The intent is for Pembina to replace the cultivar Jim on fields where Race 4 of Phytophthora root rot is reducing yield of Jim (Helms and Nelson, 1998b). Jim is susceptible to Race 4, while Pembina is resistant. Because Pembina matures earlier than Jim, Pembina will provide a replacement for Jim in the northern geographical region where Jim is too late in maturity.

Pembina is an F4-derived line, originally designated ND99–2282, with the pedigree ND93–5849 × Pioneer 9004. ND93–5849 is an experimental line that was developed by North Dakota State University and was never released. The pedigree of ND93–5849 is ‘KG20’ × ‘Maple Donovan’ (Park et al., 1988; Bernard et al., 1988). The pedigree of KG20 is ‘McCall’ × 2S11 (Lambert and Kennedy, 1979). The pedigree of 2S11 is 059–903 × ‘Hardome’ (Bernard et al., 1988). The experimental line 059–903 is a Fiskeby III selection (PI 438471). The pedigree of Pioneer 9004 is ‘Maple Ridge’ × ‘Lakota’ (Voldeng et al., 1985; Bahrenfus and Fehr, 1984).

The cross of Pembina was made in the summer of 1996 at Casselton, ND. The F1 plants were grown in the 1996–1997 winter nursery in Chile. The F2 population was grown in the summer of 1997 and advanced to the F3 generation by the single-pod bulk method (Fehr, 1991). The F3 population was grown in the 1997–1998 Chile winter nursery and advanced to the F4 generation by the single-pod bulk method. Individual F4 plants were grown in the Casselton nursery and threshed in the fall of 1998. F4:5 plant-rows were evaluated in 1999 at the Prosper, ND, nursery. Pembina was first tested as ND99–2282 in replicated yield trials in North Dakota in 2000.

Pembina was tested in the USDA Uniform Regional Trials: Northern States in 2004 (Abney, 2004). In 1 yr of USDA Uniform Regional Tests, Pembina yielded 13% less than Jim and was 3 d earlier in maturity. Protein content was 420 g kg⁻¹ for Pembina and 419 g kg⁻¹ for Jim. Oil content was 187 g kg⁻¹ for Pembina and 177 g kg⁻¹ for Jim. Seeds of Pembina are 9 mg seed⁻¹ smaller than Jim (159 g kg⁻¹).

Pembina was evaluated by the North Dakota State University soybean breeding program for a total of 21 location-years that included 2001, 2002, and 2004. Pembina yielded 7% less than Jim and 17% less than ‘Traill’ in North Dakota trials averaged across 2001, 2002, and 2004 (Helms and Nelson, 1998a). Pembina matured 10 September, which was 3 d earlier than Jim and 7 d earlier than Traill. Lodging was rated on a 1 to 5 scale with 1 the best and 5 the worst. Pembina had a lodging score of 1.6, compared to Jim with a score of 1.8, and Traill with a score of 1.8. Plant height of Pembina was 0.53 m compared to Jim and Traill with a height of 0.58 m. Iron deficiency chlorosis was rated on a 1 to 5 scale with 1 the best and 5 the worst. When Pembina was evaluated for iron-deficiency chlorosis, in 2004 at four sites in North Dakota, Pembina was moderately resistant to iron-deficiency chlorosis with a score of 2.8 versus a score of 2.5 for Jim and 2.1 for Traill.

Pembina has an indeterminate growth habit. It has green flower color, gray pubescence, brown pod coat, and yellow hilum. It is a maturity Group 00 cultivar that is generally adapted as a full-season cultivar from 48 to 49 days to May 1 in the northern Great Plains. Pembina will provide a replacement for Jim in the northern geographical region where Jim is too late in maturity.

T.C. Helms,* B.D. Nelson.

References


*Corresponding author (helms@ndsu.edu).

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