Registration of S99-11509 and S99-11986 Improved Soybean Germplasm with Diverse Pedigree

Soybean [Glycine max (L.) Merr.] germplasm lines ‘S99-11509’, (Reg. no. GP-307, PI 636695) and ‘S97-11986’ (Reg. no. GP-308, PI 636696) were developed and released in June, 2004 for use as parental lines in soybean improvement programs by the University of Missouri-Delta Center, Portageville, MO, the USDA-ARS, and the Illinois Agricultural Experiment Station. S99-11509 and S99-11986, both group IV with relative maturities of 4.4 and 4.8, respectively, combine high yield on less productive soils of the southern USA with unique diversity that is not known to be present in the current gene pool for cultivar development in North America. These lines were developed through an early generation testing procedure. The progenitor populations were yield tested as F₂ families in the F₃ and F₄ generations at Urbana, IL. S99-11509 and S99-11986 were derived from single-plant selections made in the F₂ generation and bulk harvested in the F₃ at Urbana, IL.

S99-11509 is from LG91-7320 × ‘Probst’ (Wilcox and Abney, 1995). LG91-7320 is from ‘BSR 101’ (Tachibana et al., 1987) × LG82-8379. LG82-8379 is from PI 68508 × FC 04007B (Bernard et al., 1987). PI 68508, maturity group II, was collected in northeastern China in 1926. FC 04007B, maturity group III, was imported in 1924 from an unknown origin. Using RAPD markers, Brown-Guedira et al. (2000) showed that PI 68508 was not closely related to any of the major ancestral lines of current U.S. cultivars, whereas FC 04007B was classified in the same genetic group as the ancestral lines Richland and Haberlandt. S99-11509 is indeterminate in growth habit with purple flowers, tawny pubescence, tan pods, shiny yellow seed coats, and black hila.

S99-11986 is derived entirely from plant introductions from a cross of LG87-1782 × LG88-3146. LG87-1782 is from PI 297515 × PI 290126B, and LG88-3146 is from PI 427099 × PI 445830 (Bernard et al., 1987, 1989). PI 290126B and PI 297515, maturity group II, were introduced from Hungary in 1963 and 1964, respectively. PI 427099 and PI 445830, maturity group I, were introduced from China in 1978 and 1980, respectively. Using RAPD markers, Brown-Guedira et al. (2000) showed that PI 290126B and PI 297515 were placed in the same genetic group as the minor ancestral line Korean. They grouped PI 427099 with the ancestral lines Dunfield and Mukden, and PI 445830 was placed in a third genetic group with major ancestral lines Lincoln, Illini, and S-100. S99-11986 is indeterminate in growth habit with white flowers, tawny pubescence, brown pods, shiny yellow seed coats, and black hila. These lines were tested in southeastern Missouri research trials in four environments in 2001 and five environments each in 2002 and 2003, respectively, and were compared with DP4748S, a high yielding late maturity group IV variety from Delta and Pine Land Co, Scott, MS (Wiebold et al., 2003). S99-11509 and S99-11986 were equal in yield to DP4748S in three tests on very sandy soils and were 2 and 4% less, respectively, in six tests on sharkey clay (Vertic Hapludult, very fine montmorillonitic, thermic) than DP4748S. However, in five tests on productive loam soils, yields of S99-11509 and S99-11986 were 10 and 15% less, respectively, than DP4748S. Good performance of S99-11509 and S99-11986, both group IV with relative maturities of 1.8 for both breeding lines versus 2.0 for DP4748S. S99-11509 matured 4 d earlier. Lodging scores (1 for KS4602N (Paris, 2003). Seed protein and oil averaged 428 and 190 g kg⁻¹, respectively, versus 433 and 206 g kg⁻¹ for DP4748S. Seed size of S99-11986 averaged 199 g kg⁻¹, compared with 152 mg seed⁻¹ for K4602N (Paris, 2004). Seed size of S99-11509 and K4602N averaged 152 mg seed⁻¹ (Paris, 2004).

Both S99-11509 and S99-11986 are resistant [caused by Diaporthe phaseolorum ( Cooke var. meridionalis F.A. Fernandez)] and bacteria by Xanthomonas axonopodis pv. glycines (Naleno et al.). They are susceptible to soybean cyst nematode, Heterodera glycines Ichinohe, and root knot nematode, Meloidogyne spp.).

Seeds of S99-11509 and S99-11986 will be USDA Soybean Germplasm Collection and may be requested from the corresponding author for research purposes, including the development and commercialization of exotic germplasm. We ask that the appropriate recognition be made of exotic germplasm that contributes to the development of a new cultivar.

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References


Brown-Guedira, G.L., J.A. Thompson, R.L. Nelson, and M.L. Warden, and PI 445830 was placed in a third genetic group with the ancestral lines Dunfield and Mukden. They are susceptible to soybean cyst nematode, Heterodera glycines Ichinohe, and root knot nematode, Meloidogyne spp.). Seeds of S99-11509 and S99-11986 will be USDA Soybean Germplasm Collection and may be requested from the corresponding author for research purposes, including the development and commercialization of exotic germplasm. We ask that the appropriate recognition be made of exotic germplasm that contributes to the development of a new cultivar.

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References


