Registration of ‘Clifford’ Soybean

‘Clifford’ soybean [Glycine max (L.) Merr.] (Reg. no. CV-363, PI 596414) was developed by the USDA-ARS, in cooperation with the North Carolina Agricultural Research Service and the Maryland and Virginia Agricultural Experiment Stations. It was released in 1994 to provide a cultivar of Group V maturity with high productivity, and resistance to lodging and soybean mosaic virus. Clifford is most adapted to production areas between 34° and 39° N lat. Clifford was named in honor of Clifford Elledge, a technician in the soybean breeding program at North Carolina State University from 1946 to 1977.

Clifford is the bulked increase of an F6 line from the cross N77-114 × N77-179. The maternal parent, N77-114, was derived from a cross between the cultivar Essex and N70-2173 (8). Parents of N70-2173 were ‘Hampton’ and ‘Ransom’ (3,9). The paternal parent, N77-179, was derived from the cross N70-1549 × N72-3213. Parents of N70-1549 were the cultivar Dare and D65-6765 (2). Parents of D65-6765 were D58-3358, a ‘Jackson’ backcross derivative [Jackson (4) × D49-2491], and D59-9289 (6,7). Parents of D59-9289 were D51-4877 (a sib of the cultivar Hood) and D55-4168, derived from ‘Ogden’ × ‘Biloxi’ (1,7). The paternal parent of N77-179, N72-3213, was derived from a cross between D67-85, essentially similar to Lee, and N64-2451, a sib of the cultivar Ransom (4,3). The parents of Clifford were crossed in 1985 at Clayton, NC, and the F1 was grown in the USDA Tropical Agriculture Research Station at Isabela, PR, from November 1985 to April 1986. The F1 progeny were inbred to the F5 generation using single-seed descent. Initial testing of Clifford occurred in North Carolina in 1987 and 1988. Prior to release, the breeding line was designated N87-325.

Clifford was tested in the Uniform Preliminary V Nursery in 1989 and the Uniform Group VI Nursery in 1990 and 1991 (4,5). In those tests, Clifford matured 1 d later in full-season planting than Essex and produced 12% higher seed yield than Essex. Seed size averaged 17.5 g 100 seed⁻¹, 3.0 g 100 seed⁻¹ greater than Essex. The average seed protein and oil concentrations for Clifford were 400 and 210 g kg⁻¹ seed, respectively, compared with 422 and 206 g kg⁻¹ seed for Essex.

Clifford has yellow seeds with shiny luster and brown hilum, purple flowers, tawny pubescence, tan pod walls, and determinate growth habit. Clifford is resistant to diseases, frogeye leafspot (caused by Cercospora sojina K. Hara; syn. C. daizu Miura) and soybean mosaic potyvirus (SMV). It is very susceptible to stem canker [caused by Diaporthe phaseolorum (Cooke & Ellis) Sacc. f. sp. meridionalis Morgan-Jones].

In 1992, breeder seed was provided to the North Carolina Foundation Seed Producers, Inc., for increase. Foundation seed was distributed to other states by request and according to seed supply. The North Carolina Agricultural Research Service will be responsible for maintaining breeder seed. Small samples (500 seeds) of Clifford can be obtained from the corresponding author for at least 5 yr.

Registration of ‘Flint’ Soybean

‘Flint’ soybean [Glycine max (L.) Merr.] (Reg. no. CV-362, PI 595843) was developed by the Ohio Agricultural Research and Development Center of The Ohio State University (OSU). It was released on 1 Aug. 1996 because of its potential high yield and resistance to Phytophthora rot (by M.J. Kaufmann & J.W. Gerdemann).

Flint is an F4-derived line, originally obtained from the cross GR8836 (4) × Elgin 87 (2). Tests began in the summer of 1986 at Wooster, OH. Flint was evaluated in early-generation testing. The F2–derived line was tested in Ohio in 1988 as an F3, and as an F4 derived from an F4 plant of OX86263-2-9, in Ohio locations from 1990 to 1995 (5). Flint was evaluated regionally in the Northern Uniform Soybean Preliminary Test IIB in 1993 and in the Northern Uniform Soybean Test IIB in 1994 and 1995 (6).

Flint has indeterminate stem habit, purple flower, brown pods, and dull yellow seedcoat. Seedcoat peroxidase activity is high. Flint is a Maturity Group II soybean (2.9) cultivar, generally adapted as a full-season soybean to 42° N lat. In Ohio tests from 1992 to 1995, seed yield of Flint was equal to ‘Resnik’ (3430 kg ha⁻¹) (3), and 1.5 d earlier (5). Height of the two cultivars was similar; Resnik having slightly better lodging resistance (1.5 for Resnik). In comparison with Resnik, Flint's seed protein content was 14 g kg⁻¹ less, while the seed oil content of Resnik was 3 g kg⁻¹ greater than Resnik. Seed size of Flint is 14 g kg⁻¹.

Flint has the Rps1-k gene for race-specific resistance to Phytophthora rot. In layer-tests with compatible races of Phytophthora, Flint demonstrated moderate tolerance, slightly better than ‘Conrad’ (1). Flint is moderately susceptible to Phytophthora blight [caused by Phytophthora gregaria (Allington & W. Gams)].

Breeder seed of Flint was distributed to Ohio Seed Co., Inc., for production of foundation seed in 1994. Flint will be maintained with the cooperation of Ohio Foundation Seeds, Inc., by The Ohio State University Research and Development Center, 1680 Mayfield Rd., OH 44691-4096. A small sample of seed for the 1997 planting season can be obtained from the corresponding author (joe.burton@ncsu.edu) for research purposes.