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Registration of 'NC-Raleigh' Soybean

Soybean [*Glycine max* (L.) Merr.] germplasm NC-Raleigh (Reg. no. CV-485, PI 641156) was cooperatively developed and released by the USDA-ARS and the North Carolina Agricultural Research Service in May 2002. It has excellent yield potential, small seed, high oil concentration, and resistance to *Soybean mosaic virus*, stem canker [caused by *Diaporthe phaseolorum* (Cooke & Ellis) Sacc. var. *caulivora* Athow & Caldwell], bacterial pustule [caused by *Xanthomonas axonopodis* pv. *glycines* (Nakano 1919) Vauterin, Hoste, Kersters & Swings 1995 = *Xanthomonas campestris* pv. *glycines* (Nakano 1919) Dye 1978b], and frogeye leaf spot (caused by *Cercospora sojina* K. Hara). It is a determinate group VII maturity soybean variety adapted to the southern USA, 27 to 37° N latitude.

NC-Raleigh is an F_5–derived selection from the cross of USDA breeding line N85–492 and USDA germplasm release N88–480, made in 1991 in North Carolina (Burton and Wilson, 1994). N85–492 was derived from the cross of N77–179 × 'Johnston' and is the maternal parent of the soybean cultivar Kuell (Burton et al., 1987; Weaver et al., 2000). N77–179 was selected from the cross of N70–1549 × N72–3213 and is a parent of soybean cultivars Clifford and Holladay (Burton et al., 1997, 1996).

The paternal parent of NC-Raleigh was N88–480, an F_3–derived breeding line selected from the fourth cycle of a recurrent selection population improvement program for higher seed oil concentration. The parents of the original population were 'Arksoy', 'Ogden', 'Lee', 'Roanoke', D60–8107, 'Jackson', and N69–2774 (USDA-ARS National Genetic Resources Program, 2005; Weiss, 1953a, 1953b; Johnson, 1958). D60–8017 was derived from the cross of D51–4877 × D55–4168. D51–4877 was derived from Roanoke × N45–745. N69–2774 is the original maintainer source for the male-sterile gene *ms1* of unknown pedigree (Brim and Young, 1971).

During the winter of 1991–1992, F_1 plants were grown at the USDA-ARS Tropical Agriculture Research Station (TARS), Isabela, PR. The F_2, F_3, and F_4 generations were advanced by the single seed descent breeding method (Brim, 1966) at Clayton, NC, in 1992, at TARS in the winter of 1992–1993, and at Clayton in 1993, respectively. In 1994, individual F_5 plants were grown and harvested at Clayton, NC. In 1995, $F_{5:6}$ plant rows were grown, harvested, and selected for yield and other agronomic traits. Plant row N95–614 was later named NC-Raleigh.

During 1999–2001, NC-Raleigh was evaluated in eight environments of the North Carolina State University Official Variety Trials (Bowman, 2001). NC-Raleigh matured the same day as Pioneer variety '97B61'. NC-Raleigh yielded 336 kg ha^{-1} greater than 97B61 (3001 kg ha^{-1}). Plant height of NC-Raleigh was 2 cm shorter than 97B61 (99 cm) across four environments.

During 1998–2000, NC-Raleigh was evaluated at 42 environments in the USDA-ARS Uniform Soybean Tests, Southern States, Group VII (Paris and Shelton, 2000). It matured 3 d later than 'Benning' and on the same day as 'Haskell', the standard control cultivars for this test (Boerma et al., 1994, 1997). Seed yield of NC-Raleigh was 61 and 115 kg ha^{-1} greater than Benning (2667 kg ha^{-1}) and Haskell (2721 kg ha^{-1}), respectively. The plant height of NC-Raleigh was 5 cm shorter than Benning and Haskell (both were 91 cm). Plant lodging was rated using a scale 1 to 5, where 1 indicates no lodging and 5 is completely lodged at maturity. NC-Raleigh had a plant lodging rating of 2, the same rating as Benning and Haskell. The 100-seed weight of NC-Raleigh (13.1 g) was smaller than that of Benning (13.9 g) or Haskell (15.1 g). The seed protein concentration for NC-Raleigh (401 g kg^{-1}) was lower than that of Benning (422 g kg^{-1}) or Haskell (417 g kg^{-1}). The oil concentration for NC-Raleigh (221 g kg^{-1}) was greater than that of Benning (201 g kg^{-1}) or Haskell (198 g kg^{-1}).

NC-Raleigh has white flowers, tawny pubescence, various hila color (brown and black), and tan pod wall color. In USDA regional tests, NC-Raleigh was rated resistant to *Soybean mosaic virus* and stem canker. It was rated susceptible to soybean cyst (*Heterodera glycines* Ichinohe) and root-knot [*Meloidogyne incognita* (Kofoid & White) Chitwood and *M. arenaria* (Neal) Chitwood] nematodes. In USDA trials in North Carolina, NC-Raleigh was rated resistant to frogeye leaf spot and bacterial pustule. It was rated moderately resistant to powdery mildew (caused by *Microsphaera diffusa* Cooke & Peck).

Seed is available from North Carolina Foundation Seed Producers, Inc. (8220 Riley Hill Rd., Zebulon, NC 27597–8773 USA 919–269–5592). Small seed quantities of NC-Raleigh will be available for research purposes from the corresponding author. It is requested that appropriate recognition be made if this germplasm contributes to the development of a new germplasm line or cultivar. Seed will also be deposited in the National Center for Genetic Resources Preservation and National Plant Germplasm System.

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