Registration of N96076L Peanut Germplasm Line

N96076L (Reg. no. GP-125, PI 641950) is a large-seeded virginia-type peanut (Arachis hypogaea L. subsp. hypogaea var. hypogaea) germplasm line with resistance to multiple diseases including early leafspot (caused by Cercospora arachidicola S. Horii), Cylindrocladium black rot (CBR) (caused by Cylindrocladium parasiticum Crous, Wingfield & Alfenas [syn. C. crotalariae (Loos) D.K. Bell & Sobers]), Sclerotinia blight (caused by Sclerotinia minor Jagger), and tomato spotted wilt caused by Tomato spotted wilt virus (TSWV). N96076L was released by the North Carolina Agricultural Research Service (NCARS) in 2005. N96076L was tested by the NCARS, by the Virginia Agricultural Experiment Station (VAES), and by the USDA-ARS Wheat, Peanut and Other Field Crops Research Unit at Stillwater, OK.

N96076L is a virginia market-type line possessing alternate branching pattern, runner growth habit, medium green foliage, large seeds with dull tan testa averaging 880 mg seed⁻¹, approximately 70% jumbo pods and 22% fancy pods. N96076L is an F₂-derived line selected from cross X91053 made in 1991 using NCUS breeding line N90004 as the female and leafspot-resistant germplasm line GP NC WS 13 (Stalker et al., 2002) as the male. N90004 was an F₂-derived line selected from NCUS cross X84002 between ‘NC 7’ (Wynne et al., 1979) and ‘Flo- rigiant’ (Carver, 1969). GP NC WS 13 has complex ancestry. One quarter of its ancestry comes from GP NC WS 4 (Stalker and Beute, 1993), a tetraploid (2n = 4x = 40) selection from a cross between PI 261942 (A. hypogaea subsp. fastigiata Waldron var. fastigiata) and leafspot-resistant diploid (2n = 2x = 20) wild species A. cardenensis Krapow & W.C. Gregory GKP 10017 (PI 262141). One quarter of GP NC WS 13’s ancestry comes from leafspot-resistant A. hypogaea PI 27807, and one half from the cultivar ‘NC 5’ (Emery and Gregory, 1970), which has moderate resistance to early leafspot. F₁ plants of cross X91053 were grown at a winter nursery in Puerto Rico, single-seed descent was practiced in the F₂ and F₃ generations, and single-plant selections were made in the F₄ generation. F₅ families were planted at Peanut Belt Research Station (PBRS) at Lewiston in Bertie County, NC, in a field receiving no fungicide treatment to control leafspot in the summer of 1995. Families exhibiting reduced levels of defoliation were harvested in bulk and retained for evaluation in the Leafspot Test, a two-rep test of defoliation, yield, and grade grown without leafspot control at PBRS in 1996. Family X91053 F₂-S-S-08: F₀5 was numbered N96076L when entered in the 1996 Leafspot Test.

Although N96076L was developed for resistance to early leafspot, it was also evaluated for resistance to other diseases common to the Virginia–Carolina region. N96076L's reaction to early leafspot was evaluated from 1996 through 2004 in 12 field trials with no application of leafspot fungicide during the entire season. Defoliation was rated on a proportional scale of 1 (no defoliation) to 9 (complete defoliation) in late September or early October each year, and yield was measured on the unsprayed plots. Although N96076L had more defoliation than resistant check GP-NC 343 (Campbell et al., 1971) (5.5 vs. 4.3, P < 0.01), it had less than either ‘NC 12C’ (Isleib et al., 1997) (5.7 vs. 6.2 defoliation score, P < 0.01) or ‘Perry’ (Isleib et al., 2003) (5.8 vs. 6.6 defoliation score, P < 0.01), the two most resistant virginia-type cultivars. N96076L did not differ significantly from any of these three checks for yield in the absence of leafspot control.

N96076L's rejections to Cylindrocladium black rot (CBR) and to Sclerotinia blight were evaluated by the NCUS breeding project from 1997 through 2004 in eight replicated tests conducted in North Carolina on naturally infested soils with no chemical control of these diseases. N96076L was not significantly different from the resistant cultivar Perry in incidence of CBR (8 vs. 10%, ns), but it did have lower CBR incidence than NC 12C (9 vs. 21%, P < 0.01) and ‘Gregory’ (Isleib et al., 1999) (8 vs. 17%, P < 0.01). N96076L was not different from the partially resistant cultivar Perry in incidence of Sclerotinia blight (7 vs. 21%, ns), but it did have lower incidence than NC 12C (6 vs. 28%, P < 0.01) and Gregory (7 vs. 30%, P < 0.01). Yield, grade and Sclerotinia blight incidence in N96076L were evaluated by USDA-ARS personnel at Stillwater, OK, in a two-rep trial conducted in infested soil at Fort Cobb, OK, during 1998. Disease incidence in N96076L was less in any of the lines tested except ‘Tamrun 98’ (Simpson et al., 2000) (16 vs. 30%, ns), but there was no variation in yield among the lines tested. Physiological resistance to S minor was documented in detached plant part inoculations under controlled laboratory conditions (Smith, 2004, p. 72–93). Lesion development measured by the area under the disease progress curve (AUDPC) was significantly smaller for all parts with the exception of mainstems when compared to NC 12C and NC 7 (P < 0.0001). In the field, resistance most likely due to avoidance was also documented. Fewer infections were detected on lateral branches of N96076L plants when compared with NC 12C (13 vs. 46%, P < 0.01), Perry (13 vs. 44%, P < 0.01), and ‘VA 98R’ (Mozingo et al., 2000) (13 vs. 23%, P < 0.01).

N96076L’s reaction to TSWV was evaluated from 1997 through 2004 in 18 field trials with seeds spaced 50 cm apart and no application of insecticides to control thrips (Frankliniella fusca (Hinds)), the vector of the virus. N96076L had lower incidence of TSWV symptoms than NC 12C (22 vs. 45%, P < 0.01), Gregory (26 vs. 33%, P < 0.01), and Perry (25 vs. 52%, P < 0.01) and was not different from resistant check PI 576636 (21 vs. 16%, ns). N96076L should be considered resistant to all four of these diseases.

Agronomic performance of N96076L was evaluated in 13 trials conducted by the NCARS breeding program over 1996 to 2004. Although yield of N96076L was not significantly different from that of NC 12C (3774 vs. 4050 kg ha⁻¹), Gregory (3703 vs. 3960 kg ha⁻¹, ns) or Perry (3702 vs. 3709 kg ha⁻¹, ns), its average pod brightness (42.7 Hunter L score) was higher than in any of the lines tested except ‘Tamrun 98’ (Simpson et al., 2000) (16 vs. 30%, ns), Perry (25 vs. 52%, P < 0.01), and Gregory (26 vs. 33%, P < 0.01), making N96076L unsuitable for use as a cultivar for the in-shell market.

N96076L is adapted to the Virginia–Carolina peanut production area. Seed of N96076L will be maintained by the N.C. Agricultural Research Service, Box 7643, N.C. State University, Raleigh, NC 27695–7643. Foundation seed will be distributed by the N.C. Foundation Seed Producers, Inc., 8220 Riley Hill Rd., Zebulon, NC 27597. The N.C. Agricultural Research Service will provide small (50–100 seed) samples to research organizations for research purposes.


References