Registration of Root-Knot Nematode Resistant Peanut Germplasm Lines NR 0812 and NR 0817

Peanut (Arachis hypogaea L. subsp. hypogaea var. hypogaea) germplasm lines NR 0812 (Reg. no. GP-123, PI 639266) and NR 0817 (Reg. no. GP-124, PI 639267) were jointly released by the USDA-ARS and the University of Georgia, College of Agricultural and Environmental Sciences, Coastal Plain Experiment Station in May 2005. Both are runner market types with very high levels of resistance to the peanut root-knot nematode [Meloidogyne arenaria (Neal) Chitwood]. The two lines were derived from a cross of ‘AgraTech 108’ (PVP no. 9600322) and GP-NC WS 5 (Stalker et al., 2002) made in 1995. NC WS 5 was derived from an interspecific cross between the diploid A. cardenasi Krapov. & W.C. Gregory GKP 10017 and tetraploid A. hypogaea (PI 261942). The F_2_3 seed were planted in 1997, and multiple individual plants were tested for the Z3 RAPD marker (Garcia et al., 1996), which is linked to peanut root-knot nematode resistance. F_2 families that were homogeneous for the marker were harvested, and single plant pedigree selections were made until the F_5 generation in 2000. F_5,6 plots were evaluated and selected based on agronomic characteristics and Tomato spotted wilt virus (TSWV) resistance. Selected plots were bulk harvested for preliminary yield testing in 2001.

Resistance to M. arenaria in NR 0812 was confirmed in the greenhouse in 2001 (Timper et al., 2003) and in two M. arenaria–infested fields in Decatur County, Georgia, and Headland, AL, in 2001 and 2002. In the greenhouse evaluation, NR 0812 also showed resistance to M. javanica race 3 and susceptibility to M. hapla Chitwood (Timper et al., 2003). NR 0817 was included in the 2002 field tests and expressed root-knot nematode resistance similar to NR 0812. In each case, resistance to M. arenaria was comparable to ‘COAN’ (Simpson and Starr, 2001) based on root galling and egg and juvenile counts. The resistance of NR 0812 and NR 0817 to TSWV was not significantly different from ‘Georgia Green’ (Branch, 1996) in yield trials conducted in Ashburn, GA, in 2001 and 2002.

NR 0812 yields were not significantly different (3940 kg ha^{-1} and 3118 kg ha^{-1}) from Georgia Green (3981 kg ha^{-1} and 4075 kg ha^{-1}) in replicated yield trials with no nematode pressure in 2001 and 2002, respectively. Under high nematode pressure, yields of NR 0812 (3483, 2745, and 3496 kg ha^{-1}) were also not significantly different from Georgia Green (3355, 3371, and 3451 kg ha^{-1}) but were significantly greater at two locations than highly nematode resistant but TSWV susceptible COAN (2781, 2622, and 2620 kg ha^{-1}) in infested-field trails in 2001 and 2002.

NR 0812 and NR 0817 have semierect growth habit that are not present on the mainstem. Plants are small in size, smaller than Georgia Green, medium in size similar to Georgia Green. NR 0817 mature at approximately 130 to 145 d from Georgia. NR 0812 produces thin shelled two-seeded pods with pink testa with majority of seeds with a blocky appearance. Seed of NR 0812 indicated a shelling percentage of 76% and 56 g seed weight that fit the medium runner type market. The oil chemistry of NR 0812 is comparable to Georgia Green. NR 0812 and NR 0817 will both be maintained by the Crop Genetics and Breeding Research Unit, USDA-ARS, Tifton, GA, and will be distributed on written request to the corresponding author.

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References


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