North Carolina Agricultural Research Service
North Carolina State University
Raleigh, North Carolina

Notice of Release of NC 1rinEC Tomato Breeding Line

NC 1rinEC is a large fruited fresh market tomato line with the ripening inhibitor gene (rin) in combination with the crimson gene (og) and another genetic factor which intensifies fruit color in the rin background. NC 1rinEC was developed for use as a parent line for the production of long shelf life F₁ hybrids with improved fruit color and flavor adapted to North Carolina growing conditions and vine ripened production systems.

The rin gene used in the development of NC 1rinEC was obtained from self-pollinated seed of an unknown F₁ hybrid produced in Mexico, fruit of which were purchased from a local supermarket. A selection homozygous for the rin gene from selfing this hybrid was crossed to NC 134G-2(94), a line with deep red color resulting from the crimson og gene. In the F₂ generation from the resultant hybrid, selection was made for the rin and og genes combined. Among the plants in this F₂ population, some were identified with much more intense interior and exterior color than seen in the original rin plant obtained from selfing the unknown hybrid and in other known lines with the rin gene. This improvement of color in rin lines is termed “rin enhanced color,” abbreviated as rinEC. NC 1 rinEC was found to have good combining ability in F₁ hybrids and was first made available in 2002 as a parent in the F₁ hybrid ‘Mountain Crest,’ a long shelf life hybrid with improved color and fruit flavor adapted to North Carolina growing conditions and systems.

The recessive ripening inhibitor gene (rin), when combined with a firm fruit background and used in heterozygous condition in F₁ hybrids, results in extended shelf life by slowing fruit ripening and softening. Commercial rin hybrids have not shown good adaptability to summer production in North Carolina because of fruit quality defects such as fruit cracking and misshapen fruit, poor color development and often, poor flavor. NC 1rinEC has much better color than other known sources of the rin gene and produces improved color in F₁ hybrids compared to other rin hybrids. The F₁ hybrid ‘Mountain Crest’ (NC 84173PVP x NC 1rinEC) released in 2002 has acceptable color and flavor rated similarly to that of ‘Mountain Spring,’ a widely grown hybrid in NC and other eastern US production areas for the vine ripe market. Since its release, ‘Mountain Crest’ has become extensively grown for vine ripe production during the summer in the eastern US. NC 1rinEC has combined well in other experimental F₁ hybrids and has been transferred to several seed companies through seed transfer agreements. Since NC 1rinEC has the recessive crimson og gene, crosses with a normal ripening parent line having the og gene would produce hybrids homozygous for the crimson gene, which would further improve color and increase lycopene content in long self life rin tomato hybrids.
NC 1rinEC is determinate, with moderately heavy foliage with slight leaf curl. Fruit ripen uniformly (u gene) with jointed fruit pedicels and deep oblate to flattened globe fruit shape. NC 1rinEC fruit develop a deep orange exterior color at maturity. Red streaks are scattered throughout the fruit flesh. A color image can be viewed at the North Carolina State University Tomato Breeding Program website at: www.ces.ncsu.edu/fletcher/programs/tomato/.

Fruit of NC 1rinEC have smooth blossom ends and have exhibited good resistance to fruit cracking and weather check. It is resistant to race 2 of fusarium wilt (I-2 gene). Although NC 1rinEC has not been examined for other disease resistances or harvest characteristics (yield, grade, size), it has been observed to produce a heavy set of uniformly large fruit.

Seed of NC 1rinEC have been transferred to other breeders through Tomato Seed Transfer Agreements for experimental breeding and testing of potential new hybrids using NC 1rinEC as a parent. ‘Mountain Crest,’ which contains NC 1rinEC as one of its parents, is exclusively licensed to SUNSEEDS COMPANY for its seed production and sales.

Breeder seed of NC 1rinEC are available by contacting Dr. Randy Gardner or Dr. Dilip Panthee, Mountain Horticultural Crops Research and Extension Center, 455 Research Drive, Mills River, NC 28759 or by telephone: 828.684.3562; fax: 828.684.8715; email addresses: randy_gardner@ncsu.edu or dilip_panthee@ncsu.edu. A fully executed tomato seed transfer agreement with NC State University’s Office of Technology Transfer will be required to acquire seed of NC 1rinEC.

[Signature]
Director, North Carolina Agricultural Research Service

10-16-09
Date
Fig. 1. Pedigrees of 'Mountain Crest' F1 hybrid tomato and its parent line, NC 1 rinEC.