

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

Notice of Release of NC 1*rin*EC Tomato Breeding Line

NC 1*rin*EC 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 1*rin*EC 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 1*rin*EC 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 *rin*EC. NC 1 *rin*EC 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 1*rin*EC 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 1*rin*EC) 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 1*rin*EC has combined well in other experimental F₁ hybrids and has been transferred to several seed companies through seed transfer agreements. Since NC 1*rin*EC 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*.



Director, North Carolina Agricultural Research Service

10-16-09
Date

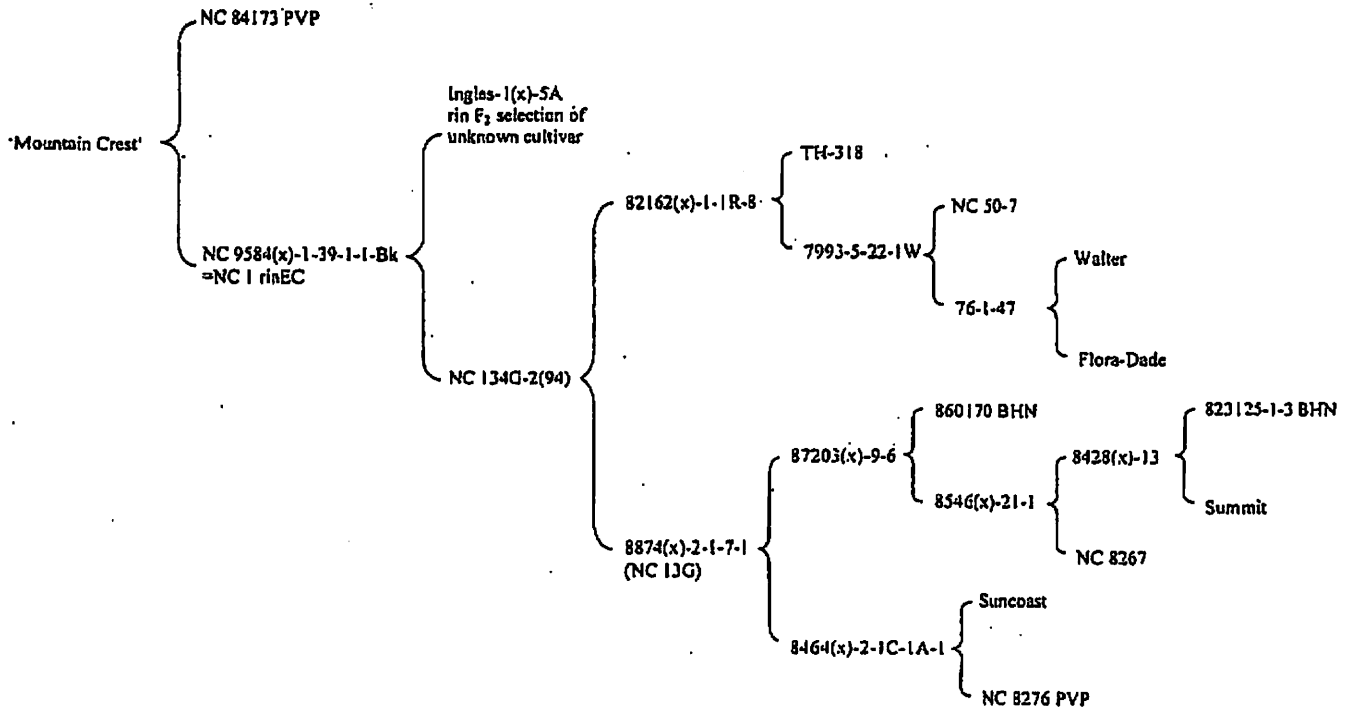


Fig. 1. Pedigrees of 'Mountain Crest' F1 hybrid tomato and its parent line, NC 1 rinEC.