

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

**Notice of Release of NC 2rinEC Tomato Breeding Line**

NC 2rinEC has a complex pedigree (see Figure 1) tracing back to breeding lines and cultivars developed in the NC tomato breeding program over a 25-year period. NC 2rinEC is an inbred line in the F<sub>7</sub> generation. Single plant selections were made in the F<sub>1</sub> through F<sub>4</sub> generations. The *rin* gene in NC 2rinEC originated from selfing an unknown long-shelf-life F<sub>1</sub> hybrid, fruit of which were purchased from a local supermarket. An F<sub>2</sub> generation selection homozygous for the *rin* gene, designated as Ingles-1, was crossed with NC 93227(x)-37, a firm-fruited line with deep red color that obtained the crimson gene from 'Suncoast,' a release from the University of Florida tomato breeding program. In the F<sub>2</sub> population from this cross, selection was made for the recessive *rin* and crimson genes combined in homozygous condition. Among the plants in this F<sub>2</sub> population, fruit of some plants had 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 has been designated as "*rin* enhanced color," abbreviated as *rin*EC. NC 2rinEC is the second enhanced color *rin* line to be released from the NCSU tomato breeding program. NC 1rinEC, released in 2005, is a parent in the F<sub>1</sub> hybrid 'Mountain Crest.' Although 'Mountain Crest' produces high yields of good quality fruit, its fruit size has been smaller than desired for the vine-ripe fresh market. NC 2rinEC has larger fruit size than NC 1rinEC, resulting in larger fruit size in F<sub>1</sub> hybrid combinations where it has been tested.


Plant growth habit of NC 2rinEC is vigorous, determinate with attractive, heavy foliage cover. Fruit are deep oblate to flattened globe in shape, are smooth and have jointed pedicels. In a replicated field trial at Fletcher, NC in summer 2004, NC 2rinEC averaged 10.7 oz/fruit, which was significantly greater than the 9.0 oz/fruit mean weight for NC 1rinEC. Immature fruit are uniform light green (*u* gene) and have a glossy finish. Mature fruit are firm and develop some red exterior and interior color as a result of the crimson gene combined in the *rin* background with another unidentified gene which enhances color. Fruit are highly resistant to gray wall and cracking. NC 2rinEC contains the *Ve* gene, which confers a high level of resistance to verticillium wilt and the *I* and *I-2* genes, which confer a high level of resistance to races 1 and 2 of fusarium wilt.

NC 2rinEC has been tested as a parent in several F<sub>1</sub> hybrid combinations and has shown good combining ability. Optimum red fruit color and increased lycopene content in F<sub>1</sub> hybrids require both parents to have the crimson gene, since it is recessive in action. The F<sub>1</sub> hybrid NC 0821 (NC 1 CS x NC 2rinEC) performed well in replicated and observational trials in 2008. Since both parents of this hybrid have the recessive crimson gene, and NC 1 CS has the dominant *Sw-5* gene



for resistance to tomato spotted wilt virus (TSWV), this particular combination has resulted in a promising hybrid which incorporates multiple disease resistance into a long-shelf-life hybrid with improved red color and increased lycopene content. In early and late season replicated trials at Mountain Horticultural Crops Research Station in 2008, NC 0821 yielded well compared to other entries and produced large fruit size comparable to hybrids currently grown for vine-ripe production. NC 0821 was compared to several other TSWV-resistant hybrids in two grower plantings in coastal SC and in NC in two grower plantings in Rowan County, three plantings in Haywood County, and one planting in Henderson County. NC 0821 was selected as one of five TSWV-resistant hybrids to be increased for larger grower trials in 2009. It is anticipated that NC 0821 may be proposed for release as a named variety following the 2009 growing season. Pollen and seed of NC *2rin*EC have been transferred to other breeders through MTA's, and F<sub>1</sub> hybrids are being tested. Photographs of NC *2rin*EC may be viewed at the NC State University Fresh Market Tomato Breeding Program website at: [www.ces.ncsu.edu/fletcher/programs/tomato/](http://www.ces.ncsu.edu/fletcher/programs/tomato/).

Breeders seed of NC *2rin*EC 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](mailto:randy_gardner@ncsu.edu) or [dilip\\_panthee@ncsu.edu](mailto:dilip_panthee@ncsu.edu). A fully executed tomato seed transfer agreement will be required to acquire seed of NC *2rin*EC.

  
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Director, North Carolina Agricultural Research Service

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