

NORTH CAROLINA AGRICULTURAL RESEARCH SERVICE
NORTH CAROLINA STATE UNIVERSITY
RALEIGH, NC

Notice of Release

NC 161L Pink Fruited Tomato Breeding Line

The North Carolina Agricultural Research Service announces the release of a pink fruited tomato breeding line, NC 161L. Breeding that led to the development of NC 161L was initiated in 2002 with the objective of combining late blight resistance (*Ph-2* and *Ph-3* genes combined) from NC 2CELBR and root knot nematode (*Mi* gene) resistance from 'Tough Boy' into a pink fruited tomato line with desirable horticultural traits.

The F1 hybrid 'Momotaro' ('Tough Boy'), a pink-fruited Japanese greenhouse tomato, was selfed to produce the F2 generation. The selection designated as TB(x)-9 was grown in the F3 generation in the greenhouse in the fall of 2005 and crossed with NC 2CELBR to produce the F1 hybrid NC 0652. Single plant selections of subsequent generations of this cross that had a high level of late blight resistance and desirable horticultural traits resulted in an F5 generation line that was bulked to produce seed of the F6 generation, which is being released as NC 161L.

NC 161L is a fresh-market tomato breeding line with exterior pink color resulting from the combination of red flesh and clear skin (*y* gene). It has a vigorous plant with regular, dark green foliage and compact, determinate growth habit (*sp* gene). Fruit of NC 161L tomato are deep oblate in shape and average around 10 oz (288 g) in weight. Immature fruits have a glossy dark green shoulder, and fruit pedicels are jointed. As a result of the *y* gene, fruit have a thin cuticle leading to susceptibility to fruit cracking, characteristic of most pink-fruited tomatoes. Flavor of NC 161L has been rated excellent in subjective taste evaluations in multiple tests. NC 161L has resistance to late blight (*Ph-2* and *Ph-3* genes combined) as verified by molecular markers closely linked to the resistance genes and based on field evaluations in 2006, 2007, and 2009 when late blight was severe. A high level of late blight resistance was also observed in an organic trial at Waynesville, NC in 2009 in the F1 hybrids NC 08144 and NC 08224, both of which use NC 161L as a parent.

NC 161L has a single dominant gene, *Mi*, for root knot nematode (RKN) resistance as determined in NC 161L and its hybrids under natural inoculum conditions in a grower field trial in 2010. RKN resistance was also confirmed by a molecular marker closely linked to the *Mi* gene. NC 161L is the first known breeding line of pink tomato with the *Ph-2* and *Ph-3* genes combined for late blight resistance and *Mi* gene for RKN resistance. In replicated trials in 2009 and 2011, the F1 hybrid NC 08224, which uses NC 161L as the female parent, was one of the best performing entries for marketable yield and one of the most preferred tomatoes by tomato growers and seed company representatives for outstanding fruit flavor and desirable fruit texture. This hybrid is being proposed for release as a named cultivar in conjunction with the release of NC 161L.

In an organic culture replicated trial in 2011, NC 161L performed well in marketable yield compared to Cherokee Purple and Brandywine Pink. Its total yield did not differ from the other entries in trial, but its marketable yield was much higher because of less severe fruit cracking and incidence of other fruit defects such as rough blossom scar, which led to fruit culling. Average fruit weight of NC 161L in the 2011 organic trial was 199 gm., which was less than the other entries

observed. In a conventional culture trial at Mills River, NC in 2010, NC 161L performed well in comparison to the inbred lines NC 714 and NC 1CS, which are the parents of the recently released hybrid 'Mountain Majesty'. It was smaller fruited than those inbred lines.

Seed of NC 161L will be available for research and breeding purposes by signing a tomato breeding line seed transfer agreement from NC State University's Office of Technology Transfer. For questions or to inquire about acquiring seed for research or breeding purposes, please contact Dr. Dilip Panthee at telephone 828.654.8590 or by email at: dilip_panthee@ncsu.edu.



Director, North Carolina Agricultural Research Service



Date

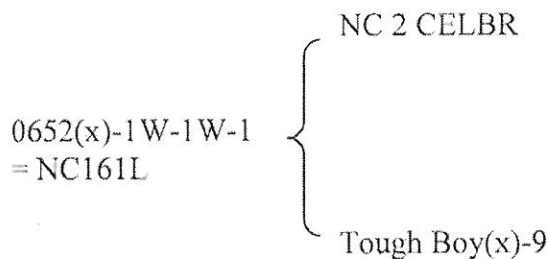


Figure 1. Pedigree of NC 161L tomato breeding line

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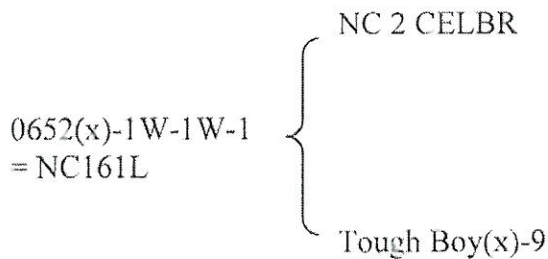


Figure 1. Pedigree of NC 161L tomato breeding line

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'Mountain Rouge' Hybrid Pink Heirloom Tomato

'Mountain Rouge', the F1 hybrid of NC 161L x 'Pink Brandywine' (tested as NC08224; see Figure 1), resulted from a tomato breeding effort initiated in 2005 to develop a superior heirloom-type, pink tomato hybrid with improved fruit quality, combined with late blight and root knot nematode resistances. 'Pink Brandywine' is a widely grown heirloom tomato variety. 'Mountain Rouge' has the dominant genes *Ph-2*, *Ph-3* and *Mi* in heterozygous condition derived from the NC 161L parent for resistance to late blight and root knot nematode, respectively. 'Mountain Rouge' is the first pink heirloom-type tomato hybrid with these important disease resistances combined.

It has a vigorous, indeterminate growth habit with regular leaf type at mature plant stage. Foliage is dark green and provides adequate cover for fruit protection. Fruit have dark green shoulder at the immature stage and have an attractive pink color when ripe, resulting from the combination of red fruit flesh and clear fruit skin (*y* gene).

Performance of 'Mountain Rouge' was compared with 'Cherokee Purple', 'Pink Brandywine' and 'Mr. Stripey'. These are heirloom varieties widely grown in various parts of the country. Total yields and marketable yields of 'Mountain Rouge' were significantly greater than the check heirloom varieties. Fruit average 10.8 oz (306 g) in weight and are deep oblate and slightly irregular in shape, with smooth blossom end scars. In replicated trials in 2009 and 2011, it was one of the best performing entries for marketable yield and one of the most preferred tomatoes by tomato growers and seed company representatives because of its excellent flavor and desirable fruit texture. 'Mountain Rouge' is susceptible to fruit cracking and lacks the firmness needed for long distance shipping. However, it is well suited for home garden and local market production and is well adapted to organic production because of its late blight resistance.

Despite its susceptibility to fruit cracking, 'Mountain Rouge' is proposed for release because of its superior disease resistance compared to heirloom varieties, combined with its outstanding flavor comparable to the best heirloom varieties. Breeder seed of 'Mountain Rouge' and each parent are available by contacting Dr. Dilip Panthee, Mountain Horticultural Crops Research and Extension Center, 455 Research Drive, Mills River, NC 28759 or by telephone: 828.654.8590; fax 828.684.8715; email: dilip_panthee@ncsu.edu. To acquire seed of the parents of 'Mountain Rouge' or the hybrid for non-exclusive, non-transferable research purposes, a fully executed tomato seed transfer agreement (parents) or plant trial agreement (hybrid) is required with NC State University's Office of Technology Transfer. NCSU will invite proposals from interested tomato seed companies and select one company to enter into an exclusive production and marketing agreement for 'Mountain Rouge'.



Director, North Carolina Agricultural Research Service

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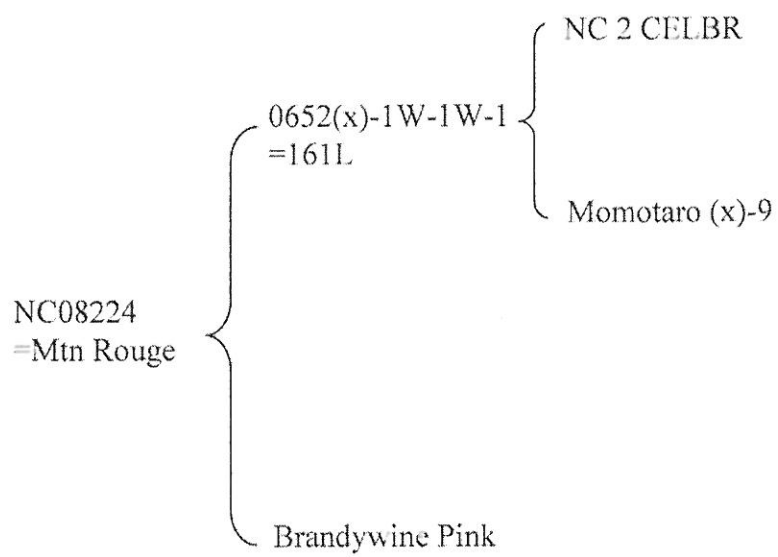


Figure 1. Pedigree of 'Mountain Rouge'

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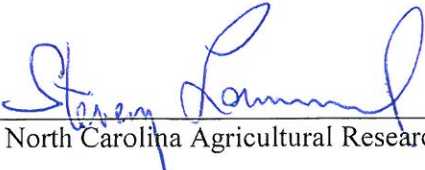
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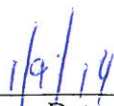
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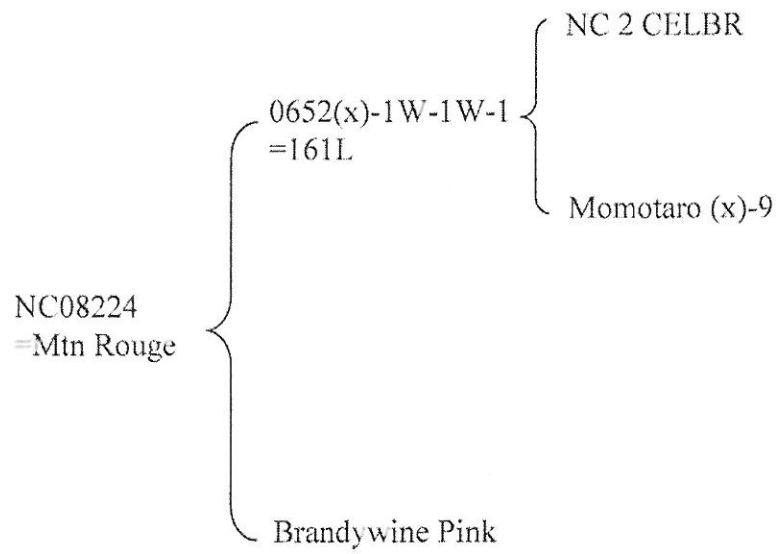


Figure 1. Pedigree of 'Mountain Rouge'