North Carolina Agricultural Research Service

North Carolina State University

Raleigh, North Carolina

Notice of Release of NC 5Grape Tomato Breeding Line

The North Carolina Agricultural Research Service announces the release of NC 5Grape tomato breeding line. Conception and crossing to develop NC 5Grape was initiated in 2003 in the greenhouse. The objective of the breeding effort was to improve plant and fruit quality traits, especially incorporation of the crimson gene for improved fruit color and increased lycopene content, in compact indeterminate grape tomato breeding lines for use in developing improved grape tomato hybrids similar to the widely grown 'Smarty' hybrid.

NC 5Grape has a complex pedigree tracing back to numerous other lines in the breeding program (Fig.1). NC 2Grape was used extensively in crossing as a source of compact indeterminate growth habit with short internodes (brachytic, *br* gene) and desirable fruit quality traits, including high sugar level. NC 2Grape was crossed to the large fruited F2 selection, 03220(x)-11, which is homozygous for the *Ph-2* and *Ph-3* genes combined for late blight resistance. The F1 hybrid 0464 from this cross was crossed with 9722(x)-18, an ovate cherry type tomato with the *Ph-3* gene derived from the S. pimpinellifolium tomato line L.3707. The resultant hybrid, 05109, was selfed and selected in field and growth chamber trials for desirable plant and fruit type, combined with late blight resistance to produce the F3 generation line 05109(x)-1-198.

On the other side of the pedigree, NC 2Grape was crossed with the determinate, brachytic, crimson-fruited, male sterile line 032(x)-5-11gsms to produce the F1 hybrid 042. An indeterminate F2 selection with the crimson gene, 042(x)-1GH, was crossed with NC 2Grape to produce the F1 hybrid 051. An indeterminate, crimson, male sterile F2 segregate, 051(x)-18gsms, was crossed to CB25(x)-18-3, which is an F3 selection derived from the cross of a Clause proprietary cherry tomato line with NC 1Grape. The 0661 F1 hybrid resulting from this cross was then crossed with 05109(x)-1-198 to produce the F1 hybrid 06160. An F1 generation plant, 06160-2A, with a desirable combination of plant and fruit traits was selected for further breeding. Selfing and selection of 06160-2A in segregating generations resulted in the F4 generation selection 06160(x)-2-19-1, which was bulked in further generations of selfing and is being released as NC 5Grape.

NC 5Grape tomato breeding line has a vigorous plant with a compact indeterminate growth habit conditioned by the brachytic (*br*) gene for short internodes. Foliage is an attractive dark green color, providing good coverage for fruit protection and holding up well throughout the season. Immature fruits have a glossy finish with a dark green shoulder color. Fruit pedicels are jointless, and the fruit separate easily from the pedicels at harvest. Fruit of NC 5Grape tomato average around 10 grams and have an ideal elongate shape desired for grape tomatoes. They develop deep, attractive red color, are crisp in texture with a sweet flavor, and are firm in the fully ripened stage. Fruit maintain good quality on the plant for an extended period after ripening without developing burst or cracking. NC 5Grape was susceptible to late blight in a replicated greenhouse disease screen in 2012. It has not

been tested for other disease resistance genes. However, based on resistances present in parent lines leading to its development, it has potential to have the *Ve* gene for resistance to verticillium wilt and the *I* and/or *I-2* genes for resistance to races 1 and 2 of fusarium wilt.

In replicated trials in 2010 through 2012, the F1 hybrid NC 10235, which uses NC 5Grape as the male parent, was one of the best performing (comparisons included 'Smarty') entries for marketable yield and one of the most preferred tomatoes by tomato growers and seed company representatives. This hybrid is being released as the named cultivar 'Mountain Vineyard' in conjunction with the release of NC 5Grape.

Breeders seed of NC 5Grape are available by contacting Dr. Dilip Panthee, Mountain Horticultural Crops Research and Extension Center, 455 Research Drive, Mills River, NC 28759 or by telephone: 828.684.3562; fax: 828.684.8715; email addresses: 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 5Grape for research or breeding purposes.

_____ _____

Director, North Carolina Agricultural Research Service Date

Figure 1. Pedigree for 'NC 5' Grape Tomato Breeding Line