

North Carolina Agricultural Research Service

North Carolina State University

Raleigh, North Carolina

Notice of Release of NC 6Grape Tomato Breeding Line

The North Carolina Agricultural Research Service announces the release of NC 6Grape tomato breeding line. Conception and crossing to develop NC 6Grape was initiated in 2003 in the greenhouse. The breeding objective was to develop a late blight resistant, compact indeterminate, brachytic-growth-habit grape tomato breeding line that could be used as a parent to widen disease resistances and other traits in a 'Smarty' type grape tomato F1 hybrid. 'Smarty', resulting from the cross of NC 3Grape x NC 2Grape, is a high-quality, widely-grown grape tomato hybrid that is an industry standard.

NC 6Grape has a complex pedigree tracing back to other released and unreleased lines in the breeding program (Fig.1). NC 2Grape was used heavily in crossing as a source of compact, indeterminate growth habit and desirable fruit quality traits, including high sugar level. NC 2Grape was crossed to large fruited F2 selections, 03220(x)-20 and 03220(x)-11, which are homozygous for the *Ph-2* and *Ph-3* genes combined for late blight resistance. The F1 hybrids from these crosses (0463 and 0464) were 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 hybrids, 05108 and 05109, were selfed and selected in field and growth chamber trials for desirable plant and fruit type combined with late blight resistance. The line 05108(x)-2-166 was crossed with 051(x)-18gsms, a highly desirable grape tomato line, to develop the hybrid 0674. Selfing and selection of 0674 resulted in 0674 -2W(x)-1W, a large-fruited grape type tomato line with resistance to early blight, late blight, and septoria leafspot . The 05109(x)-1-198 selection was crossed with 0661, the F1 hybrid from the cross of 051(x)-18gsms x CB25(x)-18-3. CB25 is a hybrid from the cross with NC 1Grape x a Clause Seed Co. proprietary cherry tomato line. The resultant hybrid 06160 was selfed and selected to produce the line 06160-2A(x)-2-1, which is an outstanding grape tomato line with deeply colored, sweet, firm, crack resistant fruit and a compact indeterminate plant.

The cross of 0674-2W(x)-1W x 06160-2A(x)-2-1-1 resulted in the hybrid 08135. The F2 generation of 08135 was grown in the field in 2008 and selected for desirable grape type fruit and compact, brachytic, indeterminate growth habit. Because of very dry conditions, late blight was not present, so selection could not be made in the field for resistance. Testing in the growth chamber indicated the F3 selection 08135(x)-8W-15 to be late blight resistant and with good fruit quality and plant type when grown to maturity in the greenhouse. From the F4 generation grown in the field in 2009, the selection 08135(x)-8W-15-16 was late blight resistant and had good plant type and fruit quality traits. Following the F4 generation single plant selection, bulks were made of the line to be released as NC 6Grape. Subsequent greenhouse and molecular marker testing showed NC 6Grape to be homozygous for the *Ph-2* gene for late blight resistance but to lack the *Ph-3* gene for resistance.

NC 6Grape tomato breeding line has a vigorous plant with a compact indeterminate growth habit conditioned by the brachytic (*br*) gene for short internodes. Fruit of NC 6Grape tomato average around 16 grams. They develop deep red color, are crisp in texture, and are firm in the fully ripened stage. Immature fruits have a glossy, uniform light green color (*u* gene). Fruit pedicels are jointed. The fruit are ovate in shape and have good resistance to fruit cracking and bursting despite high total soluble solids (TSS) levels. Flavor of NC 6Grape has been rated excellent in subjective taste evaluations due to its high sugar level (8.3%). NC 6Grape is the first known breeding line of grape tomato with the *Ph-2* gene for late blight resistance. It may have other resistance genes such as 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. However, presence of these resistance genes has not been verified. NC 6Grape was not evaluated in replicated trials for yield or other characteristics (other than those described above) since it is intended for use as a parent in producing F1 hybrids only and not as a cultivar for fruit production.

In replicated trials in 2010 through 2012, the F1 hybrid NC 10242, which uses NC 6Grape 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 Honey’ in conjunction with the release of NC 6Grape.

Breeders seed of NC 6Grape 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 6Grape for research or breeding purposes.

Director, North Carolina Agricultural Research Service

Date

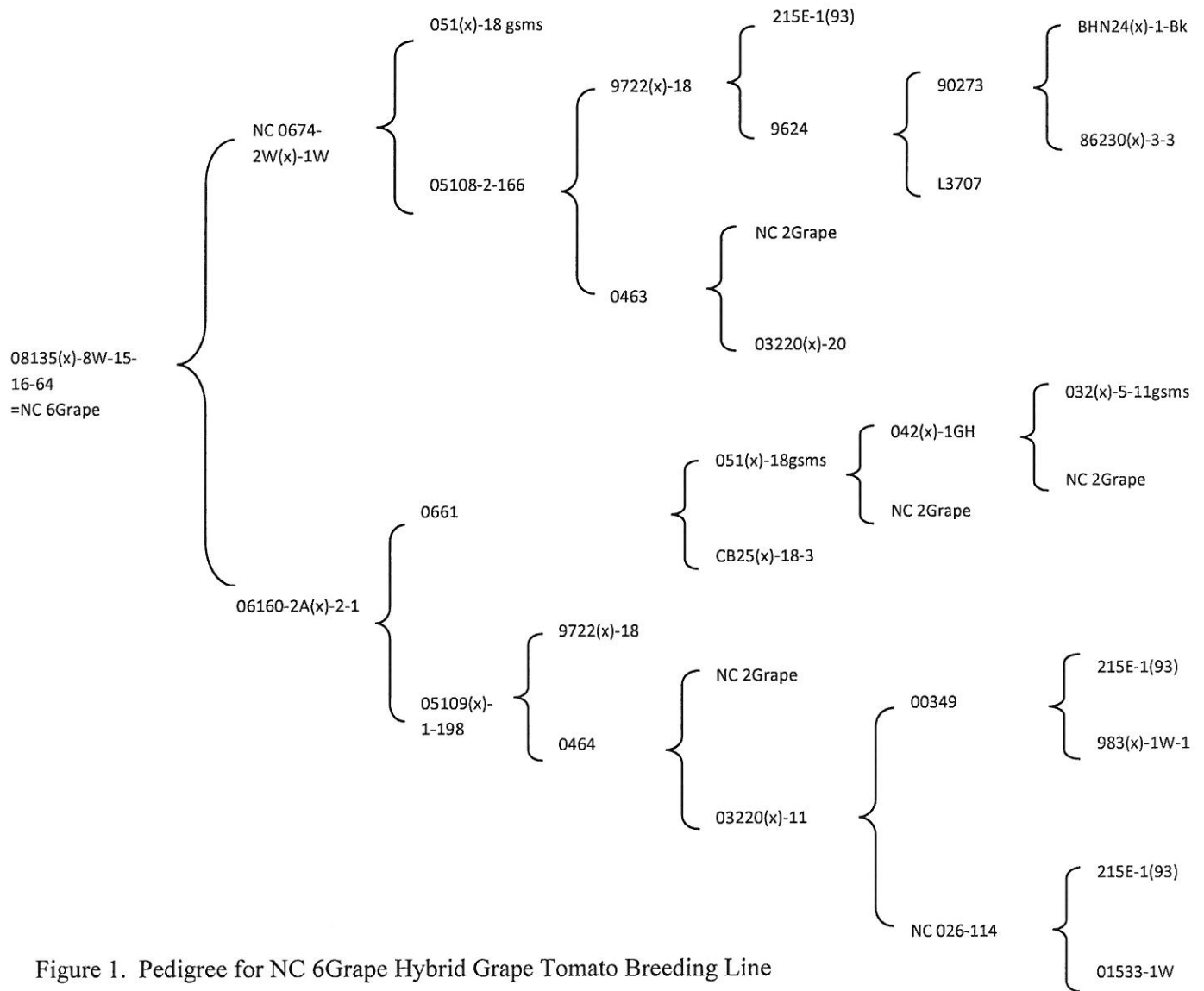


Figure 1. Pedigree for NC 6Grape Hybrid Grape Tomato Breeding Line