

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

Notice of Release of NC 1 CS Tomato Breeding Line

NC 1 CS (inbred line in the F₆ generation) resulted from selfing NC 056, the F₁ hybrid of NC 123S x NC 0255(x)-1. NC 123S, which combines single dominant gene resistances to TSWV, fusarium wilt race 3, and nematodes (*Sw-5*, *I-3*, *Mi* genes) was released from the NC breeding program and is used as a parent in the F₁ hybrid 'Crista'. 'Amelia' F₁ hybrid, from which NC 123S was developed, is a co-developed hybrid using NC 111F-2(97) as a source of the *I-3* gene for fusarium wilt race 3 resistance crossed with a Clause Seed Company line having the *Sw-5* and *Mi* genes. NC 0255(x)-1 is an outstanding large-fruited selection with the crimson gene that traces its pedigree back to breeding lines and cultivars developed in the NC tomato breeding program over a 25-year period. The source of the crimson gene in NC 0255(x)-1 is 'Suncoast', an inbred cultivar released from the Univ. of Florida breeding program.

A population of 500 F₂ plants derived from selfing NC 056 was grown in the field in 2005 and selected for the recessive crimson gene combined with other desirable horticultural traits. F₃ lines were tested for molecular markers linked to the *Sw-5*, *I-3*, and *Mi* genes. Lines resistant to TSWV were grown in the field in 2006 and further selected for horticultural traits. An outstanding selection from the greenhouse in fall, 2006 designated as 056(x)-7-4-1 was used as a parent in producing experimental F₁ hybrids. In addition to the *Sw-5* gene for TSWV resistance, NC 1 CS has resistance to verticillium wilt (*Ve* gene) and races 1 and 2 of fusarium wilt (*I*, and *I-2* genes).

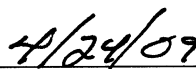
Plant growth habit of NC 1 CS is vigorous, determinate with attractive, heavy foliage cover. Fruit are deep oblate to flattened globe in shape, are smooth and have jointed pedicels. Immature fruit are uniform light green (*u* gene). Ripe fruit are firm and develop exceptionally bright red exterior and interior color as a result of the crimson gene. Fruit are highly resistant to gray wall and cracking.

In replicated vine-ripe harvest and mature-green harvest trials in 2007, where TSWV was present, NC 1 CS produced high total and U.S. Combination grade yields compared to other entries and had large fruit size. NC 1 CS continued to perform well in early and late season vine-ripe harvest trials in 2008. The first hybrids made with NC 1 CS as a parent were tested in a late season replicated trial in 2007 and produced outstanding yields of large, high quality fruit. In the late season replicated trial in 2007 and in observational plots grown in late season at MHCRS, Fletcher, hybrids made with NC 1 CS had very little gray wall disorder compared to severe gray wall incidence in several other hybrids and breeding lines. Testing of hybrids with NC 1 CS was continued in replicated vine-ripe trials in early and late season at MHCRS in 2008. Hybrids made with NC 1 CS as a parent had superior performance in both trials.

Several hybrids made with NC 1 CS as a parent were grown in observational trials in two grower fields in coastal SC and in NC in two grower fields in Rowan County, three grower fields in Haywood County, and one grower field in Henderson County. Based on outstanding performance at these locations, five hybrids made with NC 1 CS as a parent are being increased for widespread testing in larger plantings in grower fields in 2009. It is anticipated that one or more hybrids using NC 1 CS as a parent will be proposed for release as named varieties following the 2009 growing season. Pollen and seed of NC 1 CS have been transferred to other breeders through MTA's, and F₁ hybrids are being tested.



Director, North Carolina Agricultural Research Service



Date