

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

Notice of Release of NC 1 CELBR and NC 2 CELBR Tomato Breeding Lines

The North Carolina Agricultural Research Service announces the release of the large-fruited, fresh-market tomato hybrid breeding lines, NC 1 CELBR and NC 2 CELBR.

NC 1 CELBR and NC 2 CELBR originated from a long-term breeding program to incorporate combined resistances to early blight and late blight into improved large-fruited tomato lines. The source for early blight resistance in these lines is NC 215 E-(93), a large fruited determinate line derived from the early blight resistance sources C.1943 and *Lycopersicon hirsutum* PI 126445. The early blight resistance derived from NC 215E-1(93) provides moderate resistance to the foliar blight phase and a high level of resistance to the stem lesion (canker) phase of early blight. Late blight resistance is conditioned by the combination of two major R genes, *Ph-2* and *Ph-3*. *Ph-2* was derived from 'Richter's Wild Tomato', and *Ph-3* was derived from L3707, a selection of the wild tomato species *Lycopersicon pimpinellifolium*. Both genes were backcrossed into NC 215 E-1(93) as a recurrent parent (Fig. 1). Following backcrosses to NC 215 E, two advanced selections were crossed to develop the hybrid NC 03220, heterozygous for *Ph-2* and *Ph-3* combined. An F₂ population of 96 plants from NC 03220 selfed was tested for late blight resistance using detached leaves in a growth chamber. Leaves were inoculated with two late blight isolates, one which specifically overcomes *Ph-2* and one which specifically overcomes *Ph-3*. Plants resistant to the combination of the two isolates were progeny tested as F₃ generation plants for early blight and late blight resistance in field trials at Fletcher and Waynesville, NC, in 2004. NC 1 CELBR and NC 2 CELBR were derived from a single outstanding F₂ plant that was homozygous for *Ph-2* and *Ph-3* combined.

NC 1 CELBR and NC 2 CELBR were tested in field plots at Waynesville and Fletcher, NC, in the 2005-2007 summer seasons for early blight and late blight resistance and have been tested numerous times for late blight resistance using detached leaves in growth chamber tests. In a replicated trial at Waynesville in 2005, both selections remained free of late blight under no fungicide spray conditions, whereas NC 215 E-2(93) was devastated by late blight. Both produced high yields of good quality fruit with large size. In replicated vine-ripe harvest trials at Fletcher in 2006, NC 1 CELBR and NC 2 CELBR did not differ from standard hybrid cultivars in total or U.S. combination grade yields. Fruit size for the two lines was smaller than for the hybrids with NC 1 CELBR being larger fruited than NC 2 CELBR.

NC 1 CELBR and NC 2 CELBR have vigorous determinate plant type with heavy foliage cover for fruit protection. Immature fruit are light, uniform green (*u* gene). Fruit pedicels are jointed. Fruit are deep oblate to flattened globe in shape with smooth shoulders and small blossom end scars. Ripe fruit develop acceptable uniform red color and are firm and highly crack resistant. Maturity of both lines is late.

In addition to combined early and late blight resistances, NC 1 CELBR and NC 2 CELBR have resistance to Verticillium wilt (*Ve* gene) and races 1 and 2 of Fusarium wilt (*I* and *I-2* genes). Both have been tested in hybrid combinations with other NC lines and have shown good combining ability. NC 2 CELBR is a parent in an early blight/late blight resistant hybrid, NC 05114, which is being released as 'Mountain Magic'.

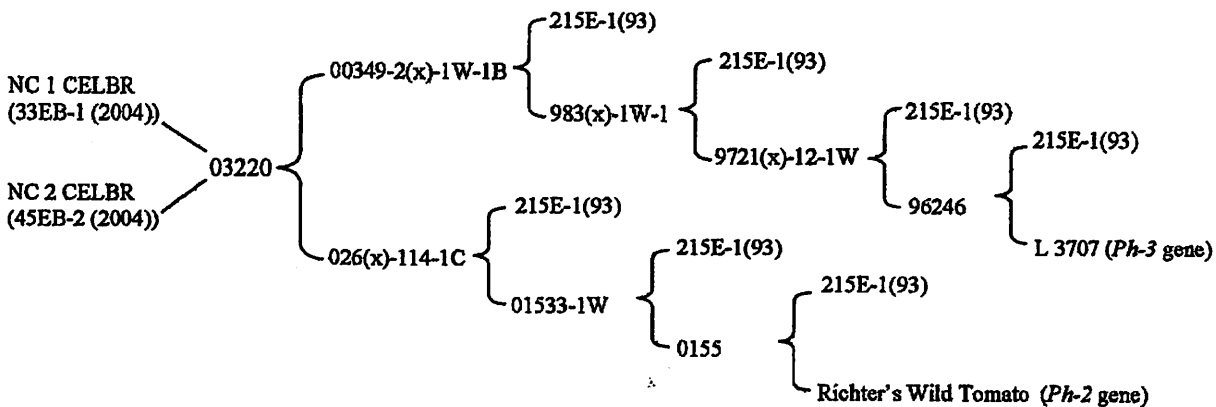


Fig. 1. Pedigrees of NC 1 CELBR and NC 2 CELBR tomato breeding lines with combined early blight and late blight resistances.

Breeder seed will be maintained by the North Carolina Agricultural Research Service. A signed tomato seed transfer agreement, which can be downloaded at the website listed below, is required for recipients of seed of the lines. Additional information and pictures of the lines are available at the following web site: <http://www.ces.ncsu.edu/fletcher/programs/tomato/>.


Director, North Carolina Agricultural
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Date