

North Carolina Agricultural Research Service

North Carolina State University

Raleigh, North Carolina

Notice of Release of NC 714 Tomato Breeding Line

NC 714 resulted from selfing NC 03113, the F1 hybrid of Fla 8044 x NC 00318-15(x)-1 (see figures 1 and 2 below for pedigrees of NC 714 and Fla 8044). Fla 8044 is a large-fruited, high-temperature fruit set line with desirable horticultural traits and multiple disease resistance genes obtained from the University of Florida tomato breeding program. NC 00318-15(x)-1 is an F2 selection obtained by crossing a male sterile version of NC 84173 with an F3 generation line derived from selfing the NCSU-released hybrid 'Mountain Crest' (NC 84173 x NC 1 rinEC). The crimson gene in NC 714 was derived from the NC 1rinEC parent of 'Mountain Crest'. The objective in breeding NC 714 was to incorporate desirable fruit characteristics and superior combining ability from NC 84173 together with the crimson (*og^c*) gene for enhanced red fruit color and lycopene content. Single plant selections were made for large fruit size, high yield, and other desirable horticultural traits in the F2 through F5 generations derived from selfing NC 03113. Seed of the F6 generation were bulked to produce the F7 generation inbred line proposed for release as NC 714.

Plant growth habit of NC 714 is vigorous, determinate with attractive, heavy foliage cover. Fruits are very large, smooth, deep globe (ball) in shape, similar to NC 84173, and have jointed pedicels. Immature fruits are uniform light green (*u* gene). Ripe fruit are firm and develop bright red exterior and interior color as a result of the crimson (*og^c*) gene. Disease resistances include verticillium wilt (*Ve* gene) and races 1 and 2 of fusarium wilt (*I* and *I-2* genes).

In replicated vine-ripe harvest and mature-green harvest trials in 2008 and 2010, NC 714 produced high total yields compared to standard check hybrids and had jumbo size (>3.5" diameter fruits- 60%), extra-large (3.0-3.5" diameter fruits- 27%) and 11% large size (2.5-3" diameter) fruits. Graded yield of NC 714 was reduced by the occurrence of weather check, which is a problem in NC 714, NC 84173 and other lines of tomatoes with the large deep globe (ball shape) trait. The large ball shape is useful in developing very large fruited lines which combine well for improved fruit size in F1 hybrids. Since the ball shape trait is recessive when crossed to normal flattened globe to oblate tomatoes, the susceptibility to weather check is not present in F1 hybrids made with this fruit type as a parent. However, the large fruited ball-shaped parents contribute to large fruit size in F1 hybrids making them very useful as parents.

Average fruit weight of about 310 grams over the four replicated trials grown was significantly higher than most of the other entries in trial. Considering its superior yield, large fruit size and good combining ability, it is being used as a parent in additional crosses. NC 714 is not intended for use as a cultivar but solely as a parent for its contribution of large fruit size, the crimson gene, and other desirable horticultural traits and disease resistance genes when used as a parent in F1 hybrids. NC 714 is the first line developed for release from the NCSU tomato breeding program

that combines the crimson gene with the large ball shape trait. It is intended for crossing with other lines having the recessive crimson gene so the hybrids will be homozygous for crimson and express improved red color and increased lycopene content.

Breeder seed of NC 714 tomato breeding line is available by contacting Dr. Dilip Panthee, Mountain Horticultural Crops Research and Extension Center, 455 Research Drive, Mills River, NC 28759 or by telephone: 828.684.8590; fax: 828.684.8715; email address: dilip_panthee@ncsu.edu. A Tomato Seed Transfer Agreement will be required to acquire seed of NC 714 for non-exclusive, non-transferrable uses in research. Any lines or hybrids using NC 714 under a Tomato Seed Transfer Agreement must be disclosed to NC State University and a determination made regarding NC State University's rights in any materials thus developed.

W David Smith

8/11/11

W. David Smith

Date

Director, North Carolina Agricultural Research Service

Fig. 1: Pedigree of NC 714 tomato breeding line

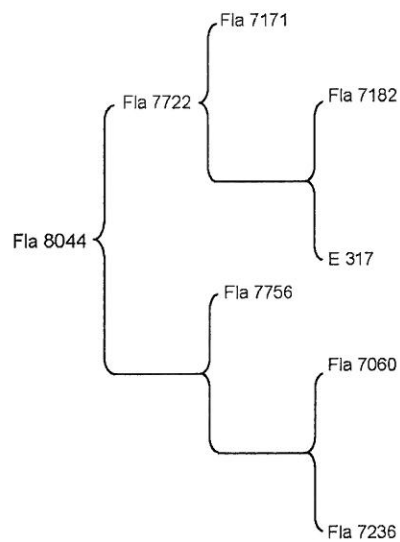
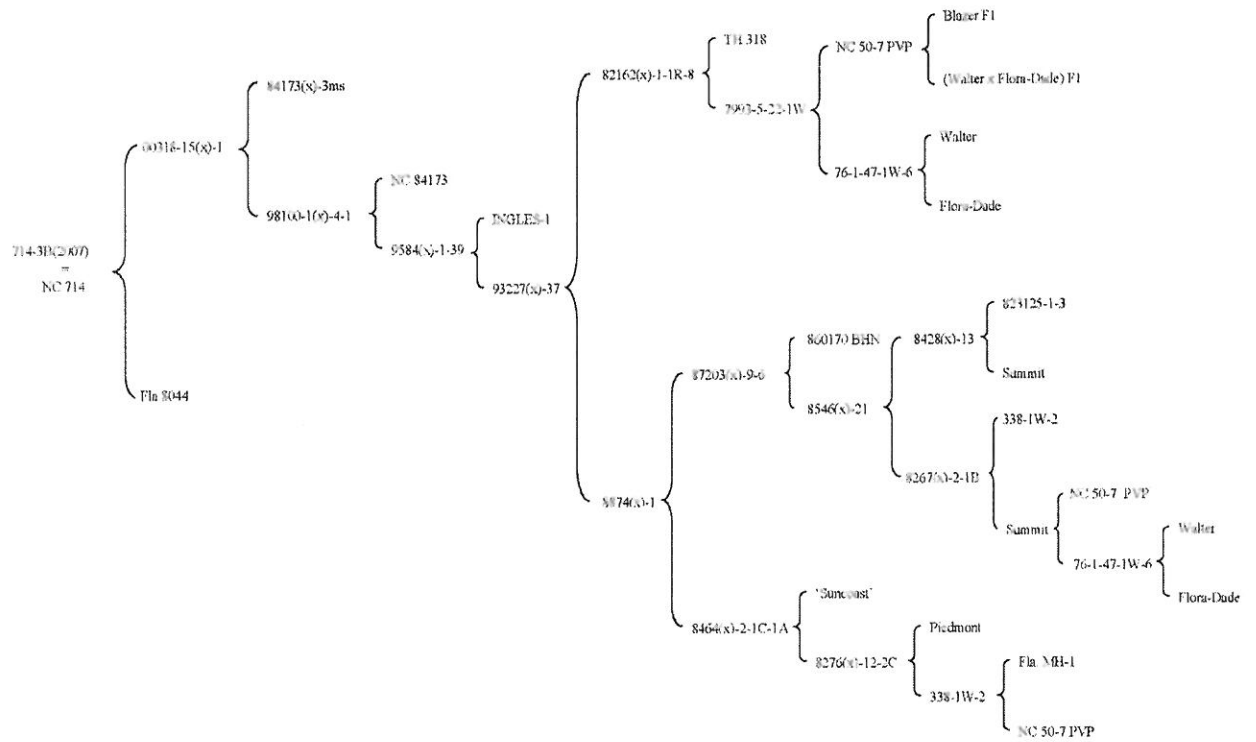


Fig. 2: Pedigree of Fla 8044 (Jay Scott, personal communication)