



May 17, 2021

TO: Interested Tomato Seed Companies

The North Carolina Agricultural Research Service (NCARS) is pleased to announce the development and release of a new tomato breeding line, 'NC 7LF'.

NC 7LF resulted from selfing NC10420, developed from NC 1 CS x NC239 HS-1(99). NC 1CS is a large-fruited tomato breeding line with desirable horticultural traits and tomato spotted wilt virus resistance (*Sw-5* gene) whereas NC239 HS-1(99) is a large-fruited tomato breeding line with heat stress tolerance. The objective of breeding NC 7LF was to incorporate Tomato spotted wilt virus resistance (*Sw-5* gene), desirable fruit characteristics and superior combining ability from NC 1CS into heat tolerance from NC239HS-1(99). Single plant selections were made for large fruit size, yield potential, and other desirable horticultural traits in the F₂ through F₅ generations derived from selfing NC10420. Seed of the F₆ generation were bulked to produce the F₇ generation inbred line proposed for release as NC 7LF.

Plant growth habit of NC 7LF is determinate with attractive, vigorous, with heavy foliage cover. Fruits are very large, smooth, deep globe in shape, similar to NC 1CS, and have jointed pedicels. Immature fruit are uniform light green (*u* gene). Ripe fruit are firm and develop red exterior and interior color. Disease resistances include verticillium wilt (*Ve* gene), fusarium wilt races 1, and 2 (*I*, and *I-2* genes), and tomato spotted wilt virus (*Sw-5* gene). When this line was evaluated for VW resistance under greenhouse conditions, it was found resistant to VW race 2. This was also verified by molecular marker screening. However, this has not been screened under heavy inoculum conditions in field.

The NC 7LF was one of the best breeding lines for number of fruits per plot (plot of four plants). Number of fruits per plant is one of the most important parameters when we are selecting any lines for heat stress tolerance since fruit dropping takes place under high temperature conditions. NC 7LF was also significantly better than control breeding lines for total as well as marketable yield. Average fruit weight of 218 gram of NC 7LF was significantly smaller than control lines including NC 1CS. Majority of the fruits were under extra-large and large category. However, 43.5 ton/ha marketable yield, and 62.6 ton/ha total yield were significantly higher than control lines, which makes this line outstanding from the control lines. We are using this breeding line to develop new experimental hybrids.

NC 7LF is resistant to weather check, which is one of the main reasons for reducing the yield. The large ball shape of NC 7LF is useful in developing very large fruited breeding 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 even if it is present in another parent. Several NCSU-released hybrids and seed company hybrids make use of a large ball shaped tomato as one of the parent lines in hybrids.

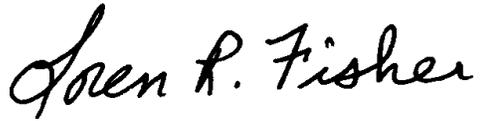
Considering its superior yield, large fruit size and good combining ability, it is being used as a parent in additional crosses. NC 7LF is not intended for use as a cultivar but solely as a parent for its contribution of large fruit size, and other desirable horticultural traits and disease resistance genes when used as a parent in F₁ hybrids. NC 7LF is the first line developed for release from the NCSU tomato breeding program that combines the *Sw-5* gene and *Ve2* gene with the heat stress tolerance trait combined. It is intended for crossing with other lines having the recessive *crimson* gene so the hybrids will have improved red color and increased lycopene content.

To acquire seed of NC 7LF for non-exclusive, non-transferrable research and breeding purposes, a fully executed tomato seed transfer agreement is required with NC State University's Office of Research Commercialization. Please contact Dr. Dilip Panthee (Dilip_Panthee@ncsu.edu).

If you have further questions about this breeding line after reviewing the attached materials, please contact me by email: loren_fisher@ncsu.edu or by phone at 919-515-4059.

I look forward to hearing from you.

Sincerely yours,

A handwritten signature in black ink that reads "Loren R. Fisher". The signature is written in a cursive, flowing style.

Loren Fisher
Assistant Director, North Carolina Agricultural Research Service

Cc: Steve Lommel
Rob Whitehead
Dilip Panthee