

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 3 Plum'.

'NC 3 Plum' resulted from repeated back-crossing and, selfing of NC 13330, resulted from the original crosses of NC78L-1W(2007) x RG-PtoR and selection from a large BC2 population. NC78L-1W(2007) is a plum tomato breeding line with desirable horticultural traits and resistance to late blight (*Ph-3* gene) developed from NC State tomato breeding program. RG-Pto-R is an old plum tomato variety with Bacterial speck resistance (*Pto* gene). Dr. Greg Martin provided RG-Pto-R seeds from BTI, Ithaca, NY to make crosses with NC-adapted lines and introduce the *Pro* gene into the NC-adapted lines. The *crimson* gene in 'NC 3 Plum' was derived from the NC78L-1W(2007). The objective of breeding NC 3 Plum was to incorporate Bacterial speck resistance (*Pto* gene) into the plum tomato's desirable horticultural background. Single plant selections were made for large fruit size, yield, and other desirable horticultural traits in the F₂ through F₅ generations derived from selfing NC 13330. The F₆ generation seeds were bulked to produce the F₇ generation inbred line proposed for release as 'NC 3 Plum'. No segregation was found beyond F₄ generation grown in the 2016 plot.

The plant growth habit of 'NC 3 Plum' is vigorous, determinate with attractive, heavy foliage cover. Fruits are large, smooth, elongated in shape, and have jointed pedicels. Immature fruits are uniform light green (*u* gene). Ripe fruits are firm and develop bright red exterior and interior color due to the *crimson* gene. Fruits have a small nipple at the end of the fruits; mostly, it is smooth. Disease resistances include verticillium wilt (*Ve* gene), fusarium wilt races 1 and 2 of (*I* and *I-2* genes), late blight (*Ph-3* genes), and Bacterial speck resistance (*Pto* gene).

The average marketable (29 ton/ha) and total (40 ton/ha) yields were not different from the control breeding lines. The average fruit weight of about 102 grams over the two replications grown was also not significantly different from control. However, because of gene combinations for disease resistance (late blight and bacterial speck) and attractive fruit shape, large fruit size, and good combining ability, it is used as a parent in other crosses. 'NC 3 Plum' is not intended for use as a cultivar but solely as a parent for its contribution of excellent fruit size, the *crimson* gene, and other desirable horticultural traits and disease resistance genes when used as a parent in F₁ hybrids. 'NC 3 Plum' is the first line developed for release from the NCSU tomato breeding program that combines the Bacterial speck resistance and late blight resistance into the desirable horticultural background along with the *crimson* gene. 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.



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To acquire seed of NC 3 Plum 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".

Loren Fisher
Assistant Director, North Carolina Agricultural Research Service

Cc: Steve Lommel
Rob Whitehead
Dilip Panthee