



—Scientific Note—

Horticultural Evaluation of ‘Valencia’ Sweet Orange Grafted onto Pummelo Interstocks and Swingle Rootstocks

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Additional index words. canopy density, huanglongbing, interstocks, pummelo

Citrus greening disease [huanglongbing (HLB)] is a devastating disease caused by gram negative, phloem-limited, fastidious bacteria *Candidatus Liberibacter* spp. (Davis et al., 2008). HLB infects almost all the commercial cultivated citrus, causing a major loss of tree vigor, production, fruit development, and quality (Trivedi et al., 2010). An interstock is a graft of a citrus selection which can be used as a “bridge” between the scion and rootstock. Interstocks can increase tree longevity, production and improve fruit quality, regulate tree size (Girardi and Mourão Filho, 2006). Interstocks have been reported to improve abiotic stress tolerance (Aboutalebi and Hasanzadeh, 2014). HLB-tolerant interstocks would allow growers to use the rootstocks they liked prior to HLB becoming a problem (Shokrollah et al., 2011).

In this study, pummelo derived interstock candidates were selected based upon their field performance in which they showed few or no HLB symptoms. The ‘Swingle’ rootstock was cleft grafted with 6-inch interstock sticks obtained from trees in the field. The interstock was subsequently cleft grafted with HLB infected ‘Valencia’ scion. A year following grafting, trees were planted out in the field. There were nine of pummelo selections: UKP-1 (unknown origin), HBJL-1, HBJL-4, 5-1-99-3, and 5-1-99-2-S5 (derived from ‘Hirado Buntan’ pummelo); 5-4-99-3 and 5-4-99-7 (derived from ‘Red Shaddock’ pummelo); 7-2-99-11 (derived from ‘Large Pink’ pummelo); and 8-1-99-1B (derived from ‘Liang Ping Yau’ pummelo). ‘Swingle’ interstock served as the control in this study.

Leaf samples were periodically collected for physiological analysis (total chlorophyll content, starch content, total phenolic compounds content (TPC). The expression of two Pathogenesis Related (PR1 and PR2) genes were investigated from RNA obtained from the ‘Valencia’ scion leaves. Soluble solid content (SSC) was estimated in ‘Valencia’ fruit. CLas titer diagnosis of field trees in 2021 showed a low bacterial titer ranging between

29.74–33.56 in ‘Valencia’ grafted onto the pummelo selections and 32.69 in ‘Valencia’ grafted onto ‘Swingle’. ‘Valencia’ grafted onto HBJL-4 interstock and ‘Swingle’ control recorded the highest foliar starch content (34.50 and 38.22 $\mu\text{g}\cdot\text{mm}^{-2}$). 5-1-99-3 and HBJL-4 interstock trees exhibited the highest values of TPC (46.44 and 46.362 $\text{mg}\cdot\text{g}^{-1}$ gallic acid FW). The highest relative expression of PR1 and PR2 genes was recorded in HBJL-1 interstock trees followed by 8-1-99-1B and UKP-1 interstock trees. All interstocks influenced tree growth rate canopy density in the field (P -value = 0.0085). Trees on the 5-4-99-7 and 8-1-99-1B interstock had higher canopy density compared with the other trees. Additionally, some of the interstock combinations resulted in higher soluble solid content (SSC), which ranged between 5.15–6.15 lb solids/box. Our results indicate that HLB-tolerant interstocks can be used to provide enhanced tolerance to the susceptible scions and improve the soluble solid content in fruits, potentially resulting in increased income.

Literature Cited

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