

C-35 citrange

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NSW DPI Citrus Team



Advantages

- ✓ *Phytophthora* tolerant
- ✓ drought tolerant
- ✓ nematode resistant
- ✓ cold tolerant
- ✓ tristeza tolerant
- ✓ medium size trees
- ✓ good fruit quality

Disadvantages

- ✗ dislikes clay soil
- ✗ sensitive to high salinity
- ✗ reportedly sensitive to calcareous soils

Origin

C-35 was bred by the University of California and released in 1987 (Cameron and Soost 1986). It has the same parentage as Benton citrange (hybrid of Ruby Blood orange and *Poncirus trifoliata*).

Tolerance to environmental and soil conditions

Overseas data indicate it has good frost tolerance, similar to Carrizo citrange. It is more sensitive to calcareous soils than Carrizo citrange and not very tolerant of high salinity. C35 has better tolerance to low iron levels (high pH soils with high levels of available calcium) than Swingle citrumelo and trifoliolate orange. It is suitable for replant sites but is susceptible to zinc and manganese deficiencies.

Pest and disease

C-35 is tolerant of tristeza virus and less susceptible to *Phytophthora* root rot than Troyer citrange. It is also tolerant of the citrus nematode (*Tylenchulus semipenetrans*). Budwood for propagation on this stock should be obtained from Auscitrus to ensure freedom from citrus exocortis viroid (CEV) and other viroids, which cause dwarfing and tree decline, and from citrus tatter leaf virus to which trifoliolate orange hybrids are sensitive resulting in a yellow ring at the bud-union.

Field performance

In shallow sandy to sandy loam soils at Loxton Research Centre, (South Australia) C-35 is currently performing well in a rootstock comparison experiment with seven other rootstocks. The scions are early, mid and late season varieties of navel orange. Trees were planted in 1997. It is also one of 10 rootstocks being compared under mid and late season mandarins in slightly deeper soils. A mandarin experiment in Queensland is comparing C-35 with 9 other rootstocks and has not yet shown any particular advantage of C-35. It causes pronounced 'benching' at the graft union with Imperial mandarin, but this has not yet led to tree decline.

Nursery performance

Per cent nucellar seedlings are lower than for Troyer citrange, which demands identification and destruction of 'off-type' stock before budding.

Fruit quality

Fruit quality is good and comparable to Carrizo citrange.

Scion compatibility

C-35 has shown incompatibility with Yen Ben lemon in New Zealand.

Overseas experience

This rootstock was bred in California, and within 10 years of its release, it is being used widely on navels, especially in the San Joaquin Valley. This is mainly because of its excellent yield efficiency i.e. for each cubic metre of canopy volume, it produces more kilograms of fruit than other rootstocks.

Overseas it produces medium sized trees about 25% smaller than Carrizo citrange. Good performance has been obtained under grapefruit, navels and valencia oranges in the USA and South Africa.

In New Zealand, C-35 with Clementine mandarin has produced high yielding trees with good fruit size and internal quality. Trees on C-35 are more vigorous than those on *P. trifoliata*, but in a similar trial where satsuma mandarin is the scion variety, the vigour of C-35 has slowed down as the trees began bearing heavy crops.

Reference

Cameron JW and Soost RK. 1986. C35 and C32: citrange rootstocks for citrus. *HortScience*, 21: 157–158.

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