

# CITRUS ROOTSTOCKS

Rootstock	Code	Fruit Quality	Nematode Resistance	Phytophthora Resistance	Scion Vigour	TOLERANCE TO:				
						Salt	Lime	Sand	Loam	Clay
Trifoliata	T.S	Very High	Very High	Very High	Low	Very Low	Very Low	Good	Very Good	Very Good
Carrizo Citrange	C.C.S	High	Very High	High	High	Moderate	Moderate	Very Good	Good	Moderate
Troyer Citrange	T.C.S	High	Very Good	High	High	Moderate	Moderate	Very Good	Good	Moderate
Benton Citrange	B.C.S	High	Very High	High	High	Moderate	Moderate	Very Good	Good	Moderate
Cleopatra Mandarin	C.M.S	High	Low	Moderate	High	Very High	High	Very Good	Good	Poor
Sweet Orange	S.O.S	High	Low	Low	High	Moderate	Moderate High	Very Good	Poor	Poor
Citronelle	C.S	Moderate	Low	Very Low	Very High	High	Very High	Very Good	Very Poor	Very Poor
Rangpur Lime	R.L.S	Moderate	Low	Low	Very High	Very High	High	Very Good	Good	Moderate
Swingle Citrumelo	S.C.S	High	High	High	High	Moderate	Poor	Very Good	Good	Poor

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Stock	Characteristics	Requirements	Major Risk Factors
P. Trifoliata (TS)	Highly resistant to Phytophthora, tristeza and exocortis. Shallow depth of rooting but develops high fibrous root density. Tree size small, but generally highly fruitful. Fruit quality very good.	Exocortis-free budwood. Will grow on wide range of soils, but prefers loams. Intolerant of highly acid and lime soils. Poor drought tolerance.	Incompatible with Eureka Lemon. Compatibility with some minor varieties unknown. Despite accumulating high levels of chloride in leaf tissues does not exhibit obvious toxicity symptoms. Sudden death.
Troyer and Carrizo Citranges (TCS & CCS)	Resistant to Phytophthora, cold hardy. Tristeza tolerant; infection by exocortis results in reduced tree size, but no but T scaling. Mycorrhizal dependent. Intermediate depth of rooting; main lateral and fibrous root development may be poor in young trees. Medium to large trees, usually very productive with good fruit quality.	Exocortis-free budwood. Adapted to wide range of soil types, except highly calcareous soils.	Incompatible with Eureka Lemon. Very prone to micronutrient deficiencies, especially on calcareous soils. Compatibility with some minor varieties unknown. Sudden death.
Rough Lemon (citronelle)	Susceptible to Phytophthora root and collar rots, citrus nematode. Tristeza and exocortis tolerant. Mycorrhizal dependent. Extensive lateral and vertical root development. Highly drought tolerant. Produces large tree. Yields are high, of good fruit size but poor quality.	Best on deep virgin sandy soils.	Does not tolerate excess soil moisture. Tendency to accumulate excessive chloride leading to leaf drop. Unsuitable for some mandarins and Ellendale tangor.
Sweet Orange (SOS)	Very susceptible to Phytophthora root and collar rots; susceptible to citrus nematode. Tristeza and exocortis tolerant. Mycorrhizal dependent. Intermediate depth of rooting. On well-drained soils in inland areas produces large trees. High yielding with good fruit quality	Best on deep sandy soils. Sensitive to dry conditions but tolerates calcareous soils.	Does not tolerate excess soil moisture.
Swingle Citrumelo (SCS)	Phytophthora and drought tolerant; nematode resistant; tristeza tolerant. More salt tolerant than other P. trifoliata hybrids. Good quality fruit.	Not suited to clay or highly calcareous soils.	Sensitive to overwatering. Incompatible with Eureka lemon and some orange and mandarin cultivars. Overgrows orange varieties. Fruit more prone to creasing.
Cleopatra Mandarin (CMS)	Moderately susceptible to Phytophthora root and collar rots. Tristeza and exocortis tolerant. Susceptible to citrus nematode. Intermediate depth of rooting; intensive fibrous root development. Slow growing in nursery, mature trees large. Early production poor, satisfactory in mature trees. Good fruit quality but small.	Performs well on both heavy and light soils; best suited to loams. Lime and salinity tolerant.	Tendency to small fruit size. Good drainage and precautions against root rot not beneficial.
Benton Citrange (BCS)	Resistant to root and collar rots caused by Phytophthora. Compatible with Eureka Lemon.	Exocortis-free budwood.	Limited Experience. Tolerance to nematodes unknown.