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Your Florida Dooryard Citrus Guide - Selecting A Citrus Tree for Your Climate¹

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Cold Tolerance

Except when cold fronts swoop down from the Arctic, Florida has a mild subtropical climate. For this reason the most important factor in selecting your dooryard citrus tree is your geographic location, especially in terms of cold tolerance.

Example: Coastal counties and areas near Lake Okeechobee have traditionally suffered less freeze damage than other parts of Florida. However, citrus trees, even in these areas, occasionally suffer freeze damage.

Of course, other factors like tree size, intended use (fresh fruit or juice), capacity of tree to store fruit on the tree for an extended harvest period, drought tolerance, and resistance to pests and diseases are important and will be discussed.

Although no major freezes have occurred since 1989 (at this writing), six major freezes from 1981 to 1989 killed or damaged thousands of acres of citrus trees. Chances are, severe freezes will occur again in Florida. In spite of this, homeowners throughout Florida, using current strategies for cold protection, can bring their dooryard trees through most freezes

and, with some care, regrow damaged tree canopies within several years to bear crops at pre-freeze levels. Now, let me tell you about the horticultural and environmental factors that affect cold tolerance.

Cold tolerance in citrus is influenced by these factors:

- rootstock
- scion
- fruit load
- temperatures preceding a freeze.

Most rootstocks can be placed in one of three general groups according to their relative effect on cold tolerance.

- Trees on rough lemon, Rangpur lime, Volkamer lemon, Milam, Palestine sweet lime and *Citrus macrophylla* are the least cold tolerant. But because of their vigor, they recover rapidly if not severely damaged or subjected to succeeding freezes in one winter or over several years.

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- Trees on sweet orange and Carrizo citrange induce intermediate cold tolerance.
- Trees on sour orange, Cleopatra mandarin, trifoliolate orange and Swingle citrumelo are the most cold tolerant. However, trees on sour orange rootstock are susceptible to strains of a widely spread virus disease (tristeza) and are not readily available.

Finally, a given rootstock's cold tolerance is highly dependent on environmental conditioning. The best example is trifoliolate orange. As a seedling it is very cold hardy and even sheds its leaves like a deciduous tree. Trees budded on this stock develop their superior cold hardiness only after being exposed to temperatures that induce cold hardiness: 70° F day/50° F night for about two weeks before a freeze.

The least cold-tolerant rootstocks don't become cold tolerant until temperatures reach 45° F day/26° F night. Since soil and air temperatures in the warmest areas of Florida often do not reach the 70° F day/50° F night temperature range in the winter, even the most cold tolerant rootstocks may not be exposed to temperatures that induce cold tolerance. In such locations normally cold tolerant combinations like tangerines on Cleopatra mandarin rootstock may be damaged as much as Valencia orange on rough lemon rootstock.

A note on cold tolerance: If your citrus trees develop cold tolerance after several weeks of cool weather, extended, unseasonably warm fronts can work in reverse, stimulating new tender growth and canceling newly acquired cold tolerance.

The scion influences cold tolerance even more than rootstock. If you plan to raise citrus, you should know there are inherent differences in cold tolerance among scion cultivars regardless of the rootstock. Mandarins, as a group, are the most cold tolerant, followed by sweet oranges and grapefruit. Lemons and limes are very susceptible to cold.

Post-freeze observations in Florida, Texas, and California have clearly shown that the scion influence is greater than that of the rootstock during freezes preceded by favorable cold-hardening conditions. However, rootstocks also have a measurable effect on cold tolerance.

Scion/Rootstock Selection

Scion/rootstock combinations, with their advantages, disadvantages, and regional recommendations are listed in Appendixes A, B and C. You will find it worth your time to review this information.

Pollination

Many citrus cultivars are self-fertile: they produce fruit when self-pollinated. However, many mandarin cultivars require a different pollenizer cultivar to set a crop of fruit. Pollenizer cultivars must have four qualities to be potentially successful:

- a bloom period that overlaps with the main cultivar,
- consistent annual production of a good crop of flowers,
- cold-hardiness the same as the main cultivar, and
- the capacity to be self-fruitful.

Pollenizer cultivars should not require cultural practices that differ widely from the main cultivar. For example, Minneola tangelos and Temple oranges (pollenizer cultivars) are susceptible to scab, a fungal disease controllable with copper sprays, whereas Orlando tangelos and Sunburst tangerines (main cultivars) are usually not susceptible. Sunburst tangerines are also very susceptible to mite damage whereas other commonly used pollenizers are not.

Commercially, pollenizers are planted no further than the third tree row or approximately 60 to 90 feet from the main cultivar, so use this as a guide if you plan to plant any of the cultivars listed in Table 1.

Another alternative may be to graft pollenizer cultivars onto the main cultivar to produce a "fruit salad" tree, which bears fruit of different cultivars. If you do this, you may have to prune more vigorous scions, like lemons, more frequently to maintain balanced growth of different scion cultivars on the same tree. Also remember to remove all mature fruit

from the pollenizer cultivar to promote a good bloom the following year.

A note on flowering and fruit set: Citrus trees flower and produce fruit in response to environmental stress. In the tropics, drought during the dry season provides the stress. In Florida, cold weather (day temperatures between 50° to 64° F and night temperatures between 46° to 55° F) usually provide this stress.

Winter temperatures in Florida can hasten or delay the bloom period that normally occurs in March-April. The time (number of weeks) that citrus trees are exposed to cool weather can also affect the intensity of flowering. However, when late winter freezes kill tender blossoms, few, if any, fruit may be produced, except from erratic late blooms. In temperate climate zones north of Florida, potted citrus should also be exposed to cold - but not freezing - temperatures before you bring these trees inside for the winter.

Table 1. Pollenizer cultivars for important self-incompatible citrus cultivars.

Pollenizer Cultivar	Main Cultivar				
	Minneola	Nova	Orlando	Robinson	Sunburst
Minneola ^{1,2}	U	U	U	U	U
Nova	?	U	S	S	S
Orlando	U	S	U	S	S
Robinson ³	U	U	S	U	U
Sunburst	S	S	S	S	U
Temple ^{2,4}	S	S	S	S	S
Murcott ^{1,2,5}	U	U	U	U	U

S=Satisfactory; U=Unsatisfactory; ?=Unknown

¹Tends to alternate bearing
²Scab Susceptible
³Produces too little pollen unless used as the main cultivar
⁴Much more sensitive to freeze damage than the other cultivars
⁵Bloom does not overlap any of the other cultivars

Note: No sweet orange or grapefruit cultivar is considered a satisfactory pollenizer, even though some seedy cultivars of oranges are slightly effective.