UNIVERSITY OF FLORIDA
Florida Cooperative Extension Service

Fact Sheet HS-123
June 1994

Cold Hardy Citrus[1]

L.K. Jackson and T.R. Fasulo[2]

The home citrus grower is at a distinct disadvantage trying to grow citrus in north and west Florida since it will freeze in most years. Since citrus species are basically subtropical or tropical crops they will not tolerate most temperatures below 28° F. The home fruit grower cannot control the climate, but there are certain other factors he can change which will influence the chances of survival of a citrus tree in north and west Florida. Moreover, there are several steps he can take to modify the immediate micro-climate of a citrus tree and thus enable it to withstand freezing temperatures.

COLD HARDY VARIETY SELECTIONS

Trifoliate orange (an inedible citrus relative) can withstand the lowest temperature of all citrus when it is mature and fully dormant, followed by kumquat, satsuma, calamondin, sour orange, mandarin, sweet orange, grapefruit, shaddock, lemon, lime and citron. Grapefruit, shaddock, lemon, lime and citron are not recommended outside the commercial citrus belt of Florida. Some sweet oranges, some mandarins and calamondin have sufficient cold-hardiness to be grown north of the commercial citrus belt, but south of a line drawn from the mouth of the Suwannee River through Gainesville to Green Cove Springs and then up the St. Johns River to the ocean. They can be successfully grown in this area in most years. Specific citrus types which can be grown in the area described above include: Sweet Orange, Mandarin, Calamondin, Satsuma, Kumquats. The most prominent citrus fruit which are sufficiently cold-hardy to grow throughout north and west Florida are satsuma and kumquats.

COLD HARDY SWEET ORANGES

Varieties of sweet oranges (*Citrus sinenesis* (L.) Osbeck) which can be grown in this area are navels, Hamlin, and Parson Brown. These oranges mature in the early to late fall so that fresh fruit would normally be harvested before a severe freeze would be expected. The preferred rootstock is trifoliate orange for maximum cold-hardiness, with sour orange being second choice if trifoliate orange is not available. Swingle citrumelo is another good rootstock for most of this area. One other new variety which could be considered is Ambersweet which is classified as an orange although it is actually a hybrid.

1. This document is Fact Sheet HS-123, a series of the Department of Horticultural Sciences, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Publication date: June 1992. Revised: June 1994.

2. Larry K. Jackson, professor, extension horticulturist, Department of Horticultural Sciences, Citrus Research and Education Center (CREC), Lake Alfred, Florida, a branch campus of the University of Florida, Gainesville, Florida; Thomas R. Fasulo, associate in entomology, entomologist, Department of Entomology and Nematology, Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville FL 32611.

The term "plates," where used in this document, refers to color photographs that can be displayed on screen from CD-ROM. These photographs are not included in the printed document.

COLD HARDY MANDARINS

The mandarins (*Citrus reticulata* Blanco) and mandarin hybrids for this area include Dancy tangerine, Orlando tangelo, Robinson tangerine and Sunburst. The preferred rootstock for cold-hardiness is trifoliate orange, but sour orange or Cleopatra will be easier to find. Changsha mandarin is quite hardy with fair quality, but may be difficult to locate.

COLD HARDY SATSUMA

Satsuma is the most cold-tolerant of commercial citrus, with mature, dormant trees having survived 15° F without serious injury. Consequently, it is adapted to regions that are too cold for most other citrus, as it has not proven commercially acceptable in milder regions of the subtropics.

The satsuma tree is moderately vigorous, medium-small, very productive and markedly cold-resistant. Greatest cold-hardiness is attained on trifoliate orange rootstock, which also causes dwarfing of the tree.

COLD HARDY KUMQUATS

Kumquats exceed even satsuma in terms of cold-hardiness, being able to sustain 10° F when fully dormant. Active growth occurs only at relatively high temperatures, so the plants remain semi-dormant during late fall, winter and early spring in warm temperate climates. They normally bloom long after citrus and cease active growth earlier in the fall, which contributes to their cold-hardiness.

Trifoliate orange is the preferred rootstock for kumquats grown in cold regions, which further reduces tree size.

PLANTING SITE

Cold air drains downhill, so higher elevations will be somewhat warmer than the sites at the bottom of a hill or slope. Usually, the south and southeast sides of a lake or other body of water will be warmer than the north side or sites with no water nearby. Planting on a slope or south of a body of water affords some cold protection. The average residential lot does not normally permit such considerations, however.

Planting on the south side of and at the correct distance from the house will be helpful. Most freezes and wind drift are from the north and northwest, thus the house will act as a windbreak, forcing the cold air up and over it and the citrus trees, leaving the area near the south side somewhat warmer. The house itself radiates considerable heat, some of which will be absorbed by adjacent plants, thus warming them.

CULTURAL PRACTICES

The soil under and around a citrus tree should be completely free of weeds, grass or mulch during the winter. Grass or mulch on the soil acts as an insulator, hence solar heat is prevented from entering the soil during the day and less heat is stored for release from the soil at night. A clean packed surface allows maximum heat absorption during the day and maximum heat radiation at night. Moreover, moist soil will absorb more heat than dry soil, so trees should be thoroughly watered just days before a bad freeze is predicted. Finally, good tree health and nutrition will help the tree withstand freezing temperatures.

Follow recommended cultural practices and fertilization to maintain the trees in the best condition. Fertilization, spraying and pruning should end in September in order to allow the trees to harden off completely before severe freezes are encountered.

COLD PROTECTION

Dooryard fruit growers must provide additional cold protection to the trees during severe freezes. Young citrus trees should be banked (Plate 1) for the first 3 - 5 winters until the tree is large enough to withstand cold.

An alternative to banking is the use of tree wraps (Plate 2). Additionally, trees may be covered temporarily with blankets, quilts, paper or other material as further protection against hard freezes. However, such material should be removed each morning to allow the tree to take full advantage of incoming solar radiation.

Irrigation may also be used for cold protection but is not without risk. If water supplies are interrupted for any reason trees protected with water may suffer more than other trees which were unprotected. When dependable municipal water is available, the combination of irrigation judiciously applied to the lower portion of the tree plus insulating wraps on the trunk may provide good protection.