Pears. There are many sand (hard) pears that can be grown in Florida. Unfortunately, the softer-fleshed pears commonly sold in grocery stores are not adapted to Florida. Pear trees find their best use as specimen plants. The trees have a beautiful showy white bloom in the spring which is usually followed by a large crop of pears that can be eaten fresh or used for processing. Pears usually require little insect and disease control. Possibly the 2 biggest problems are fire-blight and leaf spot. Fire-blight is controlled by planting tolerant varieties and leaf spot can be controlled with 1 or 2 sprays.

Pecans. Pecans are one of the most widely used shade trees in north Florida. The pecan can be grown throughout the entire state and should be used in the dooryard as a shade tree. Since pecans are such large trees they should be planted at least 60 feet apart for best results. Outside of commercial orchards, pecans should be planted for the beauty and shade rather than for their nuts, since nut production is often disappointing in the dooryard.

Persimmon. Persimmons are deciduous trees with beautiful green foliage during summer. The persimmon in the fall adds to the dooryard landscape since it has beautiful orange colored fruit. The leaves of some varieties also turn orange in the fall, and this provides color in the landscape during a time of the year when color is usually lacking. Fruit come in astringent and non astringent types, the latter being most popular. The persimmon usually *requires only* a dormant oil spray in the winter for good fruit production.

Plums. The plum is a small tree and one that can be used for spring color with its white showy bloom. The plum is usually used as a center planting but can be used as a hedgerow or screening plant. The plum, like peaches and nectarines, requires an extensive insect and disease control program and some pruning.

Raspberry. The raspberry is very much like the blackberry in that its best adaptation is probably as a hedgerow. The raspberry requires pruning each year to keep it in bounds but is otherwise fairly trouble-free.

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COLD-HARDINESS CONSIDERATIONS FOR CITRUS IN THE FLORIDA LANDSCAPE

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Abstract. **Some varieties of citrus can be grown successfully in the home landscape of most areas of Florida. Such plants are not only attractive ornamentals but can provide the homeowner with delicious fresh fruit. Cold-hardy citrus variety selection is discussed with respect to the major geographic areas of the state. Evaluation of the potential planting site with respect to possible cold damage is outlined.**

Citrus is big business in Florida. The industry is now over 400 years old and there are some 850,000 acres (340,000 ha) in commercial production. However, even with a seemingly inexhaustible supply of citrus virtually at our fingertips, almost everyone who lives in Florida wants to have a citrus tree in the dooryard. This is not difficult to understand since the citrus tree is a lovely evergreen plant which, given proper care, can furnish the grower with an abundance of delicious fruit every year.

Citrus is a subtropical plant and will not tolerate temperatures much below freezing. Florida has a subtropical climate, but there are few areas in the state which escape all freezing temperatures. In general, the probability of a damaging freeze increases with northerly latitude.

Climatic Zones

Florida is often divided into climatic zones (Fig. 1.). Each of these zones has a particular probability of damaging cold and consequently, a certain risk of damage to citrus trees.

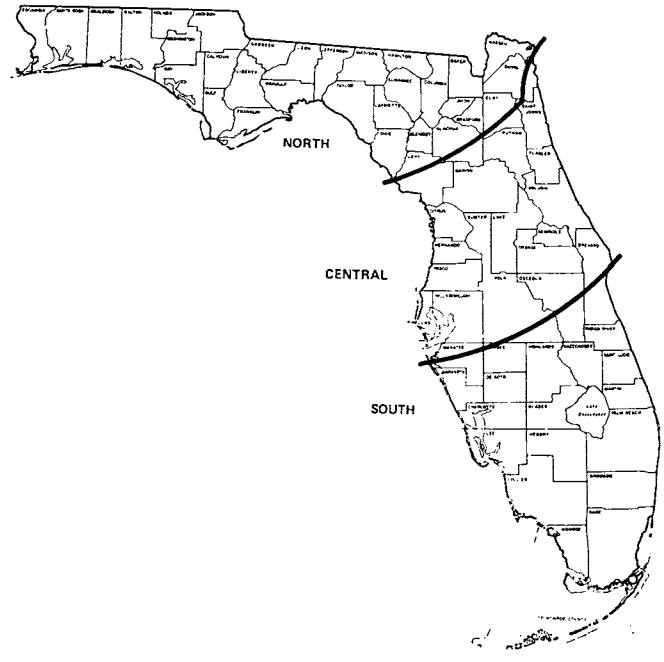

Fig. 1. Climatic zone map of Florida.

The northern and western portions of the state receive damaging temperatures most years and special precautions are necessary for tree survival. This area is roughly north

and west of a line extending from Cedar Key through Gainesville to Jacksonville. This line is not sharply defined, and should be considered a transition area.

Central Florida consists of the area south of the previously discussed line down to another line which extends from Bradenton through southern Polk County over to Cocoa. Freeze probabilities are much lower in most of this area as evidenced by the fact that most of the state's commercial citrus is located here.

South Florida includes the area to the south of the Bradenton-Cocoa line previously discussed. The probability of damaging freezes is low in most of this area, and even the most tender citrus varieties can usually be successfully grown.

Local microclimates exist within each zone which may have a substantial effect on minimum temperatures. Elevation is one characteristic which has a large effect on these microclimates. Low areas and pockets tend to collect cold air which is heavier than warm air, and temperatures are usually several degrees colder in such locations during cold weather. Conversely, hilltops and other elevated areas with good air drainage are usually several degrees warmer than lower areas nearby. Citrus growers should take advantage of elevation when possible to help minimize the risk of cold damage (1).

Another feature of local microclimates which can be used to advantage in growing citrus is proximity to a heat source. Cold weather in Florida arrives from the northwest and north, so plants located on the south and southeast sides of lakes, rivers or buildings will receive some protection from these sources (2).

Cold Protection

Citrus growers in north, west and many areas of central Florida should be particularly careful in selecting a planting site, taking advantage of elevation and proximity to heat source whenever possible. Other methods of passive cold protection include planting under over-hanging trees, keeping planting sites weed-free, pre-freeze irrigation and proper cultural practices (2).

Overhanging trees absorb heat radiated from plants and the ground, reradiating some of it to the ground. This provides a temperature advantage, but growing citrus beneath other trees is not entirely satisfactory due to poorer growth and lower yields.

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, preventing solar heat from entering the soil during the day and reducing the amount of heat 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 before a freeze arrives (3).

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 (5).

Variety Selection

Selection of the proper rootstock and scion variety is critical if cold-hardiness is a major consideration. There is a considerable range in hardiness among the many citrus cultivars and selection of the right cultivar for a particular location may mean the difference between success and failure.

The dooryard grower usually does not have a wide selection of citrus rootstocks from which to choose. Rootstocks are chosen for many horticultural reasons such as vigor, tree size, productivity, precocity, soil adaptation, disease resistance and cold-hardiness. Selection of the rootstock becomes easier when the risk of cold damage becomes very high. In this situation, growers should select trees on the hardiest possible rootstock. Generally, trees grown on trifoliate orange (*Poncirus trifoliata*) or sour orange (*Citrus aurantium*) should be used for maximum hardiness. Trees on 'Cleopatra' mandarin (*Citrus reticulata*) or on one of the citranges might also be considered, but they are not as hardy as trees on sour or trifoliate orange. Other rootstocks would probably not be desirable from the cold-hardiness standpoint and their use should be confined to warmer areas of the state.

The scion variety selected by the grower is probably the single most important decision made where cold-hardiness is needed. Generally speaking, the scion cultivars are ranked from most hardy to least hardy as follows: kumquat, satsuma, calamondin, sour orange, mandarin, sweet orange, grapefruit, pummello, lemon, lime and citron (4).

The Kumquats

The kumquats (*Fortunella* spp.) are undoubtedly of Chinese origin, the 'Nagami' variety having been introduced to Europe and the U.S. from China in the middle of the last century. Other varieties were introduced into the U.S. around the turn of the century.

Kumquats are primarily grown for ornament in California and the Gulf Coast states and for use of the fruit in the gift-package trade in Florida. The fruit may be eaten fresh, peel included, but it is most frequently preserved as marmalade or candied whole fruit.

Kumquats exceed even satsuma in cold-hardiness 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. Both factors contribute to their cold-hardiness.

The plant is a shrubby evergreen tree, rarely 10 ft. (3 m) tall, densely branched with few or no thorns. The leaves are small and simple, with hardly any petiole wings. Trifoliate orange, the preferred rootstock for kumquats grown in cold regions, further reduces tree size. There are 4 principal cultivars of kumquat found in Florida: 'Nagami', 'Meiwa,' 'Marumi' and 'Hong Kong'.

Satsuma

The satsuma mandarin (*Citrus unshiu*) apparently originated as a chance seedling in southern Japan sometime before 1600 A.D. and can be grown in the U.S. from Florida to Texas along the Gulf Coast and in Arizona and California.

Satsuma is among the most cold-tolerant of all commercial citrus. Consequently, it is adapted to regions that are too cold for other citrus.

There are several groups or varieties of satsuma, although the majority are 'Owari' or varieties which arose from 'Owari' by bud mutation. 'Silverhill' is a nucellar seedling selection of 'Owari' which was named in Florida about 1931 and it appears identical to 'Frost Owari' in California. Satsumas propagated in Florida may be called, 'Owari', 'Silverhill' or simply satsuma.

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 some dwarfing of the tree.

The fruit matures in October-November but holds poorly on the tree, becoming puffy and losing quality so that it must be picked promptly. The fruit stores well after harvest.

Calamondin

The calamondin (*Citrus madurensis*) can substitute for other acid citrus. It is widely grown as an ornamental in Florida and California. Calamondin is particularly attractive as a container plant and is used extensively throughout the U.S. as a house plant.

Calamondin is mandarin-like in many respects, but also resembles kumquats. The tree is dwarf and bushy, being quite showy when laden with mature fruit. It is nearly thornless, with small broadly oval leaves.

Calamondin can be propagated by seed and by cuttage, although seedlings may not fruit for several years. It does not require a rootstock and is itself a suitable rootstock for kumquats.

Mandarin and Mandarin Hybrids

The mandarins and their hybrids are fairly hardy and usually mature a crop of fruit before the danger of damaging freezes. There are many cultivars within this group, but from a cold-hardiness standpoint, the following cultivars might be selected: 'Dancy' tangerine, 'Orlando' or 'Nova' tangelo, 'Robinson' or 'Sunburst' tangerine hybrid, 'Changsha' or 'Cleopatra' mandarin.

Sweet Oranges

Only those sweet oranges that mature a crop before the probability of a freeze are considered here. This is not to say that these cultivars are better than others which could be grown in central or south Florida. The recommended cultivars of navel, 'Hamlin' and 'Parson Brown' are generally acknowledged to be slightly hardier and mature a crop which could probably be harvested and used before the danger of a freeze.

Other Citrus

The grapefruit, pummelo, lemon, lime and citron should probably not be grown in cold locations. These varieties are all fairly susceptible to cold damage and survive only during mild winters or when well protected by artificial means. This should not preclude their use in warmer locations of the state.

Summary and Conclusions

Citrus is sensitive to cold and the amount of cold the trees can tolerate is often the limiting factor in determining whether or not a given variety should be grown. South Florida is warm enough that most citrus cultivars can be grown without serious danger from cold. Central Florida will also be warm enough for most citrus if discretion is used in selecting a planting site. Cold protection may be necessary on occasion in the central Florida area, especially if some of the less hardy cultivars are planted. North and west Florida is considered marginal for most citrus but kumquats, satsumas, calamondins and some mandarins and sweet oranges might be considered. Hardy varieties must be selected and site selection is critical. Cold protection will probably be necessary in most years.

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ARTHROPODS ASSOCIATED WITH FOURTEEN URBAN LANDSCAPE PLANTS IN SUBTROPICAL FLORIDA[1]

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Additional index words. Eugenia, Murraya, Carissa, Lagerstroemia, Codiaeum, Juniperus, Pyracantha, Viburnum, Casuarina, Bouganvillea, Ixora, Nerium, Podocarpus, Bucida, pest management.

Abstract. **Fourteen plant species growing in an urban landscape in Fort Lauderdale were sampled biweekly from Sept. 1977-Dec. 1978 for insect and mite associates. The pest or beneficial status of each organism or complex was determined, and their importance to the host for an integrated pest management program was summarized.**

Initiation of a management program to maintain urban landscape plants free from ravages of pests depends upon knowledge of what pests are present and when they attack. Because plant damage is correlated to pest abundance, especially with arthropod pests, estimates of population size relative to damage are essential (3). People generally have a low tolerance for damage by pests on urban landscape plants which are valued for their aesthetic contribution to the environment surrounding private as well as public structures and facilities.

Single species of ornamental plants samples over a wide

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