



Florida Citrus Varieties

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UNIVERSITY OF
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Second Edition

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Introduction

Florida produces a wide selection of high quality citrus fruits for processing into juice products and for fresh consumption. For a large tree fruit industry, such as citrus in Florida, where over 85 percent of the product is processed, it is important to retain a viable, well identified fresh fruit sector which enjoys a high degree of recognition by the general public in the United States and abroad.

The purpose of this publication is to provide brief descriptions of citrus cultivars suitable for planting under Florida conditions so that commercial growers, homeowners and other interested individuals can make informed decisions based on their respective needs. Suitable selections from the range of varieties described will provide fruit for sale or personal consumption throughout much of the year. The text identifies origins of the various cultivars and provides information on fruit size, seediness and maturity periods as well as horticultural and pest-related characteristics of the fruit and tree.

Commercial producers, nurserymen, packers, processors, retail outlets and homeowners are beneficiaries of the many horticultural, plant protection, postharvest and marketing standards developed over the years. The Citrus Budwood Protection Program administered by the Florida Department of Agriculture and Consumer Services (FDACS), Division of Plant Industry (DPI), Budwood Registration Bureau evaluates promising citrus varieties for bud-transmissible diseases and horticultural characteristics, including yield and fruit quality, and makes propagation material from selected trees available to nurseries which produce trees for the industry and retail outlets. Current information on numbered selections (clones or registered budlines) of varieties is available from the Bureau. DPI also maintains an arboretum located in Winter Haven, Florida where many of the varieties in this publication can be seen. Regulations promulgated by the Department are intended for the welfare of the commercial industry, consumers and the economy of the State of Florida.

Selection of dooryard citrus trees should also be based on standards similar to those considered by commercial growers, namely end use (utilization), maturity period, tree size, cold, flood salt tolerance, other soil-related factors such as pH and pest and disease resistance. Fruit size, eating quality, seediness, ease of peeling and on-tree holding quality are also of interest to commercial producers, dooryard growers, and consumers.

For citrus to be a profitable venture there must be a willingness to provide a high level of management input and to become very knowledgeable about specific cultural, harvesting, handling and marketing

requirements of individual varieties for the fresh and juice products markets. Management of tree growth, fruit production and quality integrates site characteristics, predominantly soil type, variety, rootstock vigor, tree spacing, nutritional, water and weed control inputs and eventually hedging and topping. The objective is to optimize fruit production and quality with minimal vegetative regrowth. Citrus rootstocks affect more than 20 horticultural and pathological characteristics of the tree and fruit including tree vigor, cold hardiness, yield, fruit size, juice quality and holding quality on the tree and pest tolerance.

Trees of different varieties vary in degree of cold hardiness with mandarin types being the most hardy, Temple and Fallglo being the notable exceptions. Sweet oranges rank next in cold hardiness, closely followed by grapefruit. Lemons and limes (acid fruit) are far less cold hardy and are, therefore, limited to the warmest locations. Fruit tolerance to cold differs from tree hardiness, with grapefruit usually being the most tolerant due to fruit size and peel thickness, followed by oranges, mandarins, lemons and limes.

Cross pollination is necessary for satisfactory fruit set and yields of certain mandarin types and hybrids.

The pollenizer variety, its percentage of the planting and arrangement and its marketing potential are all very important. Growers should not overlook the importance of honeybees and their behavior for effective cross pollination. Fertilization and irrigation practices also influence fruit size, internal and external quality and sometimes storage and shipping qualities. Over fertilization, over irrigation and frequent heavy pruning invariably results in excessive vegetative growth, poorer fruit quality and in some cases greater susceptibility to foliar fungal diseases. Excessive crop load and fruit size, sometimes associated with limb breakage in certain varieties such as Murcott, Dancy and Sunburst, can be regulated by mechanical pruning or other fruit thinning practices.

A higher level of pest and disease management is required for fresh fruit as external appearance is important for the fresh fruit market. In addition to wind scar, considerable surface blemish can result from mites, insect and disease infestations in Florida. Cultural practices may be used to modify the impact of pests and diseases but agrichemicals will have to be used if monitoring indicates a necessity. While the commercial fresh market demands blemish-free fruit, the homeowner who is usually more interested in the eating quality may choose not to spray repeatedly to maintain external appearance. Reduced frequency of overhead irrigation or its replacement by low volume, subcanopy systems will reduce the incidence and severity of some fungal diseases.

In the absence of some fungicides previously available it would be wise to select varieties not highly susceptible to the fungus diseases such as scab and *Alternaria* brown spot, which require multiple sprays for their effective control.

Citrus matures slowly, does not suddenly ripen as do many other fruit and does not continue to ripen after harvest. Gradual changes in juice content, sugar and acid levels determine fruit maturity, with acid content decreasing and sugar content increasing as fruit mature. Commercial growers take samples of fruit for analysis to determine if legal maturity standards have been attained. The dooryard grower usually determines this by fruit color break and taste. Citrus may be held on the tree long after it attains acceptable quality standards, usually improving in taste until the flesh begins to dry out, at which time it may fall from the tree. Frozen fruit will drop within a few days and those remaining on the tree will dry out with time, with the degree of juice loss being related to variety and the severity and duration of freezing temperatures. The homeowner may pick such fruit and store the juice in the freezer. Slightly damaged Valencia fruit will often recover some of their juice content with a relatively early freeze. A grapefruit crop from the same bloom can be harvested from October through May or later, but fruit drop and seed germination in the fruit may occur later in the season. Fruit of orange varieties usually hold for shorter periods than grapefruit, while mandarin types cannot be stored on the tree for nearly as long. Mandarins tend to become puffy with age when the flesh separates from the peel. Lemons and limes may be used whenever deemed to have enough juice. Although the major citrus bloom is in the spring, acid varieties will bloom sporadically making it possible to have a limited quantity of fruit much of the year.

The orange peel color of fruit, which is closely identified with eating quality by consumers, is intensified by cool fall and winter temperatures. Thus, fruit sometimes will not develop the desired color in Florida and in tropical areas with milder climate conditions. Flesh color is similarly affected but to a lesser degree. Early maturing varieties generally are not as well colored as mid- and late-season ones and the better colored later maturing Valencia may actually regreen to some extent if held on the tree until late in the season. Fruit of mandarin types, tangerines and tangelos, vary widely in color, some being more dependent on low temperature for color development than others. Grapefruit develops an excellent peel color even in the hottest climates, but the green color changes to yellow earliest in cooler climates. Fruit shape and peel texture,

important factors in fresh fruit marketing, are also qualities influenced by climate. Lemons are picked according to size and degreened with ethylene to develop the yellow color. Limes are picked for juice content and size, are normally green when "ripe" but do eventually become yellow.

As much time as possible should be allowed for fruit to reach peak maturity on the tree, as quality usually improves with time. More emphasis should be placed on the sustained production of high quality, marketable fruit than on early returns from fresh fruit of lesser quality harvested and marketed too early. A consumer is less likely to be a return customer following an unsatisfactory experience. Fruit must be handled carefully during harvesting and handling (including degreening operations) to minimize fruit damage and postharvest decay development, and to improve shelf life. Certain varieties attain internal quality standards before acceptable external color development, while others dry out prematurely and, therefore, require early harvesting. Where fruit is prepared for sale on the fresh market, Florida Department of Citrus regulations should be followed and postharvest fungicidal and wax treatments properly applied. If fruit is stored, correct conditions of relative humidity and temperature should be maintained.

Fresh fruit will usually, but not always, return higher prices than fruit for processing and is, therefore, a good hedge against years of low processed product returns. Certain fresh citrus fruit varieties may be used for juice blending to improve juice color, an increasingly important marketing factor. Valencias held late in the season may command a higher price for the not from concentrate (NFC) market.

The United States Department of Agriculture and University of Florida citrus fruit breeding programs are integrating emerging biotechnologies that will facilitate the development and selection of improved fresh and processing varieties that: 1) satisfy demands between marketing periods of existing varieties and capture early markets with varieties which may be harvested before the threat of freezing weather; 2) improve external appearance (particularly fruit color), ease of peeling, internal quality, juice color and reduce seed content; 3) improve storage, shipping qualities and shelf life; 4) reduce pest and disease susceptibility of tree and fruit, thereby lowering dependence on agrichemicals; and 5) improve cold hardiness of trees to better survive freezes. Emphasis is on the development of high quality seedless mandarin types for the fresh market and improved sweet orange selections that will facilitate the processing industry's shift from frozen concentrate to not from concentrate (NFC).

Florida Citrus Harvesting Periods*



*Maturity period of each variety actually exceeds range shown as maturity is affected by Florida's seasonal and production location variations. Harvest of grapefruit in southern Florida begins usually in late September-early October with legal maturity obtained 2-3 weeks later in central and northern growing areas. Best eating quality for grapefruit is usually not attained until November.