

Table 1. Symptoms useful in field diagnoses of several palm diseases common in South Florida landscapes (Garofalo, 1998; Garofalo, 1997; Elliott and Broschat, 1996; Meerow, 1994; Chase and Broschat, 1991).

Disease	Most useful symptoms	Other useful symptoms
<i>Phytophthora</i> bud rot	1. the <i>bud only</i> falls over 2. bud has foul odor	3. spearleaf rots at base; 4. is easy to pull out 5. oldest fronds look ok after bud has rotted 6. finally, oldest fronds turn yellow, then brown, then collapse, and finally 7. fall off
<i>Ganoderma</i> butt rot	1. conk growing on the ground, or on mulch 2. conk or button on lower trunk	3. older fronds droop, hang parallel to trunk 4. leaflets roll back along rachis 5. new growth smaller, pale green, shows nutrient deficiencies 6. spearleaf dies before opening
<i>Thielaviopsis</i> bud rot	1. trunk fall over, bending near middle 2. stem-bleeding at base, turns black 3. smells like wine or beer	4. fallen trunks hollow at base
Lethal Yellowing	1. fruit drop, stem end watersoaked 2. flowers turn brown; drop 3. most foliage yellow or brown 4. "flag leaf"—one leaf turns yellow	5. immature fronds turn yellow, then brown 6. but remain upright 7. bud dies when ½-2/3 of canopy is yellow 8. palm dies within 6 month
<i>Fusarium</i> wilts	1. progressive death of leaflets 2. from base up one side of rachis, to tip, 3. then down the other side, back to base	4. one side of tree dies 5. brown streak at base of petiole 6. vascular tissue in petiole browns 7. fungal hyphae may be seen in xs of petiole

odor while with *Ganoderma* butt rot, a button or conk is visible on the lower trunk or growing from the ground or the mulch. With *Thielaviopsis* bud rot, the trunk collapses below the tip at half its length. For Lethal Yellowing, the shedding of flowers and fruit is diagnostic, while with *Fusarium* wilt death of the leaflets progresses from the base of the leaf, up one side of the rachis to the tip, then down the other side back to the base.

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PEACHES FOR SOUTHWEST FLORIDA

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Abstract. Low-chill peach (*Prunus persica* L. Batsch) genotypes with commercial quality have been developed and adapted to the subtropical conditions in south Florida. The first of these with yellow flesh was 'Flordaprince'. Recent selections include 'TropicBeauty' and 'UFGold'. Additionally, 'Flordaglo' and 'TropicSnow' are white flesh varieties with high sugar content and noticeably sweet taste. These varieties vary from 75 to 250 chill units, ripen from mid-April through mid-May, and have fruit sizes greater than two inches in diameter (80 to 110 g). Trees are vigorous, upright, and produce fruit within two years. Fruit have exterior red blush with yellow to cream background for yellow and white flesh varieties, respectively. Fruit quality is good and these peach varieties are suitable for commercial

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shipment, local markets, commercial u-pick, and home garden and landscape. Other varieties suitable for use in the home garden and landscape are 'FlordaGrande', 'TropicSweet' and 'Rayon'.

Introduction

Growing high quality peaches (*Prunus persica* L. Batsch) with good flavor and size, and low-chilling requirement (less than 300 chill units) in central and south Florida is appealing to homeowners and landscapers. Peaches, with the above-mentioned characteristics, could command high prices for commercial u-pick and local markets because the fruit would ripen with commercial low-chill, blueberry, blackberry, and raspberry varieties. These fruit would ripen before the earliest higher-chill varieties from north Florida, Georgia, the Carolinas and California, and therefore could be economically advantageous. It is important to have several varieties that mature fruit sequentially from mid-April to mid-May to fill the commercial or u-pick market window.

The Low-Chill Stone Fruit Breeding Program in Gainesville, at the University of Florida, has developed peach varieties adapted to the subtropical climatic conditions of central and south Florida. Yellow flesh varieties 'Flordaprince', 'Flordastar', 'FlordaGrande', 'TropicBeauty', 'TropicSweet' (Sherman, et al., 1984; Sherman and Lyrene, 1989a; Rouse et al., 1984; Rouse and Sherman, 1989c; Rouse and Sherman, 1987), and white-flesh varieties 'Flordaglo' and 'TropicSnow' (Sherman and Lyrene, 1989b; Rouse and Sherman, 1989b), are low-chill varieties with melting flesh of which several are currently recommended for home gardens in central Florida (Williams et al., 1995). Additionally, 'UFGold' (Sherman and Lyrene, 1997), a non-melting, yellow-flesh variety, was recently released and is expected to be the first of several new varieties with extended shelf life following harvest.

Subtropical peach trees, like other deciduous fruit trees, require cool temperatures during the winter for leaf and flower bud dormancy to be satisfied before growth will resume in the spring. This "chilling" requirement is measured in units. A chill unit is the maximum amount of chilling that can be satisfied in one hour at an optimum temperature (Richardson & Walker, 1974). The optimum temperature for chilling in most peach varieties is believed to be near 45°F (Chandler & Tufts, 1934; Weinberger, 1950; Weinberger, 1956). Low-chill, subtropical, peach varieties acquire chilling at higher temperatures (Gurdian and Biggs, 1964), and have performed perfectly well without temperatures below 45°F when experiencing some winter cold in the range of 55°F (Sharpe, 1969). Nevertheless, inadequate chilling results in delayed and erratic flowering, reduced fruit set, and oblong-pointed misshapened fruit.

A number of low-chill peach varieties have been suggested for south-central and south Florida based on presumed chilling unit accumulation calculated from winter temperature records. Many times a chilling requirement for a low-chill variety is determined in an area that receives more than adequate chilling (i.e. Gainesville at 29°38'N, 82°21'W). The subtropical climate of southwest Florida allows for evaluating varieties at their extreme lower limits for acquiring chilling. Although the chill requirements for these peach varieties are low, they must be tested in new locations before final recommendations can be made (Topp and Sherman, 1989). Climatic adaptation, insect, and disease pressures vary at different locations. The objective of this study was to grow low-chill

peach varieties in southwest Florida, observe their adaptability to climatic conditions, and make observations that might encourage or limit their use in the home-garden landscape and commercial u-pick operations and local markets.

Materials and Methods

Peach varieties 'Flordastar', 'Flordaprince', 'TropicBeauty', 'UFGold', 'Flordaglo', 'FlordaGrande', 'TropicSnow', 'TropicSweet', and 'Rayon' were budded to Flordaguard peach rootstock and planted in a southwest Florida landscape near Fort Myers (26°39'N, 81°45'W) and Immokalee (26°27'N, 81°26'W) between 1993 and 1996. Although varieties 'Flordastar' and 'Rayon' may be considered obsolete due to the availability of more recent varieties, they were included because they satisfy the low-chill requirement (Rouse, 1989). Trees were spaced 15 feet apart in a row, fertilized with a dry soluble complete blend 3 to 5 times/year, irrigated with microsprinklers, and maintained weed free beneath the canopy with contact/systemic herbicides. Trees were pruned to establish open centers and topped to maintain a maximum height of eight feet.

Bloom and fruit maturity dates were noted and fruit were lightly thinned, allowing some overcropping to occur. Fruit shape, firmness, peel and internal color, taste, and resistance to flesh browning were all subjectively rated on a scale of 1 to 10, with 10 being the highest value for most desirable. Round fruit without protuberances or suture bulges received highest ratings. Fruit that mature unevenly or lack firmness at the time of harvest, as evaluated by ground color change from green to yellow, received low scores because they are unacceptable for commercial use. Red peel color is desirable in U.S. markets and usually receives the best price, so varieties with bright red color received a high rating. Fruit taste was subjectively scored highest for high aroma, high acid, high sugar, and a balanced sugar:acid ratio. Varieties that bruise easily or have flesh that browns and darkens easily when exposed to air are unacceptable and are rated low. Although white flesh color is not currently a major segment in U.S. markets, two selections with fruit characteristics equal, in our opinion, to the best yellow flesh varieties were included.

Observations were made of insect and disease pressures to fruit and trees. Bacterial spot disease resistance is required in Florida due to the driving rainstorms associated with the summer wet season.

Results and Discussion

Trees of all peach varieties observed produced fruit characteristic of their respective varieties and produced good crops most years in southwest Florida. Table 1 lists tree and fruit characteristics of these varieties. All varieties had fruit with diameter exceeding 2.0 inches.

Flowering usually occurred in early February and the first fruit (depending on variety) matured 75 to 110 days later. Although there was some flowering in the fall and during warm periods in December or January, most premature flowers did not persist to produce fruit, but sufficient flower buds remained to produce a full crop. 'Flordastar' and 'Flordaprince' were the first each season to mature fruit in mid-April. Fruit remained on the tree only 5 to 7 days after becoming tree ripe and then fell to the ground. Additional varieties matured fruit sequentially as listed in Table 1.

Table 1. Tree and fruit characteristics of low-chill subtropical peach varieties for southwest Florida. Ratings compiled from observations and published sources (Rouse, 1989; Rouse and Sherman, 1989a; Sherman personal communication).

Peach variety	Estimated chill units	Fruit wt. (g)	Pity	Flesh color*	Firmness ^w	Taste ^w	Bacterial spot resistance ^v	Browning ^w	Rip date ^u
Flordastar	225	73	SC	Y	9	7	9	8	mid-April
Flodaprince	150	85	SC	Y	8	8	4	7	mid-April
TropicBeauty	150	110	SF	Y	10	8	6	9	late-April
UFGold	200	100	C	Y	10	8	8	9	late-April
Flordaglo	150	124	SC	W	9	9	8	9	late-April
FlordaGrande	75	100	F	Y	8	8	9	8	early-May
TropicSnow	175	140	F	W	9	10	9	10	early-May
TropicSweet	250	111	F	Y	9	10	6	9	mid-May
Rayon	175	130	F	Y	7	8	9	8	late-May

*One chill unit = one hour of chilling at an optimum temperature near 45°F.

^vF = free; SF = semifree where pit is loose when fruit is soft ripe; SC = semicling; C = cling.

^{*}Y = yellow; W = white.

^wRated on a 1 to 10 scale where 10 is most desirable.

^vRated on a 1 to 10 scale where 10 is functional immunity.

^uFruit maturity period based on full bloom occurring early February.

The chilling requirement for these varieties is relatively low (estimated at 75 to 250 chill units) making them suitable for the mild winters and subtropical climate conditions of south Florida. All varieties except 'TropicSweet' received adequate chilling each winter of the study and produced excessive fruit that required thinning. 'TropicSweet' was marginal in receiving adequate chilling in the mild winter of 1997.

These varieties are all self-fruitful and require no pollinizer tree. Trees required extensive pruning to achieve desired tree shape due to a 300 day growing season. Trees experience limb breakage with heavy fruiting if not thinned. Fruit thinning was required with all varieties to produce desired size of fruit.

Primary pest problems were due to diseases. The widely distributed disease of peaches and plums known as bacterial spot [*Xanthomonas campestris* pv. *pruni* (Smith) Dye] was present on leaves of all varieties, but did not cause excessive leaf loss until late in the growing season. Another disease, known as leaf rust [*Tranzschelia prunispinosae* (Pers.) Diet.] which resulted in early fall defoliation, may be more likely to be limiting to peaches grown in south Florida. Rust builds up quickly after harvest when the summer rainy season begins in mid-June in south Florida. All varieties appeared equally susceptible. It was not uncommon for the trees to defoliate in late August or September and produce bloom with some re-foliating before winter.

Insect pests were not observed to be a problem. Plant bugs (*Leptoglossus* spp.) like the leaf-footed bug, citron bug, and stink bug (*Nezara viridula* L.) were observed in the spring during fruit development. Plum curculeo (*Conotrachelus nenupar* Herbst) has not been observed. Sap beetles were only observed in overripe fruit still hanging on the tree. Caribbean fruit fly (*Anastrepha suspensa* Loew) has not been observed in any peach fruit to date. Bird damage was noted when fruit reached full color development. Birds were attracted to the fruit as the peel color developed and they were observed to peck holes in the fruit rendering it inedible and causing it to begin rotting on the tree or fall to the ground.

Peach varieties are mature and tree ripe for only about a week before they become too soft and fall to the ground. Therefore it is important to have several varieties planted so they mature fruit sequentially. This is especially important for

commercial and u-pick operations to have fruit available during the early market window before other peaches are available.

The peach varieties found most desirable and likely to meet the sequential ripening criteria are highlighted below. 'Flordaprince' trees require about 150 chill units and fruit ripen in mid-April. Fruit are attractive, having a bright red blush over a yellow background. Yellow flesh is semicling to the pit when fully mature. Fruit have highly aromatic flavor giving them an excellent taste and are consistently 2.0 inches or larger when properly thinned. 'TropicBeauty' trees require about 150 chill units, fruit ripens at the end of April and holds on the tree better than most other varieties. Fruit have a high percentage red overcover on bright yellow background with very short fuzz, making the fruit highly attractive. The round, firm fruit have melting, deep-yellow flesh that frees from the pit at soft ripe. Fruit size is about 2¼ to 2½ inches in diameter. 'UFGold' is the first of a series of non-melting flesh varieties that can fully ripen on the tree for maximum flavor and have the desirable qualities of other low-chill melting flesh varieties of good taste, great external appeal, more firmness and longer shelf life. Trees require about 200 chill units with fruit ripening in late April. Fruit are 2¼ inch diameter and larger. 'FlordaGrande' is a variety perhaps best suited to the u-pick and landscape because of a pointed tip at the blossom end. These trees require 75 or less chill units, which are lower than other varieties. Fruit are freestone and have strong aromatic flavor. Fruit are large for the season at 2¼ to 2½ inch diameter and ripen early May. 'Flordaglo' is a white flesh peach requiring about 150 chill units. Fruit have high red overcolor on melting white flesh with semicling pit. Fruit size is 2¼ to 2½ inch diameter and ripen late April to early May. 'TropicSnow' fruit are white fleshed, freestone, and trees require about 175 chill units. Taste is tart but sweet and aromatic. Fruit are large for the season at 2½ inch or larger diameter and ripen early May to mid-May.

In summary, low-chill peach varieties can be successfully grown and fruited in south Florida. They have fruit of good size, appearance and firmness, and warrant further use in the development of fruit varieties for the landscape and for commercial u-pick operations. Trees of most of these varieties are available in garden centers, especially in winter, throughout central and south Florida.

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EVALUATION OF IMPATIENS CULTIVARS FOR THE LANDSCAPE IN WEST-CENTRAL FLORIDA

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Abstract. During spring and fall 1997, *impatiens* cultivars were evaluated for number of days to flower, flower size, flower color, foliar characteristics, plant dimensions, and plant appearance. In spring, days from sowing to first flower among the 125 cultivars ranged from 53.0 days for 'Impulse Salmon' to 75.5 days for 'Carousel Mix'. Flower size ranged from 1.6 inches for 'Carousel Red' to 2.4 inches for 'Pride White', 'Impulse Violet', 'Accent Lilac', 'Bruno Orange', and 'Pride Pink'. Early season plant heights ranged from 8.9 inches for 'Super Elfin Deep Pink' and 'Super Elfin Blush' to 15.1 inches for 'Pride Salmon Orange'. Late season plant heights ranged from 17.7 inches for 'Dazzler Burgundy' to 29.8 inches for 'Tempo Bright Red'. Subjective ratings showed cultivars varied more in appearance later in the season than earlier. In fall, days from sowing to first flower among the 141 cultivars ranged from 55.0 days for 'Dazzler Coral' and 'Accent Blush Pink' to 67.7 days for 'Carousel Red' and 'Neon White'. Flower size ranged from 1.7 inches for 'Carousel Mix' to 2.4 inches for Experimental Violet (Benary). Plant height at peak flowering ranged from 9.7 inches for 'Impulse Purple' to 16.7 inches for 'Neon Rose'. Subjective ratings showed consistencies and inconsistencies among cultivars

within series and between series in flowering, plant uniformity, and overall appearance.

Introduction

The wholesale value of bedding plants produced in Florida was \$105.6 million in 1997 from growers with sales of products exceeding \$100,000 making Florida the third largest producing state behind California and Michigan (Fla. Agr. Stat. Serv., 1998). *Impatiens* plants are one of the few select species for which details are reported for quantities produced and value of commodities sold (USDA, 1998). The wholesale value of *impatiens* plants in the state of Florida was \$14.6 million. Florida ranked sixth in the number of *impatiens* flats produced nationwide with 1.05 million flats sold at a value of \$7.7 million. Florida ranked first in the U.S. in the number of *impatiens* pots produced. Their worth was \$5.7 million, which was more than double the value of pots produced in second-ranked California. Finally, Florida ranked third in the number of *impatiens* sold as hanging baskets which were valued at \$1.2 million.

Impatiens plants are thought to be indigenous to Zanzibar, an island off the coast and part of present day Tanzania (National Garden Bureau, 1995). Dr. John Kirk, a physician and naturalist traveling with Dr. Livingstone's expedition team in Africa, first introduced *impatiens* to England in 1896. The plant was originally named *Impatiens sultani* in honor of the Sultan of Zanzibar and was later named *Impatiens wallerana* after Horace Waller, a British missionary who published *The Livingstone Expedition* journals. In the 1950's, *impatiens* plants were only available as open-pollinated plants in mixed colors. Breeders at Ball Seed Co. in Santa Paula, CA and West

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