

Krome Memorial Institute

Proc. Fla. State Hort. Soc. 102:193-195. 1989.

LOW-CHILL PEACHES IN SOUTH TEXAS AND POTENTIAL IN CENTRAL FLORIDA

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Additional index words. *Prunus persica*, fruit breeding, cultivar evaluation.

Abstract. The development of low-chill peach [*Prunus persica* (L.) Batsch] cultivars during the last 10 years has made possible a new industry of about 1,000 acres in the subtropical climate of the Lower Rio Grande Valley of Texas and less than 100 acres in central Florida. Sufficient cultivars are available to meet the demands of a specific market window from mid-April to mid-May, which begins when no other commercial peaches are produced in the U.S. The first 10 days of production are from 'EarliGrande', and 'Flordaprince'. The second 10 days will be filled by 'ValleGrande', 'TropicBeauty', and 'Flordaglo', which have been planted since being released in 1988. The season finishes in mid-May with 'FlordaGrande', 'TropicSweet', and the newly released 'TropicSnow'. The development of the peach industry in south Texas could be paralleled by a similar increase in acreage in central Florida which has a similar climate and ripening season, and sites with the same low risk of post-bloom frost. Florida has the advantages over south Texas of available orchard sites with a desirable soil pH, and no risk of cotton root rot [*Phymatotrichum omnivorum* (Shear) Duggar].

Peach and nectarine cultivars with chilling requirements not exceeding 250 chill units are needed for fruit production in subtropical climatic regions. Peach cultivars developed since 1980 meeting this chill unit requirement are being commercially grown in the Lower Rio Grande Valley of Texas (1,3,4,5,6,7,8,11,15). Approximately 1,000 acres of low-chill peaches have been established in the Lower Rio Grande Valley since 1984 and this acreage is expected to rapidly increase in the next few years as the demand for this new crop is further demonstrated.

The cultivars being used in the Lower Rio Grande Valley are adapted to central Florida, and areas around the world with similar subtropical climates (12,13,14). The central Florida area of best adaption is south of a line from New Port Richey to Daytona Beach and north of a line from Sarasota to Vero Beach. Subtropical low-chill peaches might also be grown north of this zone to a line between Yankeetown to St. Augustine with increased risk of Spring frost. Additional former and recently released low-chill

and subtropical peach and nectarine cultivars recommended for grower trial in Florida have been identified (16).

The peach industry in the Lower Rio Grande Valley has been supported by a Texas Agricultural Experiment Station project at Weslaco. The objectives of this program has been to test and develop low-chill deciduous fruits adapted to the subtropical climate of the Lower Rio Grande Valley. The program's goal has been to recommend cultivars which have demonstrated commercial potential for this subtropical environment. Emphasis for selection has been based on commercial crops with minimum fruit size of 5.7 cm (2.25 inch) diameter (95 to 100 g) that mature in April and early May. Seven cultivars ('EarliGrande', 'ValleGrande', 'TropicBeauty', 'TropicSweet', 'FlordaGrande', 'Flordaglo', and 'TropicSnow') are currently recommended to growers in the Lower Rio Grande Valley and 4 of these cultivars were released jointly with the Florida Agricultural Experiment Station. 'Flordaprince' is also an excellent early ripening cultivar but growers have had difficulty thinning fruit properly to obtain adequate size.

Materials and Methods

Selections for testing were obtained from the breeding programs at Texas A&M University, University of Florida, University of California, and other sources of suitable germplasm. Selected crosses have also been made and a bud sport, 'ValleyGrande', found at Weslaco.

The criteria for evaluating each clone include: chilling requirement, flower bud set and thinning requirements, tree form and structure, bloom and ripening dates, and fruit characteristics. Chilling requirements of selections and new cultivars are determined by comparing bloom and leaf bud break dates with that of known cultivars. Flower bud set indicates the production potential of the selection. Tree growth habit identifies trees that require extensive pruning to achieve desired tree shape due to an almost year-round growing season. Fruit thinning is necessary with all cultivars to optimize production of marketable size fruit. Fruit shape, firmness, peel and flesh color, taste, and resistance to flesh browning are all subjectively rated on a scale of 1 to 10, with 10 being the most desirable. Round fruit without protuberances or suture bulges receive highest ratings. Fruit which mature unevenly or lack firmness at the time of harvest receive low scores. Cultivars with bright red blush receive a high rating. Fruit taste is subjectively scored highest for high aroma with high acid and sugar in a balanced ratio. Cultivars that bruise easily or have flesh that brown and darken easily when exposed to air are rated low. Tolerance to bacterial spot has been evaluated in the Florida breeding program as this disease has not been a problem in the Lower Rio Grande Valley.

Table 1. General characteristics of peach cultivars adapted to the subtropical climate of the Lower Rio Grande Valley, Texas and central Florida.

Cultivar	Estimated chill units	FDP ^z (days)	Leaf glands	Bacterial spot resistance ^y	Flower	
					Type	Bud set ^x
Flordastar	225	70	reniform	9	showy	8
EarliGrande	200	75	globose	10	nonshowy	6
Flordaprince	150	78	reniform	4	showy	10
ValleGrande	200	82	globose	10	nonshowy	6
Flordaglo	150	87	reniform	8	showy	10
TropicBeauty	150	89	reniform	6	showy	10
TropicSnow	175	93	reniform	9	showy	10
TropicSweet	175	95	reniform	6	showy	10
FlordaGrande	75	100	reniform	9	showy	9

^zFruit development period from full bloom to maturity.

^yRated in Florida on a 1 to 10 scale where 10 is functional immunity.

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

Cultivars with white flesh have fruit characteristics equal to the best yellow flesh cultivars.

Results and Discussion

Many of the adapted cultivars for the Lower Rio Grande Valley and central Florida were obtained from the Florida breeding program. Currently recommended peach cultivars possess fruit quality and shipping characteristics acceptable in U.S. markets and ripen in April or May. The cultivars considered adapted to the subtropical climate of the Lower Rio Grande Valley and central Florida are shown in Tables 1 and 2. All cultivars are recommended for south Texas except 'Flordastar' which lacks acceptable size (10). 'Flordaprince', 'TropicSweet', and 'TropicBeauty' are not recommended in central Florida areas where bacterial spot is a problem. In addition, 'EarliGrande' and 'Valle Grande' do not have enough red overcolor and firmness for recommendation in central Florida.

Certain advantages have been noted when comparing fruit and tree characteristics of a particular cultivar grown in the subtropical climate of the Lower Rio Grande Valley in south Texas (26°09'N, 97°58'W) or perhaps central Florida to a cooler area like Gainesville, Florida (29°38'N, 82°21'W). The external red color appears to be enhanced by the warm subtropical climate in the Lower Rio Grande

Valley. The red blush normally observed on a particular cultivar will be 10 to 20% greater than in an area with cooler Spring temperatures similar to Gainesville. Bloom is usually 7 to 10 days earlier in the Lower Rio Grande Valley than in Gainesville. The fruit development time from full bloom to harvest at mature ripe in the Lower Rio Grande Valley is normally 5 days less than at Gainesville, and this has been attributed to warmer daily mean temperatures during fruit development (17). Earlier bloom and shorter fruit development time in south Texas have resulted in fruit harvest of a specific cultivar as much as two to three weeks ahead of Gainesville.

The optimum temperature for chilling in some low-chill peaches has been shown to be near 55F (2), and the recommended cultivars have flowered and fruited well at Weslaco, an environment in some years lacking in winter temperatures below 45F. It has been observed in Texas and Florida that trees set fruit following delayed bloom and produced a full crop after receiving only about two thirds the required number of chilling units with the consequences of being 5 to 7 days later ripening and with pointed fruit on some cultivars.

After being evaluated in the subtropical climates of the Lower Rio Grande Valley and central Florida, several cultivars are now considered obsolete or unsuitable. Some of these cultivars have been grown successfully in other areas

Table 2. Fruit and flesh characteristics of peach cultivars adapted to the subtropical climate of the Lower Rio Grande Valley, Texas and Central Florida.

Cultivar	Fruit					Flesh				
	Mean size (g)	Pit ^z	Color		Shape ^x	Firmness ^x	Taste ^x	Texture ^x	Brown-ing ^x	Color
			Blush (%)	Peel/ground ^y						
Flordastar	73	SC	65	Y	8	9	7	7	8	yellow
EarliGrande	98	SC	40	Y	7	6	7	7	8	yellow
Flordaprince	85	SC	80	Y	9	8	8	7	7	yellow
ValleGrande	120	SF	65	Y	8	8	8	7	9	yellow
Flordaglo	124	SC	80	CW	9	9	9	8	9	white
TropicBeauty	110	SF	80	Y	10	10	8	8	9	yellow
TropicSnow	140	F	90	CW	7	9	10	8	10	white
TropicSweet	111	F	70	DY	9	9	10	9	9	yellow
FlordaGrande	100	F	60	DY	8	8	8	8	8	yellow

^zF = free, SF = semifree where pit is loose when fruit is soft ripe, SC = semicircling where pit is not loose when fruit is soft ripe.

^yCW = cream white, DY = dull yellow, Y = yellow.

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

of the world but are not recommended here. Among these are 'Desertred' whose fruit are too small and trees are too susceptible to bacterial spot. Cultivars 'Rayon', 'Hermosillo', 'Flordabelle', 'Flordabeauty', and 'Newbelle' have acceptable fruit size but ripen in late May. Cultivars 'McRed', 'Early Amber', and 'San Pedro' are too soft for commercial shipment or have high chilling requirements. Recent cultivar releases are superior to 'Flordagem' which has a large suture bulge in years when chilling is inadequate. Another recent release, 'Flordacrest', requires 400 chilling units making it better suited to north Florida (9). 'Gulfqueen', a patented cultivar, has also been evaluated and found to require more chilling than normally occurs in the Lower Rio Grande Valley and central Florida, resulting in an unacceptable fruit tip in both south Texas and central Florida.

Marketing of fruit from the Lower Rio Grande Valley has been mostly out-of-state sales to cities in the Midwest and Northeast United States. In contrast, most central Florida fruit are marketed within the state through one packinghouse, roadstands, and U-pick operations. The cultivars in Table 1 are recommended for commercial production in the Lower Rio Grande Valley, central Florida, and areas with similar subtropical climates. Fruit of 'Flordaglo' and 'TropicSnow' have firm white flesh with commercially acceptable size and high quality, but may be limited to local markets until commercial markets in the United States accept white peaches.

The peach cultivars in Tables 1 and 2 are recommended for grower trials in central Florida based on experience in the Lower Rio Grande Valley of south Texas. These recently released cultivars represent a major achievement in developing a continuous ripening sequence in low-chill peaches requiring approximately 250 or less chill units. The cultivars released in the past 5 years are being commercially produced in the Lower Rio Grande Valley and are promising for a parallel industry to be developed in central Florida. These cultivars were developed

for commercial size and firmness, attractiveness, excellent taste, non-browning flesh and short fuzz for fresh market sales.

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Proc. Fla. State Hort. Soc. 102:195-199. 1989.

LOCATION INFLUENCES ON FRUIT TRAITS OF LOW-CHILL PEACHES IN AUSTRALIA

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Additional index words. cultivars, fruit quality, *Prunus persica*, temperature.

Abstract. Twenty two cultivars, most originating in Florida but some in South Africa and Australia were evaluated at 13 locations in Australia, some with climates similar to those found in Florida production areas. Fruit size was significantly

correlated with mean growing season temperature of the test location ($r = -0.83^{**}$) as were firmness (0.62^*) and flavor (0.72^{**}), but the amount of red blush, attractiveness, fuzz, suture bulge, and juiciness were not correlated across locations. Stylar tip increased in warm locations for some but not all cultivars ($r = -0.65^*$). 'Flordagold' peach and 'Sundowner' nectarine were the most widely recommended cultivars and were recommended in both low and high-chill environments. 'Flordabelle', 'Flordared' and 'Flordaprince' were recommended only for low-chill locations.

Low-chill peaches and nectarines from Florida, South Africa and Australia are grown in low-chill regions of Australia, but also are grown in high-chill regions where their early ripening is commercially advantageous (3). The adaptation of new cultivars must be well tested for each location prior to recommendation. The blossom date changes with location less than does the fruit development

Florida Agricultural Experiment Station Journal Series No. N-00044.

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