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THE WHITE SAPOTE: CULTIVARS, PUBLIC APPEAL AND COMMERCIAL PRODUCTION IN FLORIDA

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Abstract. The white sapote (*Casimiroa edulis* Llave and Lex.) is native to the Mexican and the Central American highlands, where in addition to its fresh consumption, it is known to possess medicinal properties. The white sapote was first introduced to Florida nearly 90 years ago and to California over 180 years ago. Since its introduction, many cultivars have been selected in both locations. The 'Dade', 'SES 1', 'SES 2', 'Homestead' and the 'Smathers' cultivars were considered to have the greatest commercial possibilities in Florida. These cultivars offer distinct differences in the size, shape, skin and flesh color, brix levels and seed/flesh ratios. Public evaluations conducted at the Fairchild Tropical Garden in 1993 and 1994 have demonstrated a wide-spread acceptance of the 'Smathers' cultivar, with an expressed willingness to purchase fruit at a reasonable price. Yet, with the apparent acceptability of this fruit, supply still exceeds demand with the limited acreage (< 2 ha) presently planted.

The white sapote is native to the Mexican and Central American highlands and has not been widely distributed outside of this region. Traditionally the white sapote was consumed as a fresh fruit, and it was considered to have medicinal properties. Much of the early interest in white sapote centered on the fruit's narcotic and/or medicinal properties (Morton, 1962). Morton (1962) reported that the narcotic effect can be induced by components of the seeds, resulting in sleep with few noted side-effects. The flesh has

not been shown to contain these compounds. In addition to its medicinal properties, in the last 100 years there has been interest in the commercial exploitation of white sapote as a fresh fruit in the United States and other countries (Nerd et al., 1992; Sauls and Campbell, 1980).

Since the introduction of the white sapote to California 180 years ago and Florida over 90 years ago there has been selection of seedlings adapted to both climates. Yet, despite its long history in Florida, the tree remained only of home garden interest (Sauls and Campbell, 1980) until the last 15 years in Florida, when commercial plantings were initiated. The white sapote lends itself to commercial exploitation in South Florida due to its adaptation to a wide range of climatic and edaphic conditions, its productivity, and its relative freedom from serious pests. However, the commercial exploitation of this crop has been a disappointment to date and its commercial future in Florida seems uncertain.

The objectives of this paper are to describe the current situation of commercial white sapote production in South Florida, and to discuss reasons for its limitations as a commercial crop.

Cultivars and the Potential for New Germplasm

Following its introduction to both California and Florida, there were concentrated efforts in each state to select superior cultivars adapted to their particular climate. In California, there were many superior cultivars selected and introduced by the commercial nurseries, including 'Chapman', 'Coleman', 'Max Golden', 'May', 'Pike', 'Suebelle', 'Wilson' and 'Wood'. These cultivars were best suited to the Mediterranean climate of California, and many were difficult to grow, unproductive, and/or they had poor fruit quality when grown in Florida.

Within Florida, there was also a substantial effort made in the selection of white sapote cultivars suited to our environmental conditions, conducted by the United States Department of Agriculture (USDA), the University of Florida, and private citizens in South Florida. The 'Dade', 'Johnstons Golden Sapote', 'Lenz', 'Sara Jones' and 'Thompson' were some of the cultivars selected and distributed throughout

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South Florida. Among the white sapote germplasm evaluated in Florida and California there are both glabrous and pubescent-leaved forms. There remains disagreement among taxonomists as to whether these two "types" of white sapotes are separate species or just varieties of *C. edulis*. The pubescent or "wooly-leaf" type of white sapote is often classified as *Casimiroa tetrameria*. These trees are generally more cold sensitive and have a larger fruit than *C. edulis*. However, the fruit is sometimes considered to be of inferior quality to that of *C. edulis*.

One of the first cultivars, or selections described from Florida was a seedling of a "wooly-leaf" fruit, introduced to Florida from Tegucigalpa, Honduras in 1907 by the USDA (Fairchild, 1939). The seeds were planted by David Fairchild at the Kampong in Miami. The fruit are large and irregular in shape. They may average nearly 800 g with a superior percentage of flesh compared to other cultivars (Table 1). This selection is also referred to in South Florida as the 'Smathers' after South Florida grower and past president of the Miami Rare Fruit Council, Mr. Frank Smathers, Jr. Another cultivar which received attention was 'Dade'. This cultivar performed well in field trials in Dade County and was released by the University of Florida in the 1940s for home garden and possible commercial use (Lynch, 1943). Other cultivars selected more recently in Florida include 'SES 1' and 'SES 2' and 'Homestead'. 'SES 1' and 'SES 2' are similar to 'Dade' and were selected for their production and lack of bitter flavor (C. W. Campbell, personal communication). 'Homestead' is a uniform fruit with good productivity and has been preferred for commercial use in recent years (M. Ellenby, personal communication). Data on fruit characteristics are included in Table 1.

Public Evaluation of White Sapote Fruit

To test public acceptance of good quality white sapote fruit, public evaluations were conducted in 1993 and 1994 at the Fairchild Tropical Garden (FTG) bookstore. Single fruit were provided to FTG visitors, with an evaluation form. Fruit were harvested within 3 days of distribution and were carefully handled. External and internal quality were exceptional, superior to most fruit that would be subjected to commercial handling and packing procedures. Results of these evaluations are presented in Table 2. Overall, there was a positive acceptance of the fruit. The most prevalent negative comments

Table 1. Fruit quality characteristics of selected white sapote cultivars in Florida.^z

Cultivar	Weight (g)	Blemish Rating (1-3) ^y	Color ^x	Seed			
				Brix	Number	wt	% Flesh
Smathers	795	1	2.56Y 7/10	20	2.5	25	97
Homestead	200	1.3	2.56Y 7/10	16	4.5	34	83
SES2	141	2	5.6Y 6/8	17	6.0	42	70
Dade	226	1	5.6Y 6/8	18	3.2	28	88

^zEvaluations conducted from 1992 - 1994.

^yBlemish rating; 1 = least, 3 = most blemishes.

^xColor determination made using a Nickerson color fan (Munsell Color Company).

Table 2. Results of public evaluations of 'Smathers' white sapote conducted in 1993 and 1994 at Fairchild Tropical Garden.

Year	Responses	Taste ^z (1-5)	Bitterness ^y (1-5)	Stone cells ^x (%)	Overall Acceptance ^w
1993	52	2.2	1.8	65%	2.2
1994	60	2.5	1.9	72%	2.3

^zTaste rating; 1 = like; 5 = dislike.

^yDetection of bitterness; 1 = no bitterness, 5 = extreme bitterness.

^xPercentage of respondents detecting stone cells.

^wOverall acceptance; 1 = very acceptable, 5 = not acceptable.

were about the fruit's extremely soft texture, bitterness and bland flavor. In the two years of evaluation, nearly 70% of respondents noted stone cells in the flesh similar to those found in pears. Such evaluations are at best subjective, but they demonstrated a general acceptance of this fruit by the public.

Constraints to Marketing White Sapote Fruit

Given the public acceptance of this fruit, it is disappointing that in Florida, the white sapote has not been an economically viable crop. The tree grows and produces well under our conditions, yet, economic returns have not been adequate and production from less than two hectares has been sufficient to exceed demand (Mark Ellenby, personal communication). The short shelf life and delicate nature of this fruit contribute to its difficulties in the marketplace. Consumers likely never receive fruit of the quality used in our evaluations. Concomitantly, however, there have been white sapotes imported to Florida markets from California. Apparently, innovative marketing of the fruit has been instrumental in its success. However, volume is still small and its growth potential questionable.

As with many of Florida's minor tropical fruit, an ethnic-based market is important for the successful marketing of these fruits. White sapote lacks the strong ethnic base found with mamey sapote (*Pouteria sapota*) or sapodilla (*Manilkara sapota*). Therefore, the white sapote has a tenuous position for increasing its market. The white sapote is a tropical fruit well suited for production in South Florida. Further, this fruit has proven well adapted to harsh conditions in arid regions such as the Negev desert of Israel (Nerd et al., 1992). The adaptability of this fruit to production in Florida and other areas is apparently not enough to compensate for its lack of wide-spread appeal or familiarity necessary to create enough demand in the market place.

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