

EVALUATION OF FRUIT FROM A GREEN SAPOTE (*Calocarpum viride* Pitt.) SELECTION AT THE UNIVERSITY OF FLORIDA TROPICAL RESEARCH AND EDUCATION CENTER, HOMESTEAD

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Abstract. Quality of fruit from a green sapote (*Calocarpum viride* Pitt.) tree grafted onto mamey sapote [*Pouteria sapota* (Jacq.) H.E. Moore + Stearn] were evaluated for quality. This green sapote selection, which was donated to the University of Florida Tropical Research and Education Center by William F. Whitman, originated from scion wood collected in Honduras by W. Popenoe. Thirty fruit were harvested on 8 Feb. 2001 and allowed to slowly ripen at room temperature (24-29°C). Fruit had an ovoid shape with a persistent calyx, light green peel with an orange blush, and deep orange to salmon flesh color. The fruit ripened 4 to 14 days after harvest. At harvest, fruit ranged in size from 123 to 248 g and the mean fruit weight was 154.5 g. Upon ripening, the average weight was 133.2 g, an average of 14% moisture loss. Mean fruit length was 73 mm, diameter 64 mm, peel weight 15 g with 80% edible flesh, and soluble solids 29°Brix. On average, there was 1 seed per fruit, mean seed weight was 11 g, and seed length was 73 mm and seed width 27 mm. The fruit peel was smooth upon harvest but had a shriveled appearance upon ripening. The ripe flesh was moist, very sweet, and had good flavor.

Green sapote (*Calocarpum viride* Pitt.) was introduced into the U.S. by the USDA first in 1913 and on five subsequent occasions, and by the Sub-Tropical Experiment Station (now called Tropical Research and Education Center = TREC) on seven occasions. The introduced seeds and trees did not survive, either due to lack of seed germination or flooding (Mowry et al., 1967; Whitman, 1965). During 1954, Wilson Popenoe, then Director of the Escuela Agrícola Panamericana, Tegucigalpa, Honduras, donated scion wood to William F. Whitman, who had it grafted onto mamey sapote (*Pouteria sapota* Jacq.) seedling rootstocks (Whitman, 1965; Whitman,

1972). One of these grafted trees first fruited in 1961 and another in 1964 (Whitman, 1965). In 1962, Mr. Whitman donated a green sapote tree grafted onto mamey sapote to the TREC; this selection was propagated and planted again at TREC by C. W. Campbell in 1975.

The green sapote is a member of the Sapotaceae and is indigenous to the Central American highland areas of Guatemala, Honduras, Costa Rica, and Panama (Martin, 1987; Morton, 1987; Popenoe, 1974). The tree appears to be intolerant of hot, lowland climates and freezing temperatures below 32°F (Campbell et al., 1977) and is best adapted to cool tropical or warm subtropical climates (Morton, 1987; Popenoe, 1974; Whitman, 1965). The tree is a medium to large tree (reportedly up to 80 ft in height) with leaves tending to cluster at the ends of the branches (Morton, 1987). Leaves are oblanceolate, 4-10 in long, hairy on the upper midrib and downy on the adaxial surface. The flowers are borne in the leaf axils in groups of two to five and are tubular, five-lobed, and pinkish to white colored. The fruit varies from round to ovoid, 51-130 mm (2-5 in) long and 51-76 mm (2-3 in) in diameter with an olive-green peel and orange-green blush. The flesh is orange colored, smooth, and sweet and contains 1 to 2 dark brown, shiny seeds. Harvest season in Florida is Dec. through Mar.

Materials and Methods

Thirty mature-green sapote fruit were harvested on 8 Feb. 2001, from a single tree at the University of Florida, Tropical Research and Education Center, Homestead. Harvest maturity was indicated by a light greenish-brown peel color with orange-green blush and an orange color under the persistent calyx. Fruit were immediately taken to the laboratory, weighed, and allowed to ripen at room temperature (24-29°C; 75-84°F). Upon ripening, the following measurements were made: whole fruit, peel, and seed weights, fruit length and diameter, seed length and width, flesh total soluble solids (measured in °Brix), and peel and flesh color. The °Brix was measured using a hand held refractometer. The percentage of fresh weight lost from harvest to ripening and percentage of edible flesh were calculated.

A preliminary trial was conducted to compare ripening of mature fruit exposed to low and high relative humidities at ambient laboratory temperatures. An additional twenty mature fruit were harvested on 2 Mar. 2001 and divided into two groups. Fruit were exposed to one of two treatments, low relative humidity (LRH) and high relative humidity (HRH). Ten fruit were placed on the laboratory bench and allowed to ripen at ambient temperatures (19-26°C; 67-78°F) and 60 to 66% relative humidity. A second sample of ten fruit was placed in a ventilated plastic container on a laboratory bench (19-24°C; 67-75°F) and 80-98% RH and allowed to ripen.

Results

Fruit evaluation. On average, fruit took 8.4 d to ripen after harvest; however, the range was from 4-14 d. At harvest, fruit

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had a mean weight of 154.4 g (5.5 oz) with a range of 123.1 to 248.4 g (4.3-8.8 oz). Ripe fruit had a mean of 133.2 g (4.7 oz) with a range of 106.5 to 206.6 g (3.8-7.3 oz). Mean fruit peel weight was 14.8 g (0.5 oz). The mean percentage of fresh weight lost from harvest to ripening was 14.1% with a range of 5.0 to 19.2%. On average fruit had 78.9% edible flesh with a wide range from 54.5 to 85.5%. Mean fruit length was 72.6 mm (2 7/8 in) and diameter, 64.0 mm (2 1/2 in). The mean °Brix was 29.4 with a range from 25.4 to 32°.

The mean number of seeds per fruit was 1.1 with only 10% of the fruit having 2 seeds. Mean seed weight was 11.4 g (0.4 oz) and ranged from 8.8 to 14.6 g (0.3-0.5 oz). Seed length ranged from 33.8 to 40.8 mm (1 5/16-1 5/8 in) with a mean of 31.8 mm (1 1/4 in). Seed width was 26.9 mm (1 1/16 in) on average, but ranged from 22.6 to 28.8 mm (7/8-1 1/8 in).

Most of the fruit had an ovoid shape. The peel at ripening was very thin, almost translucent, with a light green color and orange blush. Ripe flesh color ranged from deep orange to salmon colored. The fruit flesh was moist and had a pleasant sweet flavor similar to mamey sapote. The peels of all fruit showed some shriveling upon ripening (softening).

Effect of relative humidity on fruit ripening. For the fruit collected on 2 Mar., the mean number of days from harvest to ripening was 8.1 d and 9.2 d, respectively, for fruit allowed to ripen at LRH and HRH. At harvest, mean fruit weight was 145.2 g (5.1 oz) and 148.2 g (5.2 oz) for the LRH and HRH fruit, respectively. After ripening, mean fruit weight of the LRH treatment was 127.8 g (4.5 oz) and 135.2 g (4.8 oz) for the HRH treatment. From harvest to ripening, fruit in LRH lost 13% and HRH lost 9% fresh weight, respectively.

Conclusions. At ambient temperatures, green sapote ripened in about 8 d. Most fruit had only 1 seed, the mean fruit weight was 154 g (5.5 oz), the percent edible flesh was 79%, and the °Brix was 29. Fruit lost about 14% of the fresh weight from harvest to ripening. Exposing fruit to HRH from harvest to ripening decreased the percentage of fresh weight lost by 4%.

Green sapote has a good potential as an alternative fruit crop to mamey sapote during the winter months when commercially produced mamey sapote is in short supply. The flesh color, texture, and flavor of green sapote are of high quality and very similar to mamey sapote. Further introductions of superior germplasm and more research on postharvest handling are warranted for green sapote.

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PHYTOPHTHORA ROOT ROT-RESISTANT AVOCADO ROOTSTOCKS FOR SOUTHERN FLORIDA: SELECTION OF OPEN-POLLINATED SEEDLING PROGENY

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Abstract. Phytophthora root rot (PRR) is the most important constraint to the production of avocado, *Persea americana*, worldwide. The pathogen, *Phytophthora cinnamomi*, does not occur naturally in Florida, but has spread to all production areas in the state. The use of PRR-resistant rootstocks is the most effective long-term management strategy for this disease. In previous work, resistant rootstocks from the program of the University of California at Riverside were tested in Homestead. Their generally poor performance prompted the described research. From 1996 to 1998, we screened 2,081 open-pollinated seedlings from 52 accessions in the USDA-ARS National Avocado Germplasm Repository in Miami for resistance to PRR. Although most seedlings were highly susceptible (i.e., developed >80% root necrosis), tolerance to PRR was observed in several families. In general, the greatest tolerance was found in progeny with a West Indian heritage. Four seedlings survived two rounds of screening with minimal PRR damage. These selections will be clonally propagated for screening under field conditions.