

'MERIDA', AN EARLY-MATURING BLACK SAPOTE CULTIVAR

CARL W. CAMPBELL
University of Florida
TREC-Homestead
18905 S.W. 280 Street
Homestead, FL 33031

JOHN POPENOE
Fairchild Tropical Garden
10901 Old Cutler Road
Coral Gables, FL 33156

SIMON E. MALO
Escuela Agricola Panamericana
Apartado 93
Tegucigalpa, Honduras

Additional index words. *Diospyros digyna*, Ebenaceae, tropical fruit.

Abstract. Seeds of black sapote, *Diospyros digyna* Jacq., were received at the University of Florida Tropical Research and Education Center from Mexico in 1949. Trees were grown from the seeds and evaluated as potential cultivars. One tree proved to be productive, with fruit of high quality and an unusually early season of maturity. Additional trees were propagated by grafting and grown at various locations in southern Florida, where they performed in the same manner as the original tree. The cultivar was given the name 'Merida' after the place of origin of the seed in Mexico. It will extend by 6 to 8 weeks the season of availability of black sapote fruit, which is now being produced commercially on a small scale in Florida.

The black sapote, sometimes called "chocolate pudding fruit", is one of several tropical fruits which have been grown in home gardens and fruit collections in Florida for a long time (5) but have only recently entered the commercial market. Numerous introductions have been made at the University of Florida Tropical Research and Education Center (TREC), the U.S. Dept. of Agriculture Subtropical Horticulture Research Unit (SHRU) and the Fairchild Tropical Garden (FTG) over the past 55 years. Several selections have been made by nurserymen and private individuals as well, but none has been propagated and sold widely in nurseries.

The fruit is valued as food in Mexico, Central America, the West Indies and Florida (1, 2, 3, 4, 5) and has been introduced to other areas of the tropics. It is best known and appreciated in Mexico, where it is called zapote negro, sapote prieto, or tauch. Florida growers and handlers of tropical fruits have found in recent years that there is sufficient demand for black sapote to justify purchase, packing and shipping of the fruit. The demand has led to a search for superior selections. The objective of this paper is to describe a new cultivar of black sapote from Florida.

Origin

Seeds of black sapote were sent to TREC from Merida, Yucatan, Mexico in 1949 by John Martin Reinecke. Trees

were grown from the seed and 2 of them were set in the field at TREC in 1950 with several other seedlings of black sapote, including one tree with staminate flowers. The 2 trees began to flower in the late 1950's and both produced pistillate flowers.

One of the trees produced fruit of outstanding quality which matured several weeks to several months earlier than most other black sapote selections in Florida. Additional trees of the selection were grafted and 3 were planted at TREC near the original tree. Graftwood was given to individuals who grafted trees and planted them at several other locations in southern Florida, including FTG. The grafted trees behaved similarly to the original tree in all respects. The selection was first called "Reinecke" after the person who collected the seed. We have decided to describe it as a cultivar and to name it 'Merida' after the place of origin of the seed from which it grew.

Description

Tree. The canopy is compact and attractive, casting a dense shade. The original tree has a height of 12 m and a spread of 5.5 m at 38 yr of age. The 3 other trees at TREC are approximately 28 yr old and average 12 m in height and 4.3 m in canopy width. The narrow canopies of these trees are due in part to their being crowded together with other trees. Trees of 'Merida' in other locations have canopies 10-12 m high and 10 m wide, which are more typical of this species. The grafted trees at TREC began to bear fruit 3-4 yr after planting in the field.

Leaves are simple and alternate, 13-17 cm long and 5-7 cm wide (Fig. 1). Their color is pale green at first, becoming dark green and shiny on the upper surface and medium green on the lower surface at maturity. Leaf texture is stiff and leathery.

Flowers. *Diospyros digyna* is a species which is usually dioecious, but sometimes polygamous (5). The 'Merida' tree makes only pistillate flowers. The inconspicuous flowers are 2.5 cm in diameter, with whitish petals and a prominent green calyx which persists throughout the develop-

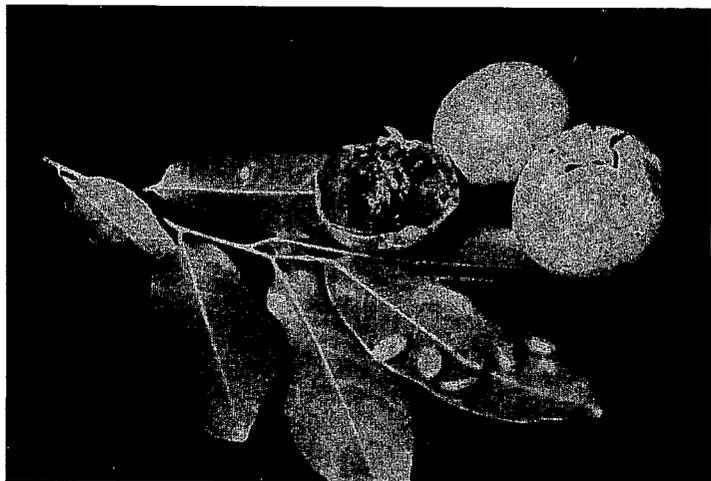


Fig. 1. Leaves, ripe fruit and seeds of 'Merida' black sapote.

ment of the fruit. Flowers are borne in the axils of the leaves of shoots which are 1-2 yr of age. Most existing trees of 'Merida' black sapote are growing near trees with staminate flowers, a situation which ensures adequate pollination. Since parthenocarpic fruits have not been reported from this cultivar, it is reasonable to assume that pollination from staminate trees is needed for good fruit production, but this has not been demonstrated experimentally.

Fruit. The fruit is oblate in shape and radially symmetrical, 7-10 cm in diameter and 5-7 cm in length (Fig. 1). Representative samples of fruit harvested over a number of years weighed from 190 to 440 g per fruit, with a mean weight of ca 290 g. The surface of the mature, unripe fruit is smooth and medium green in color, with lighter green rings around the tan, corky lenticels. External color changes to a dull brown at ripeness.

The fruit must be fully ripe to be palatable. Unripe fruit is astringent and acrid in flavor. The pulp of unripe fruit is very firm and golden yellow in color. At ripeness the pulp becomes very soft, with a texture and color similar to chocolate pudding. The fruit has no noticeable aroma. Pulp texture is uniform and smooth. Flavor is very sweet. Flavor comparisons with other black sapote selections indicate that fruit of the 'Merida' is good to excellent in quality. The seeds are 2 cm long, medium brown and hard. In fruit harvested during several years, seed number varied from 5 to 10 per fruit, with a mean of ca 9.

Production and Fruit Maturity

The fruit reaches maturity on the tree from early November to mid-November. It can be held on the tree without dropping for several weeks after that. Fruit will begin to ripen and drop from the tree in mid-December and most of it will drop by early February. The season of maturity varies somewhat from year to year, depending upon the amount of cold weather in late fall and early winter. If the fruit is to be shipped, it should be harvested from mid-November through early January, when mature, firm fruit will take 7-14 days to ripen at ambient temperature. Fruit harvested before mid-November takes 2-3 weeks or more to ripen and does not have good quality. Fruit harvested in late January or February softens in 2-6 days and is difficult to store and ship. Fruit which ripens on the tree and drops to the ground is smashed and cannot be recovered. The maturity period of mid-November through early January for 'Merida' is much earlier than that of most other black sapote selections in Florida, which extends from mid-February through June in most years.

Estimated annual yields of the trees at TREC have varied from 60 to 120 kg per tree. Since the trees were growing under crowded conditions, their yields probably would have been better if they had been growing uncrowded in full sun. Trees of 'Merida' growing at TREC and other locations have produced crops considerably greater than those of the average seedling trees.

Propagation

The 'Merida' black sapote can be propagated true-to-type only by vegetative means. Grafting is the most success-

ful method at this time, but it is considered difficult. Veneer grafts or approach grafts on black sapote seedling rootstocks are used. Scions should be from firm, mature stems which retain their leaves and have green bark (the leaves are removed before grafting). Rootstocks of 6-8 mm diameter with green bark are preferred. Fair to good results have been reported also with cleft grafting of scions retaining 1 or 2 terminal leaves, which are cut back to a length of 3-4 cm. The grafts are placed under intermittent mist until the buds begin to grow. More research is needed to determine the best methods and the best timing for grafting of black sapote cultivars. Air layering and rooting of cuttings have not been successful in Florida.

Cultural Requirements

The 'Merida' tree grows well in a variety of soils if they are well-drained. It is especially well adapted to calcareous soils. No research has been done to establish the fertilizer requirements of the tree. Trees maintained on a fertilizer program like that used for citrus trees in Florida grow and produce fruit well.

The black sapote tree is best adapted to a hot lowland tropical climate (3, 4). It grows well in areas with a high, well-distributed rainfall and in areas with a medium rainfall and distinct wet and dry seasons. It does not grow well in arid regions unless water is applied by irrigation.

Young trees are injured severely if air temperatures fall to 1 or 2°C below freezing. If temperatures fall to 4-5°C below freezing or lower, large trees will be injured severely or killed. It is advisable to plant the black sapote tree only in warm parts of southern Florida because of the danger of cold injury elsewhere in the state.

No pests or diseases cause economic damage to the black sapote tree or fruit at this time. Growers should be aware, however, that if concentrated plantings of trees are made in the future, pests or diseases could build up and cause significant damage to the crop.

Conclusion

The 'Merida' black sapote can be grown well in warm parts of southern Florida. It is useful as an ornamental specimen tree and bears large quantities of edible fruit. The fruit has superior quality and matures much earlier than fruit of most other selections in Florida, extending the season of availability for 6-8 weeks. A small commercial market exists for the fruit and appears to be increasing.

Literature Cited

1. Fouque, A. 1974. Famille de Ebenacees. *Fruits* 29(3):222.
2. Martinez, M. 1936. *Plantas utiles de Mexico*. Ediciones Botas, Mexico:396-397.
3. Popenoe, W. 1939. *Manual of tropical and subtropical fruits*. MacMillan, New York:370-373.
4. Popenoe, W. 1953. *Fruticultura Centroamericana*. *Ceiba* 3(4):225-338.
5. Ruehle, G. D. 1958. *Miscellaneous tropical and subtropical Florida fruits*. Fla. Agr. Ext. Serv. Bul. 156A:48-49.