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COLLECTING *MAMMEA AMERICANA* L. IN TROPICAL AMERICA: POTENTIAL FOR FLORIDA

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Abstract. **The abrico (*Mammea americana* L.) is a Tropical American fruit crop with potential for plantation and estate agriculture in Florida. The fruit are large (600 to 2000 g) and the flavor is agreeable for most as a fresh fruit and as a preserved product. There has been little systematic selection of superior clones of abrico either within or outside of its native range. The fruit is consumed locally throughout Central America and the Caribbean, but has never attained appeal within an international market. Over the last 4 years the Fairchild Tropical Botanic Garden (FTBG) has endeavored to make a collection of superior clones of abrico. Clonal material has been collected in the Dominican Republic, Costa Rica, El Salvador, Guatemala, Hawaii, and most extensively in Nicaragua. The criteria for selection have been a large fruit, heavy production, agreeable flavor and ease in separation of the flesh from the seed(s). There are currently 14 selections under trial in South Florida at the Williams Grove Genetic Resource Center of FTBG. Production and fruit quality data collection began in 2005.**

The abrico (Fig. 1) is considered native to the Caribbean, specifically to Jamaica, Hispaniola, Puerto Rico and the Lesser Antilles (12 to 20°N) (Francis, 1989). It is now found in association with human activities throughout the Caribbean, Central and South America, and is often considered a "local" fruit in select regions, with associated localized lore and uses of the fruit, tree and timber. The predominant use of abrico is as a fresh or minimally processed fruit (preserves, jams, etc.), although the leaves and seeds have been used as a medicinal and as an insecticide for crops, livestock and humans. The tree is polygamo-dioecious, with staminate, pistilate and hermaphroditic flowers possible within a single tree. In a practical horticultural sense, there are productive "female" trees and nearly unproductive "male" trees encountered throughout the range of the crop. The fruit are large, ranging in size from 600 to 2000 g or more, with a thick brown leathery skin, a deep yellow to orange flesh and from 1 to 4 seeds. The flesh is firm and without fiber and often contains the leathery or woody vestiges of aborted seeds embedded in the flesh. The flesh typically adheres to the large seeds, which may weigh on average 70 g or more.

Abrico is grown as a component of home gardens throughout Tropical America. Commercial orchards are rare. Propagation of abrico is typically from seed within the home garden, and the tree is not commonly found in nurseries. Fruit are harvested from productive trees within a region and are sold in local markets throughout Tropical America. Unlike other important local fruit crops like mamey sapote and sapodilla, abrico fruit are not typically separated on quality in local markets and local fruit harvesters do not identify superior local selections. Superior trees exist throughout the American Tropics, but there has been no organized effort into the identification, collection and conservation of superior clones.

Fig. 1. Abrico (*Mammea americana* L.).

This work describes the efforts of the Fairchild Tropical Botanic Garden into the identification of superior abrico throughout the American Tropics and the creation of a clonal collection within South Florida.

Identification and Collecting of Superior Selections

Since 1992 the Tropical Fruit Program of FTBG has been active in the acquisition of tropical fruit genetic material in Tropical America. Target crops of these expeditions have been mamey sapote, mango, sapodilla, and most recently avocado. Abrico occurs together with these crops throughout these same regions. Taking advantage of these expeditions, in 2002 we began to collect abrico, using as collection criteria fruit size (large), productivity, seed number and size, and separation of the flesh from the seed. Collecting efforts have been hampered because local harvesters and fruit sellers do not segregate superior selections like with other local fruit. Thus collecting has been mostly by observation and through collaborators in the region. The collection of these materials has been a secondary priority to the main collection objectives of the expeditions.

The area of the most intensive exploration to date has been near the towns of Jinotepe and Masaya in Southern Nicaragua, near the northern and Western shores of Lake Nicaragua. In this region abrico was planted as windbreaks surrounding agricultural fields, resulting in kilometers of seedling trees from which to select. Local taxi drivers and fruit harvesters have been hired to carry FTBG staff and collaborators in search of superior seedling trees throughout the

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Table 1. Abrico (*Mammea americana*) selections in the living genetic collections of Fairchild Tropical Botanic Garden, June 2005.

Cultivar	Origin	Description	Tree age in field
Baltizar	Isabal, Guatemala	—	1 year
Campos Azules 1	Campos Azules, Nicaragua	Productive, large, single seed	2 years
Campos Azules 2	Campos Azules, Nicaragua	Productive, large, single seed	2 years
El Tesoro	Esquintla, Guatemala	Small fruit, freestone	1 year
Fairchild	Coral Gables, FL	Productive	3 years
Grimal	Big Pine Key, FL	Productive	1 year
Jardin Botanico 1	Santo Domingo, Dom. Rep.	Good quality, large	1 year
Jinotepe 1	Jinotepe, Nicaragua	Productive, small, excellent quality	2 years
Jinotepe 2	Jinotepe, Nicaragua	Productive, large, good quality	2 years
Magaña	Ahuachapan, El Salvador	Productive, large fruit	1 year
Masaya	Masaya, Nicaragua	—	2 years
McNaughton	Coconut Grove, FL	Productive, single seed	1 year
Pedro	Isabal, Guatemala	Precocious	1 year
Waimanalo	Waimanalo, HI	—	1 year

local communities and surrounding countryside. Selections have been based on observations of the collector at the time of the visit with little input from local contacts. Multiple visits to this region during different seasons have resulted in a number of selections that will hopefully perform well in South Florida. Additional selections have been made in Costa Rica, Dominican Republic, El Salvador, Guatemala and Hawaii. These selections have been based more on local contacts, which report superior quality based on the identified selection criteria. An effort was, however, made to sample the fruit and observe the mature bearing habit of the tree to assure the quality of the selection.

Selections have been collected, and transported to FTBG as terminal budsticks without leaves. Veneer grafts were made using rootstocks of local origin. Grafting success has been nearly 100% for all collecting regions. Names have been assigned to the selections based on the locations where they were collected, or in the case of collecting in home gardens, using the name of the owner or name assigned by the homeowner. Introductions have been under postentry quarantine for 1 year at FTBG prior to field establishment.

Establishment and Conservation of Collections in South Florida

Abrico trees, although easy to propagate are slow to establish in the field in South Florida. Newly planted trees tend to wind throw under routine field conditions. The development of a sturdy root system and tree requiring no supplemental support has required 2 to 3 years in most cases. Abrico is also sensitive to freezing temperatures. Young trees are easily damaged by temperatures below 32°F and require years to recover from damage at this stage. However, none of the introduced selections in this current effort have been lost to cold damage.

Trees were originally planted on the property of the Montgomery Botanical Center and then later propagated for Chapman Field property, both located on Biscayne Bay, in Coral Gables and Palmetto Bay, respectively. In the last 2 years, trees have been propagated and planted at the Williams Genetic Facility located in agricultural district of South Florida, north of Homestead. Trees will be maintained as a single replicate accession, with full passport data and labeling within the plant records system of FTBG (Table 1).

Preliminary Comments on Current Selections

Fourteen selections are currently conserved with the FTBG genetic collections from South Florida (3), the Dominican Republic (1), El Salvador (1), Guatemala (3), Hawaii (1) and Nicaragua (5). Trees are less than 4 years of age and most less than 2 years of age, thus we cannot draw many conclusions about their performance in South Florida at this time. Local environmental conditions of South Florida will influence the quality factors on which the collections were based, but we hope to identify among these selections superior horticultural traits that will contribute to the economic development of this crop. No consideration has been given within this current collection effort to conserve the overall genetic diversity of this crop, that is, we have concentrated on the selection of superior fruit quality and productivity. In order to address the issue of genetic diversity, a genetic analysis should be conducted within the region and compared with the current accessions in the collection to direct future collecting.

Potential in Florida

The abrico has potential as both a home garden and estate agriculture crop in Florida. The fruit are recognized by many ethnic groups of Tropical America. The fruit are not attractive to the eye based solely on their external appearance, but the color of the flesh and contrast of flesh and skin is attractive in cut fruit. Cut fruit also maintain their attractive color for an extended time. The flavor is pleasant and agreeable to most at first taste and lends itself for use in preserves and jams. The most serious limitations are the difficulties in establishing a productive tree and sensitivity to freezing temperatures. Temperatures below 30°F will kill young trees for only a few hours. Furthermore, to improve the commercial viability of this crop there is a need for selections with large size, a smaller seed and ease in separation of the flesh from the seed.

Literature Cited

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