TWO DECADES OF TROPICAL FRUIT INTRODUCTION

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During the past twenty years the author has introduced a number of new tropical fruit into the Continental U.S.A. Most of this promological material came from the Asiatic tropics, South and Central America, and the West Indies. These experimental plants have been grown in South Florida with varying degrees of success. This paper will discuss and evaluate the introductions, omitting those that failed to survive. Among the topics covered will be the date of introduction, age at first fruiting, quality of fruit, productivity, special growing requirements, methods of propagation and extent of present distribution.

'African Pride' (Annona hybrid) Fig. 1

In 1963 S.W. Younghans and the writer jointly introduced this Annona from Queensland, Australia. The imported, grafted plants grew well and fruited two years later in 1965. This hybrid variety can bear heavy crops of quality cherimoya-like (*A. cherimola*) fruit at an early age. Specimens over two pounds are fairly common.

'African Pride' has been well received and widely distributed in South Florida from where it has been exported for growing in other warm climate areas.

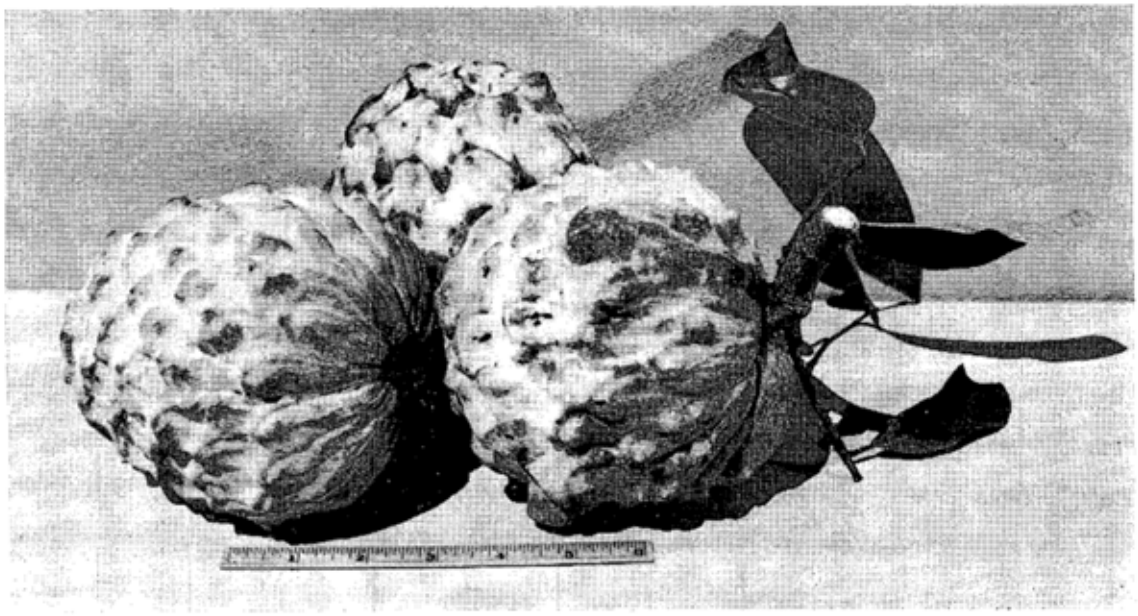
Under certain conditions the fruit develops a hard, seed-packed center, with a darkened membrane surrounding each seed. This adversely affects its eating qualities. Popenoe (1) claims the hybrid originated in Israel where it goes under the name 'Kaller.'

'Cuban Fiberless' Soursop (Annona muricata)

This highly recommended variety was received from this West Indian country in 1959. Unfortunately it has failed to bear in Florida, except in one instance when two half grown fruit dropped prior to ripening. The 'Cuban Fiberless' has had limited distribution locally. From Florida it has been introduced into the Bahamas and Hawaii for further observation and trials. Propagation has been by approach graft.

'Seedless' Cuban Sugar Apple (Annona squamosa) Fig. 2.

In 1955 a seedless Annona was received from outside Havana. The first fruit developed two years



(Photo by Wm. F. Whitman)

Fig. 1. 'African Pride' (Annona hybrid) is also known as 'Kaller.' The fruit shown weigh 2½ pounds or more each.

Fig. 2. 'Seedless' Cuban Sugar Apple (Annona squamosa).). **(Photo by Wm. F. Whitman)**

later with abortive seeds, appearing like thin, minute pieces of bran flakes. The variety, which splits badly, is deformed and smaller than it would be if it had normal seed development. It is not as productive as the seeded types, is nearly identical in quality and flavor and is said to be resistant to the chalcid fly (*Bephrata cubensis*) which destroys many fruit by infesting the seeds. In spite of this the tree can produce mummies like a seeded sugar apple does. This clone has been propagated in Florida and sent to South and Central America, India and the Far East. Another "seedless" sugar apple was introduced from Brazil, by the writer, which appeared to be identical to the Cuban variety and is therefore not covered in this report.

'Puero' Breadfruit (Artocarpus communis)

This seedless variety was introduced from Tahiti in 1963. Unfavorably cool winters have resulted in no fruit to date, and accounted for the

tree being killed back from a 15 ft. height to ground level on two occasions. The writer considers the breadfruit to be the most cold intolerant of all his introductions, although his prior introduction of an unnamed clone did fruit for several years. Wilder (5) states "The flavor of 'Puero' is excellent and the variety is very highly esteemed by the natives of Tahiti." Propagation is by root cuttings, air layers and root sprouts following severe cold damage to the parent tree.

Another variety, introduced from Hawaii by the writer, is the 'Samoan.' This broad leafed form with shallow cut leaf indentations has been grown in Fairchild Tropical Garden's Rare Plant House, where it has fruited.

'Namtansai' Rambeh (*Baccaurea dulcis*)

The Thai name for this fruit is "Mafai," while 'Namtansai' means "white sugar," referring to the sweetness of this grafted clone. The vegetatively propagated plant was received from Bangkok in 1968 and is presently 6 ft. high with twice this much spread. Small yellowish-green flowers, hanging in racemes, have appeared twice but no fruit has set. The plant has a corky bark type disease which will be described under *Lansium domesticum*. Prior introductions of this Baccaurea failed due to fungus attacks. Attempts to propagate the plant by air layers were unsuccessful.

'Wan' Maprang (*Bouea macrophylla*)

This is another grafted fruit from Thailand introduced by the writer in 1967. In appearance it closely resembles the mango, to which it is related, but its size, foliage and fruit are all smaller. The Thai word 'Wan' means "sweet," the tree is presently 8 ft. high with a spread of 7 ft. and has produced no fruit. An earlier introduction by the writer of the same clone approached fruiting size but was lost in a hurricane. Bouea are reported to graft onto the mango (*Mangifera indica*) but attempts by the writer to do this were unsuccessful.

'Cuban No. 1.' Mamey Sapote (*Calocarpum sapota*)

This variety was simultaneously introduced by former Homestead nurseryman Robert Newcomb and the writer about the mid-fifties. The tree under observation presently has its first crop of immature fruit so no evaluation can yet be given. Propagation is by graft or marcot. The variety appears to be rather slow in coming into bearing.

Green Sapote (*Calocarpum viride*)

Wilson Popenoe sent this 1954 introduction from Honduras, it first fruited in 1962. Better growth is thought to be obtained by using the mamey sapote as a rootstock. More complete information is presented in the writer's paper "The Green Sapote, a New Fruit for South Florida" (2).

Guavira Mi (*Campomanesia obversa*)

Seeds of this Paraguayan bush were forwarded to the Rare Fruit Council membership in 1966. These germinated but failed to survive due to damping off fungus. In 1968 Clarence Johnson, who had previously forwarded the above seeds from South America, now sent root cuttings to the writer at his request. This second introduction was shared with Ed Joon whose plant set its first crop in July 1971. The agreeably sweet fruit are yellow-green, ¾ inch in diam. and usually contain two seeds. The writer's plant is presently 4 ft. high with an 8 ft. spread making a horizontal growth pattern with branches laying on the ground.

Souari Nut (*Caryocar sp.*)

Seeds of this South American tree were received from Guyana in 1970. In its native habitat it makes a large forest tree whose nuts are reported to be delicious. The introduction is presently 4 ft. high.

'Haitian' Star Apple (*Chrysophyllum cainito*) Fig. 3.

This introduction was a 1952 selection of the writer's who put several marcots on the parent tree in Port-au-Prince. Nine months later these were removed and forwarded to Miami. The fruit, which first appeared in 1957, is purple, about three inches or more in diameter and nearly spherical. The 'Haitian' variety produces heavy crops of quality fruit with few seeds from January thru June. Bearing can commence when the tree reaches five feet in height. This star apple has been extensively propagated in South Florida by marcots, although it can also be grafted. It has been introduced into the Bahamas and Hawaii from Miami. The quality of the fruit, like that of other star apples, tends to be best during or after a warm winter.

Olosapo (*Couepia polyandra*)

The olosapo, under South Florida growing con-

Fig. 3. The 'Haitian' Star Apple (Chrysophyllum cainito) **is South Florida's most popular variety.**
(Photo by Wm. F. Whitman)

ditions, makes an attractive small tree. The indifferent quality orange-yellow, pickle shaped, 3½ inch by 1½ inch diam. fruit first appeared in 1968 and must be fully ripe and slightly soft to avoid being astringent. The olosapo was introduced in 1962 from seed that originated in Costa Rica. The parent tree is 12 ft. high with a 17 ft. spread. Propagation is by seed and distribution has been limited. Further information can be found in the writer's article "The Olosapo, the Sunsapote and the Fijian Longan" (4).

Namnam (*Cynometra cauliflora*)

This small leguminous slow growing tree was received from Indonesia in 1956 where it is considered rare. First fruiting was in 1965, which was preceded by small patches of crowded minute pink flowers on the main trunk near soil level. The four inch long, half inch thick pods contain a single inch long flat seed surrounded by a yellowish-white pulp tasting similar to green apples. The tree is attractive, especially when in flushes of

wine colored pendant new growth. Almost no distribution has been made even though the seeds germinate readily. The original tree is 8 ft. high with an equal spread.

Alupag (*Euphoria didyma*)

This longan (*E. longana*) relative was introduced from the Kona Coast of Hawaii in 1959. In Southern Florida the Alupag has not been a success for the plants refuse to grow and after an initial start usually die.

'Kohala' Longan (*Euphoria longana*) *Fig.* 4.

This improved strain is outstanding for the size of its fruit, 23 to the pound, and an unusually small seed. It was introduced in 1954 from Hawaii and bore its first crop in 1958. The sweet aromatic, spicy flavored fruit is well adapted to Florida, where environmental conditions are more favorable for growing the longan than the lychee (*Litchi chinensis*). This popular variety has been propagated by air layers and extensively distributed. Like other longans, it exhibits alternate

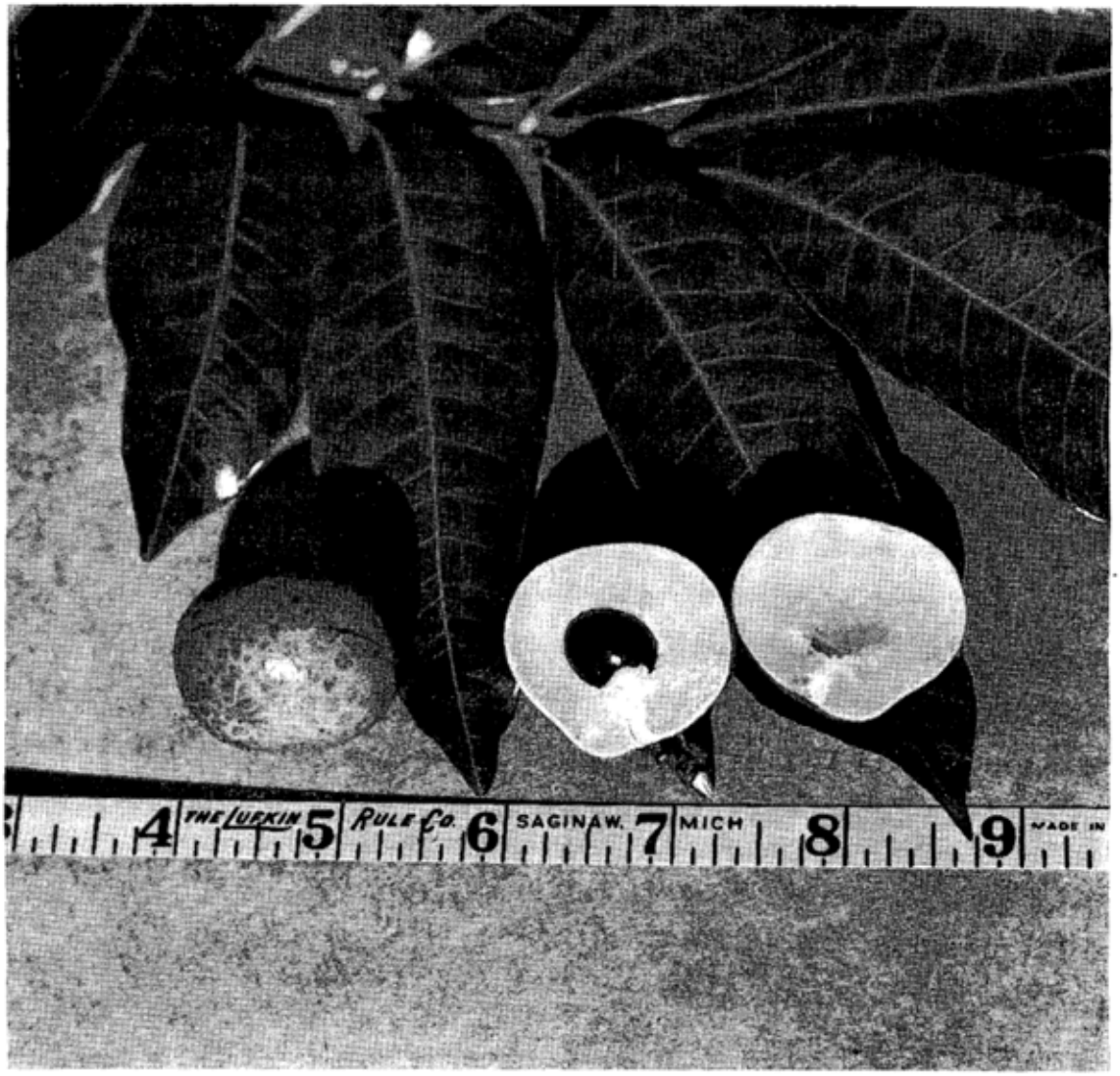


Fig. 4. 'Kohala' Longan (Euphoria longana) **This Hawaiian introduction is noted for its large fruit and small seed.**
(Photo by Wm. F. Whitman)

bearing tendencies and occasionally the crop can be bland, lacking the usual sweet, spicy flavor.

'Conception' Langsat (Lansium domesticum)

This Philippine grafted variety was imported from Manila in 1956. The original introduction has yet to come into bearing in spite of its 19 ft. height and 8 ft. spread. Propagation has been by marcot or approach graft and distribution limited. Under South Florida conditions it appears to require a partial shade enclosure from direct sunlight plus a warm location.

'Uttaradit' Langsat

In 1957 this Thailand clone was imported as a marcot from Bangkok. The tree now stands 15 ft. high with a 10 ft. spread, it has not fruited. The 'Conception' and 'Uttaradit' varieties both have the same "corky bark" symptoms as the previously described Rambeh. A Fla. Dept. of Agr. Plant Pathology specimen report stated "The eruptions on the stem (and trunk over very large areas) in all probability are the beginnings of cankers which undoubtedly have been brought about by (*Phomopsis sp.*) fungus." Small white larvae infest the raised corky areas, apparently feeding on the fungi and/or decayed wood. Benlate, a systemic fungicide, is being tried to correct the above condition but with no positive results to date. At the University of Hawaii's Kona Branch Experiment Station the same "corky bark" symptoms were observed on their specimen of *Lansium domesticum*. It is suggested that strains not exhibiting these bark disorders be used for future propagation.

'Dorsett Golden' Apple (Malus communis)

This northern fruit is included in the report because the parent seedling tree was found growing under near tropical conditions in the Bahamas. The writer was responsible for its introduction into Florida and turning over the scionwood to the former Newcomb Nursery in Homestead. Five thousand propagations were eventually made and the variety has been widely distributed. In South Florida it is subject to both fungus and aphid attacks which necessitates frequent spraying at intervals as close as ten days apart.

Mango (Mangifera indica)

Four mango varieties have been introduced, the first two in 1957. 'Oakrong' is an extremely sweet, thin skinned, greenish-yellow Thailand selection. 'Mun' is another Thai mango, one that is said to be edible while still hard and green.

'Simanalagi,' an Indonesian strain was imported in 1966 while 'Extrema' arrived from Paraguay in 1969. 'Oakrong' and 'Mun' have fruited and been distributed, the other two have not yet been evaluated. The kwini (*M. odorata*), a mango relative was brought in from Hawaii in about 1956 and has fruited in Florida.

Spanish Lime (Meliococcus bijugatus)

'Cuban No. 1.' and 'Cuban No. 2.' varieties were introduced in 1959 as approach grafts from the above country and have not fruited. Another variety, 'Queen,' was air layered from a Key West selection in 1951 and brought to Dade County by the writer. The fruit is nearly twice average size, the orange pulp being sweet without bitterness or astringency and coming free easily from the large seed. Propagation is by marcot or graft, the latter rather difficult. The 'Queen' variety has been fairly widely distributed locally, as well as being introduced into Hawaii.

Cometure (Mouriria guianensis)

This was introduced in 1962 as a seedling from South America where it makes a bush or small tree indigenous to the Guiana region of Venezuela. The fruit is reported to be about two cm. in diam., red colored with a sweet agreeable flavor. The original imported plant is 11 ft. high with a 10 ft. spread and has flowered but not set fruit. This ornamental tree has not been propagated.

Bananas (Musa sp.)

In the paper "A Decade of Banana Introductions" (3) the writer described and evaluated fifteen different varieties, mostly of Polynesian origin.

Camu Camu (Myrciaria paraensis)

This interesting fruit from the Amazon Basin was introduced in 1964. In appearance it resembles the jaboticaba (*M. cauiflora*), to which it is related, only it tends to make more upright growth. The first dark red, round 1″ diam. fruit appeared in 1972 and are presently being evaluated. The largest specimen bush is 8 ft. high with a 7 ft. spread.

'R-7' Rambutan (Nephelium lappaceum)

This Malayan variety was introduced in 1962 as patch budded plants. The largest tree is 12 ft. high with a 13 ft. spread and has not bloomed. Propagation in Florida has been by approach graft and marcot.

Fijian Longan (Pometia pinnata)

This sapindaceous tree was introduced from Hawaii in 1959 and bore its first crop ten years later. The fruit, up to 2¼" diam., tend to be pleasant but on the bland side. Propagation is by seed from the original tree which stands 21 ft. high with a 25 ft. spread. Further information appears in the writer's previously mentioned article (4).

Amazon Tree Grape (Pourouma cecropiaefolia)

In 1963, during a visit to Iquitos on the Upper Amazon, the writer obtained small seedlings of this grape-like fruited plant. Although the introductions flowered, no fruit set and additional importations by others have since been made. As the trees are dioecious, several should be planted together in a group.

Lucma (Pouteria obovata)

Seeds from selected large fruit were obtained by the writer in Lima, Peru in 1963. In Florida the Lucma has flowered for a number of years but failed to set fruit. The plant frequently appears subject to extreme splitting from weak crotches and attack by fungus resulting in die-back and eventual death. The fruit closely resembles the canistel (*P. campechiana*).

'Seedless Indonesian' Guava (Psidium guajava)

This unusual strain came from this Asiatic country in 1954 as a grafted plant. The following year the first fruit appeared. When grown without crosspollination the crop is usually light and tends to be seedless. The fruit is described as 3" diam., irregular in shape, white-fleshed, and firm textured with a good sweet flavor. Propagation is by marcot and distribution has been made to Hawaii and India as well as other tropical areas.

South American Sapote (Quararibea cordata)

Seeds of this "lollipop-leaved" Peruvian tree were introduced into Florida in 1964. One of the plants grown from the above stands 15 ft. in height with a 16 ft. spread while another has flowered but not set fruit. No vegetative propagation is believed to have been made.

'Manila' Santol (Sandoricum koetjape)

This in-arched plant was received from the Philippines in 1967 and presently is 16 ft. high with a 20 ft. spread. A year later the vegetatively propagated 'Tabtim' santol was brought in from Thailand and now stands 12 ft. high with an equal spread. Both varieties have born heavy crops and are being evaluated. Propagation is by graft and marcot.

'Srinark' Wax Jambu (Syzygium javanica)

This large fruited, pear shaped variety was introduced from Thailand about 1960. It is easily grown and fruits abundantly in South Florida where it is probably our best variety. 'Srinark' means "copper color." Another Thai importation 'Chom Poo Savey," claimed to be variegated, failed to show any deviation from normal.

'Mameau' Malay Apple (Syzygium malaccensis)

The Thailand Dept. of Agriculture forwarded this introduction which is outstanding only for the size of its leaves, up to 18 in. long, as the fruit is inferior. About 1952 the writer introduced a Malay apple from Jamaica for which he suggests the variety name 'Kingston.' This Syzygium produces abundant crops of large, up to half pound or more, quality fruit with a proportionately small seed. This unnamed variety has been marcotted in Florida more frequently than any other strain.

Comments

The information in this report is largely based upon the writer's experience in growing introductions on an acid black sandy soil in a warm area near the ocean. An initial spacing of 25 ft. appeared excessive in Bal Harbour's windy location but was later found inadequate for some specimens as they approached maturity. Relative growth rates are obtained by comparing introduction dates with present size. Foreign importations should not always be relied upon to perform as described. Many a year may pass before the tree first bears and the anticipated single seeded, large fruit could turn out to be an insignificant introduction, mostly occupied by numerous disproportionately large seeds. Hurricanes, (Fig. 5) not the occasional

Fig. 5. Hurricanes are responsible for the loss or greatly delayed fruiting of many introductions. (Photo by Wm. F. Whitman)

winter cold front, are responsible for the loss or greatly delayed fruiting of certain plants such as the mangosteen (*Garcinia mangostana*).

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