



The Fruit Growers of Southwest Florida

APRIL / MAY 2020



The speaker at the Tuesday, April 21 Collier Fruit Growers Meeting is James Farwell. James grew up in Woodbury, MN before moving to Fort Myers. He started his journey into agriculture growing various vines and vegetables around 14 years old and he is now focused nearly exclusively on cultivating edible fruit trees. After a career as a mergers and acquisitions investment banker, he purchased Montessori School of Fort Myers where he has served children and families as the Head of School since 2013. In the summer of 2018, he became less active at the school in order to purchase a 2.7-acre property with a house on it in the Colonial Farms neighborhood of south Fort Myers, FL (middle of USDA zone 10a). Since then, he has begun planting out the several hundred potted fruit trees that he had accumulated over the years. Aside from the 20+ species of fruit grown at the school for the children, the Farwell Fruit Farm hosts 170+ species and

cultivars of fruit trees. While the farm includes a collection of Annonas, Citrus, and Eugenias, James enjoys spending most of his time with the Garcinias and most of all the Plinias and Myrciarias (Jaboticaba and its close relatives). Jim can be contacted at: jmfarwell@gmail.com or by tel: 352-256-2676

Collier Fruit Growers Meeting: TUESDAY, April 21, 2020.



Har Mahdeen will speak on 'Hybridizing Annona Varieties' at the May 19 Collier Fruit Growers Meeting.

In his youth, Har Mahdeen supervised a subsistence-style orchard near the Amazon River, then worked at a farm in Tennessee and took a course in Plant Nutrition.

Har worked at the Zill Nurseries in southeastern Florida for 20 years, propagating mango and tropical fruit trees. He did fertilizer experiments, traveled to get plants for the nursery, and did plant-breeding to make Annona hybrids. The 'Lisa' atemoya came from that project.

Then he managed an educational garden after it was installed by Excalibur Fruit Trees nursery and took a course in Botany of Tropical Fruit Trees with professor Al Will.

From 2012, Har provided edible landscape and commercial grove services. Now semi-retired, Har still fertilizes home-garden fruit trees, grafts onto smallish trees in landscapes to

make "cocktail mango trees," consults, and trains 'do-it-your-selves.'

In the 1990's, Har served on a committee which developed the RFC 8-3-9 "Fruitilizer." More recently, he improved on that with RFC 8-3-12 "Fruitilizer." He also formulated the No-Nitrogen 0-3-16 (which is usually applied with gypsum), for mature mango trees, lychees, and longans. This is sold in Palm Beach County by the Rare Fruit Council and by Truly Tropical (a.k.a. The Mango Place).

Collier Fruit Growers Meeting: TUESDAY, May 19, 2020.



**The meetings starts at 7:30 pm.
Meeting will be streamed live on Facebook
and can be accessed anytime thereafter.
Please obey all Stay-at- Home orders.**



Bonita Springs Tropical Fruit Club



**Bonita Springs Tropical Fruit Club Meetings: Tuesday, April & May 2020.
Meetings Starts at 7:00 pm.
Revive Wellness Center, 3521 Bonita Bay Blvd.
Bonita Springs, FL 34134**

The Bonita Springs Tropical Fruit Club, Inc., is an educational not-for-profit organization whose purpose is to inform, educate and advise members and the public in the selection of plants and trees, to encourage their cultivation, and to provide a social forum where members can freely exchange plant material and information. The club cooperates with many organizations, and provides a basis for producing new cultivars. We function in any legal manner to further the above stated aims.

General Meeting:

General meeting, that include an educational program, are held the *second Tuesday* of each month. General meetings begin at **6:15 pm for social time**, and the **speakers begin promptly at 7 pm.**, at the Revive Wellness Center, **3521 Bonita Bay Blvd.**, Bonita Springs.

Workshops:

Workshops (monthly discussions) are held on the *fourth Tuesday* of each month at **7 PM** at the Revive Magazine, when practical. This open format encourages discussion and sharing of fruits and information. Bring in your fruits, plants, seeds, leaves, insects, photos, recipes, ect.. This is a great chance to get answers to specific questions, and there always seems to be a local expert on hand!

Tree Sales:

Semi-annual tree sales in April / May and November, in the Bonita Springs area, raise revenue for educational programs for club members and other related purposes of the club.

Trips:

The club occasionally organizes trips and tours of other organizations that share our interests. The IFAS Experimental Station and the Fairchild Nursery Farm are examples of our recent excursions.

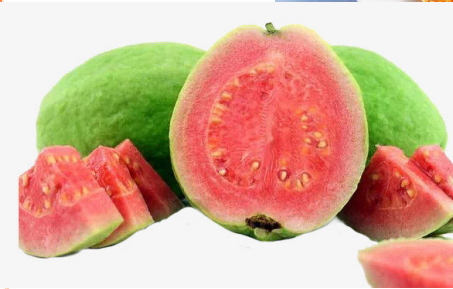
Membership:

Dues are \$15 per person for new members, and \$25 per household. Name tags are \$6 each. Send checks to: PO Box 367791, Bonita Springs, FL 34136, or bring to any regularly scheduled meeting.

RECIPE OF THE MONTH:

For those of us that are fortunate enough to have a guava tree, you will find that the fruit is ripening this time of year. This recipe from 'Tropical Fruit Recipes, Rare and Exotic Fruits,' Rare Fruit Council International, 1981, is a good way to use guavas in a delicious, old-fashioned dessert. Happy baking!

recipe:

Guava Brown Betty

- 1 cup sugar
- $\frac{3}{4}$ tsp. of each cinnamon and nutmeg
- 2 cups breadcrumbs
- $\frac{1}{4}$ cup butter
- 1 tsp. grated lemon rind
- $\frac{1}{4}$ cup water
- 3 Tbsp. lemon, lime or calamondin juice
- 2 cups guava, seeded and cut in little pieces

Blend the sugar, spices, and lemon rind. Mix crumbs and butter slightly with a fork. Cover bottom of buttered pudding dish with crumbs and add half of the guavas. Sprinkle with the sugar/spice mixture, repeat, cover with remaining crumbs. Mix the water, lemon juice, and pour over the dish. Dot with butter and bake in a moderate oven (350°F) for 45 minutes. Cover at first to keep crumbs from browning. Serve topped with cream and sugar.

Krome Memorial Section

Proc. Fla. State Hort. Soc. 129:***-***, 2016.



Improving Harvest and Postharvest Practices on 'Mallika' Mango for the Local Industry

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ADDITIONAL INDEX WORDS. reaping, storage, cultivation, crop maturity, India mangos

From the tree to the consumer's plate, every step in the mango supply chain presents an opportunity to improve quality. Mango harvest criteria can vary with local consumption patterns and distance to market. In practice, the total harvest period is very short and the grower has very little time in which to make correct decisions. For this study, 'Mallika' fruit was evaluated from picking to final destination. The study was conducted using a mango crop marketed directly by the grower and the fruit was shipped to the northern market in the United States. Indian cultivars were not selected for a postharvest cold chain as exposure of the fruit to standard shipping temperatures and techniques can result in loss of quality. This study provides a clear understanding of how fruit quality can be improved in 'Mallika' mangos for the local market. This study includes production, harvest, postharvest, and handling practices from maturity assessment to packaging solutions and interstate shipping alternatives.

Air shipments of Indian mangos to the United States began in 2006. Cultivars such as 'Alphonso', 'Kesar', and 'Totapuri' are being flown to the United States for a select clientele who service the ethnic Indian community in the United States. (Campbell and Ledesma, 2013).

India has grown mangoes for thousands of years, and produces the majority of the world's mango crop. They have lot of challenges in infrastructure—protocols, pest quarantines, and the sheer distance limit exports to the United States. The U.S. Department of Agriculture allowed the importation of Indian-grown mangos treated with irradiation to kill or sterilize insects. This is still a controversial issue. In addition, quality issues have been an obstacle to the importation associated with irradiation treatment and with the inherent nature of the cultivars and postharvest handling of the product.

Reported prices of Indian mangos are still high, generating considerable interest among western growers. There is particular interest of Indian cultivars in South Florida, such as 'Alphonso', 'Kesar', and 'Mallika'. Indian mangos are known for their exceptional flavor, pulp color, and sugar content. Production and postharvest programs in the Western Hemisphere are often not compatible with these cultivars. Grower expectations must be adjusted. In the hot tropics, Indian cultivars such as 'Alphonso' have many problems with natural and induced flowering. 'Mallika' is one of the Indian cultivars which performs well in South Florida. It is highly disease resistance, and has good yields.

(Campbell and Ledesma, 2006). Local growers in South Florida must be aware of the challenges involved with the production of Indian mango cultivars to fully realize the desired benefits.

Postharvest handling techniques have been developed over the centuries in India for local cultivars. Traditionally, Indian mangos have been stored at high temperatures than can reach between 90 to 100 °F. For centuries Indian growers developed their own ripening systems. Mangos are picked when they still green and unwashed and are kept with the natural waxy skin. Mangos are packed in wooden boxes filled with natural grass. Mangos are stored in dark, ventilated structures which can reach up to 100 °F during the day. The mangos will ripen with an intense aroma (bouquet) and perfect sweetness in 8–10 days. Some farmers just lay fruit down on a concrete surface in a dark room and cover the fruit with fabric.

The modern mango industry continues to adapt to changes in consumer demands for fresh mangos and mango products. Producers in the United States are increasingly interested in alternative mango cultivars for the fresh and processed markets. Current Western Hemisphere harvesting and postharvest handling practices must be modified for these cultivars to produce the desired fruit quality. Indian cultivars were not selected for a postharvest cold chain and exposure of the fruit to standard export temperatures and techniques can result in loss of quality. Growers in the Western Hemisphere should be aware of the challenges involved with the production of Indian mango cultivars to fully realize the desired benefits. Therefore, it is necessary to develop improved methods of mango storage to enhance shelf life without any detrimental effects on quality.

Materials and Methods

The study was conducted in a private mango farm in the Red-land farming district of Miami-Dade County in South Florida. The orchard consists of a 1.5-acre planting. Tree spacing is 6 m

For their help in contributing in this project tasting the 'Mallika' mangos at the final destination, the author is profoundly grateful to Maricel E. Presilla, chef, restaurateur, and a recognized authority on mangos and Baskar Savani, whose family grows mangoes in Gujarat, and who imports Indian mangos to the United States. They both cared for the mangos for over three weeks and carefully evaluated the fruit and provided information for this experiment.

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between the rows and 4 m within the row. Trees were not irrigated and no additional inputs of fertilizer or pesticides were used. Ground covers are used to suppress weeds. Mowing and hand weeding were performed as needed.

'Mallika' is a hybrid between 'Neelum' and 'Dusheri'. 'Mallika' is considered among the best of the new generation of Indian dessert mangos (Campbell and Ledesma, 2004). The tree is semi-dwarf, making it attractive to mango growers outside of India, who are always looking for new niche markets. The bright yellow fruit has a flattened oblong shape, with a rounded base and an irregular, non-waxy skin. Fruit weigh between 10–18 oz. When properly ripened, the pasty, but completely fiber-free flesh is a deep orange, with an intensely sweet, rich and highly aromatic flavor (Ledesma, 2015).

The grower does his own marketing, with fruit shipped to markets in the northern states of the United States. The fruit was harvested, washed, and packed, using the protocols as follow:

PICKING. Harvesting was done by hand. Fruit was picked using clippers, leaving a 20 mm stem attached to protect the fruit from sap burn. The fruit was placed into field crates or bins. Harvest was done using multiple pickings since fruit do not ripen all at the same time.

Fruit were harvested at the 70% to 80% maturity stage. Accurately, estimating when the fruit is ripe is critical to consistently meet customer expectations. It relies on visual observations and is also calendar based. Mangos normally reach maturity in 4 to 5 months from flowering. 'Mallika' fruit was harvested from June to July. The fruit was picked with a light green skin color and a range weight from 300 to 450 g. The fruit develops an oblong sigmoid shape the shoulders fill when mature.

Fruit was moved to a facility for cleaning and packing. Fruit was unloaded from field bins after being washed.

PACKING AND RIPENING. There are no USDA grade standards for mango and they are sorely needed. Sugar content, acid content, color test, specific gravity of the fruit, and time of blooming are some of the criteria used to determine fruit maturity. Fruit were sorted by weight into three categories shown in Table 1.

Keeping fruit separated by size, the fruit was stored at an average of 70 °F night and 93 °F daytime temperatures; it was never cooled. The fruit was evaluated every week to measure brix and internal color to pack and ship (Table 2).

Table 1. Size categories of treatment fruit by weight (g).

Small fruit	Medium fruit	Large fruit
< 310	310–380	> 380

Table 2. Average fruit rating before shipping.

Evaluation day	T1 (small) ^z			T2 (medium) ^y			T3 (large) ^x		
	Weight (g)	Brix	Internal color	Weight (g)	Brix	Internal color	Weight (g)	Brix	Internal color
1	300	13	cream	340	14.5	cream	370	15.00	cream
5	299	14	Pale yellow	339	15.5	Pale yellow	370	15.00	Pale yellow
6	299	15	Pale yellow	339	16.5	Pale yellow	369	15.00	Pale yellow
7	299	16	Pale yellow	339	16.5	Pale yellow	365	16.00	Pale yellow
8	298	17.5	yellow	339	17.5	orange	360	17.00	yellow
9	299	18	orange	338	18.5	orange	356	17.5	orange
10	298	18	orange	338	18.5	orange	350	18.5	orange

^zSmall: 250 g average.

^yMedium: 310 g average.

^xLarge: 300 g average.

Table 3. Average fruit rating on arrival.^z

Evaluation Day	T1 (Small)	T2 (Medium)	T3 (Large)
14	2 ^y	2	2
16	2	1	1
18	2	1	1
20	1	1	1
22	1	1	3
24	1	1	3

^zPhysical appearance at arrival 14 days after picking.

^yScores: 1 = good (ready to eat); 2 = acceptable (not ripe); and 3 = not acceptable (over ripe).

The fruit was packed manually into single-layer cardboard boxes by size (Table 1). Organic material (paper) was used to cushion each fruit in the boxes. There is no box made especially for mangos. However, local growers are using existing boxes available in the market. For this experiment, flat rate U.S. Post Office (USPS) Priority Mail Medium Flat Rate (11" × 8.5" × 5.5") and Priority Mail Large Flat Rate (12" × 12" × 5.5") boxes were used.

The final destinations were two customers in Weehawken, NJ, and Maple Glen, PA. Five boxes of each treatment (Table 1) were shipped to the two customers. The shipping time to the destinations was 3 days. We used two mango experts to evaluate the fruit on arrival. Quality at destination was evaluated based in sugar content and overall appearance of the fruit (Table 3).

STORAGE AND TEMPERATURE. Table 2 shows fruit size, weight, internal color, external color, and brix before shipping. We sent 10 boxes per size category (Table 1) to Weehawken, NJ, and Maple Glen, PA. Mango experts evaluated at the fruit on arrival, with results shown in Table 3. The evaluations at the destination continued weekly until fruit were considered "Good" or "Ready to eat". The fruit was never stored below 70 °F. Specifications on the box recommend keeping fruit in the box and holding it at room temperature or outside.

Temperature is a very important factor that influences fruit maturity and quality of the fruit. Indian cultivars were not selected for a postharvest cold chain so exposure of the fruit to standard export temperatures can result in loss of quality. Using air shipments, it takes 2–3 days to reach a destination in the northern U.S. Our plan is to develop a protocol that allow fruit to arrive at final destination ready to eat.

Results and Discussion

FRUIT WEIGHT. The fruits were graded while they were green, and packed while they are still green or semi-ripe. The weight

decreased by the time the fruits were ripe, during transit and also due to moisture loss if the weather is dry. There is no set formula to predict weight loss. The way the grading is done commercially, using a specially calibrated weighing machine shows the grade of each mango, which then goes into a dedicated baskets. For our experiment we used commercial standards as a reference.

'Mallika' fruit range between 250–420 g. Fruit is normally sold by the piece and in some cases by weight. Large fruit can be less attractive for the growers because the profits can be lower. It is advantageous for growers to be able to identify smaller fruit that can ripen properly.

FRUIT APPEARANCE. External color, appearance, and pulp color are indicators for judging the fruit maturity. At the time of maturity for 'Mallika', the pit becomes hard and pulp color changes from white or cream and finally yellow or orange (Table 2). The flesh color changes with fruit maturity, and grades A1, A2, and A3 ripen in 14–24 days from harvest (Table 3).

Observations show that the skin of 'Mallika' is smooth and uniform, although at ripening the fruit may shrivel slightly. By the time ripening starts, an intense tropical bouquet emanates from the fruit, a harbinger of the profoundly complex flesh tasting like sweet melon and honey. The fruit is disease-tolerant during the time from harvest to arrival at the final destination.

Preliminary results show that small fruit can be kept for a few days longer than large fruit (Table 3).

Fruit gets soft when ripe. Fruit must be handled gently as it can bruise easily. Avoid storing mangos at temperatures below 50 °F. Keep fruit in a box to complete the ripening process. It

is best to place the mango stem side down at room temperature. Cover the fruit with a mesh cloth. The mango fruit is like the tree itself—it prefers warm temperatures and sunlight to extend its storage lifespan. A label on the box with storage directions is necessary for shipping. Consumers need a guide for how to store fruit at home and how to determine when it is ready to eat.

Among the various carriers available to North American online merchants, the USPS offers some of the most attractive options, especially with the aforementioned flat rate and prepaid flat rate boxes and envelopes. Flat rate boxes, by their very nature, have a known cost. They are delivered in two or three days.

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BURDS' NEST OF INFORMATION

THIS and THAT FOR APRIL

To everything there is a season.....

The month of April in South Florida reflects the words above because much of the winter crop is over, some exceptions, eg Citrus - the Valencia oranges are probably at their best, some grapefruit, especially the Marsh Pinks & Whites can linger on to late May.

So what else can be harvested in April?

Custard Apples, Mamey Sapotes, Cherry of the Rio Grande and Grumichama cherry, Mulberries, and maybe Jaboticabas.

Some of the early mangos at the end of April; Rosigold, Florigon, Manilita depending on when they bloomed and when care was given.

A point to remember: Mangos, watering in the dry season should be kept to once a week, this will result in larger fruit. Too much water will dilute the flavor of each mango.

FIGS: As they are just pushing, it's now the time to selectively prune, so that you don't need a ladder to pick the fruit.

A light sprinkling of a full fertilizer, eg 6-6-6 or 8-8-8 and a good mulch will encourage fruit and help fight nematodes.

Which brings us to discuss....

COTTON SEED MEAL: Our experience of using Cotton Seed Meal as an additive has seen trees restored to their potential glory. We use it at the same time as the regular correct fertilizer, (less is better than more) 2 to 4 times a year. Cotton Seed Meal promotes acidity combined with minor elements. Citrus, Avocados, Jaboticabas, Figs, Miracle Fruit and also any acid loving ornamentals eg Gardenias will have lush green leaves and many flowers. Cotton Seed Meal can be purchased at feed stores and may need to be ordered.



IMPROVING AVAILABILITY AND QUALITY OF PLANTING MATERIALS OF HORTICULTURAL CROPS FOR DOUBLING FARMERS' INCOME

Shailendra Rajan Central Institute for Subtropical Horticulture, Rehmankhera, Lucknow-226 101

Profits from an orchard depend upon the type of planting material used for its establishment. Genuine planting material is the basic requirement on which the quality and quantity of final crop harvest depends. Mistakes made at the time of planting cannot be rectified subsequently and cause everlasting loss in productivity and income to the orchardists. Non-availability of genuine seeds and elite planting material is one of the major constraints in obtaining expected productivity in fruit crops. With increasing area under horticultural crops and replacement of old orchards, requirements of new fruit plants are for several million plants. The plants must be sourced from stable high yielding mother plants raised in scientific way and free from major pests and diseases.

In the recent past, with the growing importance of fruit crops, the demand for quality planting material has increased manifold throughout the country. However, the greatest bottleneck in the expansion of area under fruits is the non-availability of genuine and quality planting material in adequate quantity from reliable government nurseries. More often than not, the farmers have to get the fruit plants from unreliable sources and this practice is causing great harm to the fruit industry of the country. Fruit growers, with adequate means and resources, can easily establish their own Hi-tech fruit nursery with certification from a recognized government agency.

Graft production of newer varieties of fruit crop is becoming a lucrative venture for the nursery men. New nurseries are coming up at very higher rate and thus the need of the quality planting material can only be fulfilled, when certain precautions are taken during the production of planting material. Production of high quality planting material at community level is helpful in increasing the farmers income by issuing good yield from the orchard as well as generating profits from the nursery along with employment generation for the village youth during the lean season when the crop does not require much manual labor in the field.

Features of Hi-tech nursery:

In hi-tech nursery, plants are raised from seeds/other vegetative methods under protected or controlled conditions. Nursery operations starting from soil preparation to seedling packing are performed using technical knowledge for the production of genuine and healthy planting material with good field establishment. The partial control on microclimatic parameters viz., temperature, light, air composition and nature of root medium, success in multiplication is increased even in unfavorable agroclimatic conditions of open field. Followings are the main features of the high-tech nursery of subtropical fruit tree crops:

- Production of high-quality planting materials of superior varieties of known genetic identity free from known diseases.
- High quality genuine true to type plants derived from mother block located in the nursery.
- Scion blocks of elite mother trees are established and maintained with good cultural care and monitored for performance.
- Media sterilization, mist chamber, poly-house, containerization using polybags and shade net house are used for producing disease free grafted plants of improved varieties.
- Potting media also sterilized using and fortified with bio-agents
- Selection of scions/budwood and rootstocks is carried out as per standards for different crops.
- Grafts are produced in poly bags using rapid methods of propagation.
- Good health management program in the nursery area is followed with sanitization, regular monitoring of insect pests and diseases at periodical intervals.
- Record keeping of the nursery activities like cultural management practice, surveillance of nutritional deficiencies pest and disease infestation are carried out regularly.
- Rogueing is scrupulously followed for discarding planting material not confirming to prescribed standards.

The budwood/scions should always be taken from healthy and true to type mother trees of commercial/new varieties, which are free from viruses, disease and pest occurrence. A nurseryman should have mother trees of all the promising cultivars of fruits that can be grown in that particular area.

Selection of the elite mother plants should be done with greatest care since the performance of the plants produced will depend entirely upon the characteristics of the mother plant. While selecting mother plants following basic characteristics have been considered (i) Consistently high performance and yield over several years with high quality fruits (ii) Healthy and free from incidence of diseases and insect pests (iii) Plants attained full bearing age, since its characteristics known only after bearing.

With the objective of making available enough scions, a mother tree block should be established by grafting/ budding on a suitable rootstock. These plants are severely pruned to keep them in vegetative phase and to produce enough shoots for propagation year-round. The maintenance of these blocks is done rigorously so that these are healthy and free of diseases and insect pests. If there is any overcrowding and problem of light penetration, then alternate plants may be eliminated depending upon the situation. The maintenance of mother plants, right from the time of planting to the stage of bearing and subsequent years should be as per standards. Agro-techniques are followed judiciously, so that vigorous and healthy scion shoots are made available for multiplication.

Poly and net house facilities:

Propagation of fruit plant in north India starts from June and ends in the month of September. Only 3-4 months are suitable for the propagation under open conditions. But with aid of poly and net house, propagation period can be increased to 7-8 months. Poly and net structures have become a major component of the Hi-tech nursery.



Protected structures play an important role in hi-tech nursery

Preparation of rooting media and containerization: In north India, still most of the fruit plants are multiplied in beds. It has a number of limitations requiring good 'earth ball' loam or clay loam soil, rootstock and grafted plants require frequent repotting, for effective weed control lot of labor. Mortality during repotting and transplanting is a common occurrence, 'earth ball' loam carries a number of pathogens.

Sterilization of rooting mixture: Solarization has been found effective and ecofriendly which involves trapping of solar heat/ energy through polyethylene covering. This raises the temperature of media to the level, where it becomes lethal to temperature sensitive/mesophilic soil microorganism Polythene covering of soil induces green- house effect and raises media temperature.

Containerization: In general, subtropical fruits viz., mango, guava, aonla (originating in central India) and bael plants are multiplied in open beds, which may get infected with soil borne fungi, nematodes, etc. Plastic bag of appropriate size should be utilized at various stages of plant multiplication. It is quite cumbersome to sterilize the whole soil and expensive, however limited amount of root medium used in the containers can be sterilized economically. Moreover, containers can be shifted to greenhouse/ for protecting against rain, cold of high temperature for quick growth.

Promising clones and new varieties: Mother plants of new varieties and commercial varieties of major fruit crops should be available in mother blocks for multiplication.

Propagation protocols: Wedge grafting, a technique for rapid multiplication has been perfected at Central Institute for Subtropical Horticulture (CISH), Lucknow. This technique has a tremendous potential for multiplying guava plants rapidly throughout the year both in greenhouse and under open conditions. The technique involves growing of seedlings in polyethylene bags, grafting, capping and hardening of grafts. With the standardization of wedge grafting

technique, important subtropical fruits are propagated by this method and other types of grafting like veneer grafting and patch budding is also recommended in these crops.

Rootstocks raising: Raising of rootstocks for grafting has also become an attractive occupation being adopted by many small farmers, as they don't have much land to cultivate other crops and they grow rootstocks and supply to the nursery men for livelihood. Rootstock production through such system requires lot of precautions as soil borne diseases especially nematodes are travelling with the soil of the small nursery to a bigger one and to other states. There are currently, no quarantine arrangements at the Indian interstate level.

Plant Protection Measures: Insect pests like Mango hopper may become problem in nursery. Several of the leaf cutting insects and borer damage newly emerging leaves and shoots from scion. Regular control of these insects is important for healthy plant production. Diseases like vegetative malformation on seedlings may cause sick growth of rootstock or graft. Affected plants should immediately be uprooted and destroyed.

The nursery plants should be irrigated whenever there is danger of frost and during summer, the irrigation should be given at periodically depending upon the soil moisture conditions. A light application of Calcium Ammonium Nitrate or Ammonium sulphate is also recommended to encourage the growth of plants. The beds/polybags should be kept free from weeds by regular weeding/hoeing.

Labeling and traceability: Labeling and traceability are becoming important to eliminate the spurious material from the planting material supply chain. For this purpose, guidelines are being developed and issued so that newly established orchards are of genuine varieties. This has become important as many of the nurserymen supply spurious planting material due to good profits in the business. Plants need to be labeled properly so that traceability is insured. Plants need to be labeled properly so that traceability is insured.

Points to be remembered while labeling:

1. The material used for labeling should be long lasting with batch number.
2. Common name of the variety needs to be written without spelling mistake.
3. Label should be written with permanent markers.
4. Printed labels with the name and symbol of the organization should be mentioned.
5. Self-locking labels, which do not come out easily while handling and transport should only be used.
6. For the identification of the plants, local languages can be used in addition to English on the labels.

ICAR-CISH has played an important role establishment of nurseries in different parts of India, not only by supplying mother plants as core planting material to hundreds of them but also the technique. The nursery at the institute is a source of inspiration for many youngsters and farmers who started their business after seeing production of high-quality planting material. More than thousand people have taken advice and training for starting the business. At the institute, several hundreds have completed agriculture skill development program in nursery management. The wedge grafting techniques for guava and other subtropical fruit plants are being used by farmers themselves. Many of the Indian farmers have become specialists and they travel to different states for performing the grafting. This has become not only way of living for them but also reduced the transportation charges of grafts, as in different states nurseries are being developed and lack of grafters is being supplemented by network of grafters following the technique developed by CISH. Approximately 20,000 grafts of guava are being produced by using the technique and some of the organizations are making corers of rupees (several 10 million rupees⁽¹⁾) from this art. There are many success stories of the farmers where their annual income has increased several times as they took up the nursery production as profession. Production of genuine planting material is increasing farmers income directly by increasing area under high yielding varieties and production and also supporting livelihood of several thousand rural families through employment in nursery which not only supports the income of nursery owner rather it also helps increasing employment opportunities round the year.

Currency exchange rate as of 2/7/2020 is \$US 1.0 = 71.5 Indian Rupees.

Krome Memorial Section

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Morphologic Characterization of Ten Commercial Mango Cultivars (*Mangifera indica* L.) with Potential for the Pulp Industry in Colombia

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A study was conducted on 10 cultivars of *Mangifera indica* at the Fairchild Tropical Botanic Garden living collection located in Homestead, Florida. A detailed description was made of the different commercial cultivars with the purpose to determine their suitability for the Colombian pulp industry. Mango production in Colombia is used mainly for fresh fruit for the local market, which represents 95% of the total mango production (Agronet 2016). 'Hilacha' is the main mango cultivar used for processing. New alternatives are needed for the industry to extend the season and production. The mango cultivars 'Miklet', 'Fairchild', 'Espada', 'Bullock's Heart', 'Totapuri', 'Zebda', 'Mallika', 'Panchadarakalasa', 'Royal Special', and 'Tong Dam' were characterized following international standards of IPGRI (IPGRI, 1989 and Ledesma 2016). Evaluations of fruit morphology were done during the months of June and July. Fruit of the ten cultivars were randomly selected from each tree, photographed and sketched for evaluation of fruit structure.

The mango belongs to the family Anacardiaceae, which is characterized by numerous fruit species some of which, Mango and Marañón, are of great economic importance. From its area of origin in Southeast Asia, the mango is now found in more than 100 countries of the tropics and sub-tropics. (Galán, 1999).

It is believed that the mango arrived in Colombia in two ways. First, the Portuguese stopped in India before reaching the Americas in the fifteenth century. Another possible introduction may have occurred in the 16th century by the Spaniards, when they stopped in the Caribbean and then in mainland America. Years later, with the discovery of gold and silver in the region of Ibagué, a new development opened the borders of the Magdalena River to connect Tocaima and Carthage. Mango trees were planted in this valley. There is still a legendary mango tree in front of the Government Center in the city of Ibagué planted by Delfin Varón in 1861 (Ledesma, 2016).

Mango production in Colombia is mainly for fresh fruit, which accounts for more than 95% of the national production. Colombia exports processed mango and is third place in mango pulp production in the world. The main variety used for mango pulp is 'Hilacha' or mango Crioyo ("native" mango). Other varieties can be included in processing in small amounts as is the case with 'Sugar', used to increase color. The mango industry in Colombia is interested in introducing new cultivars for processing (Ledesma, 2016).

'Hilacha' is found in all mango areas in Colombia from sea level to 1667 m, including the regions of Tolima, Cundinamarca, Magdalena, Cesar, Córdoba, Bolívar, Huila, and Antioquia. It

is a polyembryonic cultivar, which is found individually and in commercial plantations. There are many selections and adaptations of 'Hilacha' in the country because it is propagated from seed. The trees are highly productive and some are tolerant of disease. The fruit has a rich flavor with sweet notes of melon and citrus. 'Hilacha' mango should be allowed to ripened on the tree to develop the best flavor. On the Atlantic coast, 'Hilacha' grows in flooded conditions and the fruit falls to the ground when the water level drops. Trees grown from seeds start to produce fruit in years 6–8 (Ledesma, 2016).

'Hilacha' is also used as a rootstock in Colombia, mostly due to compatibility with other commercial cultivars such as 'Tommy Atkins' and 'Keitt'. The rootstock enhances vigor and productivity. 'Hilacha' is available throughout Colombia almost year-round, and it is adapted to different growing conditions and areas. (Ledesma, 2016). The harvesting period for 'Hilacha' in Colombia has two seasons. The first and the main harvest is from April to August and the second is from November to January. In the Caribbean region, the harvest period has a great advantage with the greatest production being when there is no other mango for the international market (Ledesma, 2016).

'Hilacha' has small fruit with a low percentage of pulp; it is susceptible to diseases and phytosanitary problems (García et al, 2010). Other cultivars, such as 'Sugar', can be included in small quantities when processing to increase color and flavor.

The demand for pulp is growing, with emphasis on the organic market. Mango processing industries in Colombia require cultivars that are adapted to different climates and conditions and are able to extend the season to provide the international market with fresh product. The introduction of new mango cultivars with desirable characteristics for the mango pulp industry can

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be the answer. This study evaluated ten mango cultivars with potential for this market. Cultivars selected for the study are: 'Maklet', 'Fairchild', 'Espada', 'Bullock's Heart', 'Totapuri', 'Zebda', 'Mallika', 'Panchadarakalasa', 'Royal Special', and 'Tong Dam'. This study of the morphological characterization of new mango cultivars allows for detailed descriptions and obtains basic information of these varieties.

'Maklet' originates from Africa. Ghana produces this cultivar for local consumption and for the production of juices and mango pulp. It is a medium-sized, productive tree. Flowers and fruit post-harvest are resistant to anthracnose. The fruit weighs approximately 380 g and has a greenish-color that ripens to slightly yellow. The pulp is orange-yellow, with some fiber and a good taste (Ledesma, 2018).

'Fairchild' was selected at the beginning of the 1900s in the Panama Canal Zone. The fruits are small, weighing an average of 240 g. They are oblong with a flattened base. The fruits are green to lemon-yellow, with a thin, soft skin and an intense orange pulp. The taste is rich, aromatic and exotic. The tree and fruit are highly tolerant to disease, fruiting very well under rainy conditions and high humidity, making it optimal for production in humid tropical areas. The growth habit of the tree is compact and small (Campbell et al., 2002).

'Espada' is of Brazilian origin. The tree is vigorous and dense and very productive. The fruit is elongated and medium-sized with greenish skin. When mature, it has a slightly yellowish color. The skin is soft and thick, with orange-yellow pulp and quite aromatic fiber. It is also used as a rootstock. The seed is oblong with a thick crust and enough fiber. (Ledesma, 2018).

'Bullock's Heart' was selected in Egypt, where it is a medium-important cultivar for the production of juices. The tree is small with a round shape. The fruit is rounded with pale green skin that turns yellow when fully ripe. It weighs 390 g and has very juicy orange yellow pulp with no fiber. The fruit harvest season is early. It is resistant to anthracnose. (Ledesma, 2018)

'Totapuri' is originally from India and is also known as 'Bangalora' or 'Sandersha'. The tree is vigorous with large fruit (1100 g), which are long and large with sharply tapering shoulders and thick, adherent skin. The pulp is firm and juicy, somewhat fragrant with little fiber. It is a fruit used in India for the juice, chutney and sauce industries. The seed is thin and monoembryonic. It is very productive and consistent. The fruit is susceptible to changes in moisture and may exhibit stress cracking. (Ledesma, 2018)

'Zebda' was selected in Egypt, where it is very important for local consumption. The tree is vigorous and productive with consistent production. The fruit is large (660 g), flattened and green-colored even when ripe. It has a soft skin with very visible lenticels. It is resistant to anthracnose. The pulp is fiber-free, very sweet and juicy. The seeds are polyembryonic, small (50 g). It is a late season variety. (Ledesma, 2018)

'Mallika' is among the best of the new generation of Indian mangos. The tree is small, which makes it very attractive for domestic and commercial growers. The fruit is bright yellow, averages 425 g when mature. It has a deep orange color, a very sweet, pleasant flavor and is highly aromatic. The fruit of 'Mallika' must be harvested when physiologically ripe before it changes its color. It can be stored without refrigeration at a temperature below 21°C for two or three weeks to mature properly. (Campbell et al., 2002)

'Panchadarakalasa' is of Indian origin and is a vigorous open and dense tree. The fruit is medium sized (300 g) with a yellow skin. The pulp is orange-yellow, very juicy, sweet and good tast-

ing, without fiber. In India it is used for juice production. The harvest season is intermediate (Ledesma, 2018).

'Royal Special' is of Indian origin, selected for its high productivity and tolerance to different microclimates. The fruit is round with a cavity at the base of the peduncle. It weighs 280 g and has a soft, regular yellow-colored shell when ripe. It sometimes has a reddish blush if exposed to the sun. Its pulp is orange-yellow with a good taste and fiber. It is used in the preparation of chutneys and sauces. It tends to produce fruit outside the main season and is tolerant to anthracnose (Ledesma, 2018).

'Tong Dam' is an ancient Thai cultivar with multiple uses, suitable for use at both the green stage and when fully ripe. It is used in the preparation of chutney. The fruits are 397 to 510 g, and are long and slender. 'Tong Dam' is an early season variety. It is best to eat the fruit while the meat remains firm, as the fruit is soft when fully ripe (Campbell et al., 2002).

Materials and Methods

The study was conducted on ten commercial varieties of mango (*Mangifera indica* L.) with potential for the Colombian mango industry. The varieties selected for the study were: 'Miklet', 'Fairchild', 'Espada', 'Bullock's Heart', 'Totapuri', 'Zebda', 'Mallika', 'Panchadarakalasa', 'Royal Special', and 'Tong Dam'. The selection of the varieties was based on mango sections already used for the pulp industry in India, Egypt, and other countries. The evaluations took place at the germplasm bank of Fairchild Tropical Botanical Garden, located in Homestead, FL. This farm is located at geographic coordinates: 25°32'12.91" north and 80°25'55.17" west. The area is classified as a sub-tropical wet forest according to the Holdridge life zones, and is about three feet above sea level.

The collection is composed of a single tree per cultivar, with an average age of 12 years old. Trees are grafted on 'Turpentine' rootstock. Trees have been hand pruned every year after harvest. Fertilization and disease control are with very low input of chemicals. No irrigation is applied.

The evaluations are based on a wide range of descriptors both qualitative and quantitative, including characteristics of the tree and the fruit. The study follows standards for mango by the International Plant Genetic Resources Institute (IPGRI) and the United States Department of Agriculture (USDA).

Descriptors utilized

- Tree—fruit crop, growth of the tree, type of tree, leaves, severity of anthracnose.
- Fruit—size (length, width, and thickness), weight; shape, surface, base, peduncle, cavity, appendix and beak.
- Epidermis of the fruit—detachment of the epidermis, texture, color of the base of the epidermis, lenticels, fruit blush and the percentage of anthracnose in the post-harvest period.
- Seed—form, size, weight, texture and number of embryos.
- Pulp—texture, color, flavor, °Brix, aroma, and fiber. This parameter was calculated by means of a formula described as follows:
 1. WT = total weight of the fruit.
 2. WS = seed weight.
 3. WE = epidermis weight.

Pulp color, and epidermis color were evaluated with the Royal Horticultural Society (RHS) Color Chart.

Table 1. Relevant characteristics of selected mango cultivar fruit for pulp processing.

Cultivar	Pulp (%)	Flesh color	Fiber (%)	°Brix	Fruit wt. (g)	Anthraco-nose susceptibility	Seed wt. (g)
Bullock's Heart	75.96	Yellow-Orange	10	15	235	5% slight	17.9
Espada	42.83	Yellow-Orange	38	16	240	75% Very severe	31.5
Fairchild	69.41	Yellow-Orange	10	17	204	1% No disease	27.4
Hilacha	44.94	Yellow	38	17	170	5% slight	29 \
Mallika	81.25	Yellow-Orange	10	16	400	1% No disease	20.7
Miklet	76.54	Yellow-Orange	10	14	379	9% Moderate	36
Panchadarakalasa	75.67	Yellow-Orange	10	15	356	1% No disease	36.5
Royal Special	49.22	Yellow-Orange	25	16	128	9% Moderate	18.9
Tong Dam	73.45	Yellow-Orange	10	21	284	5% slight	32
Totapuri	63.14	Yellow-Orange	25	13	447	9% Moderate	38.9
Zebda	58.96	Orange	25	13	318	1% No disease	36

SUSCEPTIBILITY OF ANTHRACNOSE. Based on the anthracnose scale, using percentage of areas affected with necrotic spots.

EXPERIMENTAL DESIGN. was random sampling with ten repetitions per cultivar from one single tree.

SAMPLES. The fruits were harvested when they reached their physiological maturity based on the weight of the fruit, shoulder development and color characteristics. Fruits were stored at room temperature (75° F) to desired ripeness. Evaluations were made when fruits reach the desired maturity state for processing (80%). Additional digital photographs of fruits were taken for further analysis. Qualitative and quantitative descriptions have been used as well.

Results and Discussion

The results are preliminary and include data for years 2017 and 2018. Anthracnose susceptibility in the fruit is an important criterion for the production of organic mango pulp. 'Espada' is the most sensitive to anthracnose with 70% of fruit affected. Cultivars 'Mallika', 'Fairchild', 'Panchadarakalasa' and 'Zebda' are the most resistant with 1% affected (Table 1).

Fiber percentage is very high in 'Hilacha', which has an efficiency of 45% pulp based on total weight. 'Hilacha' also has a large seed compared to its total weight. The aim of this study is to increase efficiency since transportation and waste increase the cost of production of mango pulp.

The growth of the mango pulp industry is increasing. Efficiency in the production of mango pulp is affected by the percentage of residues such as the skin or epidermis of the fruit, the weight of the seed and the fiber content. Reports show amounts of mango pulp residues ranging from 10% to 40%.

Mango fiber also can have commercial applications. Fiber has the potential to be used in the mango juice industry. This fiber is rich in natural bioactive compounds that play an important role in the prevention of diseases. Studies have used dried mango pulp fiber to replace wheat flour. Evaluations of the physical, sensory and bioactive components show promising results for the baking industry (Lakshminarayan, 2015). This fiber percentage parameter was used as a reference to estimate percent fiber in the evaluated cultivars.

Fiber content of 'Hilacha' is very high at 38% compared with the other mango cultivars evaluated, except for 'Espada' which has the same amount. 'Totopuri' and 'Royal Special' follow and

Table 2. Fruit season and yield of selected mango cultivars.

Cultivar	Harvest time	Yield (# fruit/tree)
Bullock's Heart	June	70
Espada	June	75
Fairchild	July	70
Hilacha	July	40
Mallika	June	70
Miklet	May	76
Panchadarakalasa	June	50
Royal Special	June	52
Tong Dam	May	73
Totapuri	July	49
Zebda	June	20

the ones with the least fiber are 'Mallika', 'Zebda', 'Tong Dam', 'Miklet', 'Fairchild', 'Bullock's Heart', and 'Panchadarakalasa'.

From the mango cultivar study, are all more efficient in terms of percent pulp than 'Hilacha'. The most efficient are 'Mallika' with 81.25%; 'Miklet' with 76.54%; Bullock's Heart with 75.96%; and Panchadarakalasa with 75.67%.

Brix and color are the most important qualities for mango pulp. Orange and deep yellow pulp are most appealing colors for the market. All the evaluated cultivars have good color. 'Tong Dam' has the highest Brix levels with an average of 21. 'Mallika', 'Espada', and 'Royal Special' have an average of 16 °Brix.

Anthraco-nose control can be a challenge especially for organic production. Resistant varieties can be a solution. 'Mallika', 'Fairchild', 'Zebda' and 'Panchadarakalasa' were the least susceptible to the disease.

Season was estimated under production conditions in South Florida. This can change in different latitudes and growing conditions, but serves as a reference for future studies and the introduction of these cultivars to Colombia. (Table 2.) 'Ton Dam' and 'Miklet' have the earliest season. Fruit yield was evaluated under Fairchild Farm growing conditions, and corresponds to the number of fruit per tree (Table 2.). The most productive were 'Espada' and 'Tong Dam'. Studies in situ are necessary to establish the adaptability and productivity of these cultivars under different Colombian regions and conditions. The utilization of different

rootstocks also can affect the productivity of these cultivars. A field test must be designed and evaluated for further results.

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Calcium Sulfate as a Crop Nutrient

Calcium sulfate is good for plants but generally no one thinks of it as a source of important source of plant nutrients. Generally, everyone thinks of calcium sulfate, or gypsum, as a soil amendment and it is. But it much more than that – it is also a fertilizer that has nutrient value. Gypsum is best known for improving soil structure, increasing aeration and infiltration, and it reduces nutrient runoff and soil erosion. The benefits to the soil are long and detailed. And naturally when you improve the soil, you also improve the growing conditions for plants. In addition, it is also a natural source of calcium and sulfur for plant nutrition, both of which are secondary macronutrients. Plants need as many as 15 nutrients in addition to water, carbon dioxide and oxygen. These are broken into three groups including primary macronutrients that include nitrogen, phosphorus and potassium; the secondary macronutrients calcium, magnesium and sulfur; and finally, the micronutrients boron, chloride, copper, iron, manganese, molybdenum, nickel and zinc.

Calcium is an essential nutrient and plays an important role in nutrient uptake. Without adequate calcium, nutrient uptake and root development slows. And calcium is also essential for many plant functions including cell division, soil wall development, nitrate uptake and metabolism, enzyme activity and starch metabolism.

Calcium is important to fruit and tuber quality, which is often deficient. Good fruit and tuber quality require adequate supplies of calcium. Calcium moves slowly within the plant so it must be constantly available to the roots. Calcium in gypsum can help prevent blossom-end rot of watermelon and tomatoes and bitter pit in apples, etc.

Soils have a lot of calcium, but it is either tied up in the soil structure, attached to the cation exchange complex or tied up with carbonate form calcium carbonate – an insoluble mineral. The most available calcium is the water-soluble form that is in the soil solution and directly available to the plant. Replenishing the soluble supply regularly keeps calcium readily available to plant roots.

Our sandy soil doesn't have a lot of sulfur, which lowers the pH. Any sulfur in the soil primarily exists in the organic matter phase or as a sulfate ion (SO_4^{2-}) in the cation exchange complex. There is also some sulfur in the soil mineral, but this is not a readily available source as it is only released when soil minerals weather. Additionally, plants are showing more sulfur deficiencies because of reduced levels of sulfur available in the atmosphere. Gypsum is an excellent source of sulfur for plant nutrition.

Next time you head out to book some fertilizer for your garden, lawn or farm fields, consider adding some gypsum to the mix. It will provide your plants with much needed calcium and sulfur.

A 100-year-old tree stands in a Miami yard. Is it the ‘granddaddy of all Florida mangoes?’

By Carlos Frías

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Tucked away in a quiet section of Coconut Grove, lives what might be the first Haden mango tree in Miami, but that's still up for debate, notes C.M. GUERRERO.

My obsession started like so many obsessions do, with a question so sticky, so delicious, it was impossible to ignore: Is the tree that gave rise to the entire mango industry in the western hemisphere still alive more than 110 years later in a Coconut Grove yard?

This wouldn't be just any mango tree; this tree is the first of its kind, “the granddaddy of all Florida mangoes,” as one person later told me. It was the result of the first time anyone in America had successfully crossed two species of unremarkable mangoes and luckily — improbably, revolutionarily — created a mango that made people swoon.

It was the first to ripen to a rosy blush, with a tropical piney scent. It was the first mango you could bite into without getting a mouthful of mango dental floss, and it was hearty enough to be shipped commercially all over the world. Yet it was so perfectly adapted to our ground, temperature and weather that many South Floridians unknowingly have grown up with this mango in our backyards.



It was a mango so good that 100 years ago, Florida horticulturalists — looking for a new fruit to grow here — would make this mango their ambassador to the world.

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GET OFFER

Spicy, flashy, easy to fall in love with at first sight (or first bite): You might call it the most Miami mango ever. And all of it came from a single tree.

And, like Miami, it was founded by a woman, the wife of a retired Army captain who planted the seed by his house, blocks from the home of Everglades defender Marjory Stoneman Douglas. He died before he saw it bear fruit, but his widow raised the tree and introduced the world to the mango she named for her late husband — the Haden.

I consulted with experts, read the 100-year-old texts of the widow, pored over a 60-year-old report that seem to pinpoint the tree and even spoke to descendants who had visited the tree (and one neighbor who remembers bringing the widow fresh-baked cookies and taking mangoes in return).

All of it led to a single, ancient Haden mango tree that grows twisted in the stifling saltwater breeze blowing in from Biscayne Bay.

Experts who have seen it (and climbed it to gather fruit) say this tree is easily 100 years old. It has withstood hurricanes, dodged disease and escaped the maw of development. And all of it thanks to mango lovers, tolerant homeowners and dumb luck.

But is this *the* tree?

I couldn't stop thinking about it from the moment I came across that online photo.

'IT CAUSED SUCH A STIR'

John and Florence Haden came to Miami, like so many before and after them, to reinvent themselves.

CONTINUED

An eye condition forced Capt. Haden, a West Point grad from Howard County, Missouri, who served with the 8th U.S. Infantry, to retire after 19 years. But he was still a young man in 1896. And when he read in *Cosmopolitan Magazine* that Flagler's railroad into Miami had been finished, he was intrigued.

He and his wife visited the state, touring Central Florida by wagon before arriving in Miami later that year. The first time they walked the property overlooking Biscayne Bay, under the oak hammocks, they bought the 13-acre tract of land and almost immediately started experimenting with growing tropical fruits.

John Haden had heard about a crop of Mulgoba mangoes that a grower in West Palm Beach had produced from plants brought from India. So the Hadens sailed to West Palm Beach in 1902 and returned to what was then spelled Coconut Grove with four dozen Mulgoba fruits — pretty, tasty, but inconsistent — that they planted on their property.

The following year on Jan. 30, before the trees could bear fruit, John January Haden died of “malarial jaundice,” Florence Haden [wrote in an obituary](#) for the Florida State Horticultural Society. He was an original member of the society and “one of its warmest friends,” she wrote, and is [buried in Arlington National Cemetery](#).

But then nature — and Florence Powers Haden — took over. She tended to her late husband's grove and watched the seedlings mature into trees. Some trees produced “thin, poor looking fruits,” she [wrote in a report to the FSHS in 1910](#) still archived on the society's website (and still misspelling her name as Florence R. Hayden). Some mangoes were elongated. Others were compact and round. But on one single tree, everything came together.

This fruit was different. When it ripened, it didn't go from green to yellow like other mangoes. It blushed. No other mango produced in Florida had ever done that before.

The red-and-gold fruit grew to the size of a softball, rounded like the often tiny mulgoba. Inside, it was a deep gold, almost orange, with the piney scent of a turpentine mango without being stringy.

“A fruit sent from my orchard and named ‘The Haden,’ in honor of Captain Haden who planted the seed, was pronounced to have more good points than any yet tested,” she wrote to the society in 1910, after getting word from the Department of Agriculture that hers had been scored higher than any other mango they had ever tested.

Growers flocked to see this new mango. Two of the area's major growers took budwood — young branches from the first Haden — and grafted them onto the roots of other trees to create identical clones of the original Haden.

In a few short years, tens of thousands of young Haden trees popped up in Miami and throughout the state — which became a major player in shipping Haden mangoes throughout South America and the Pacific.

“That's what started the whole industry in Florida,” said Dr. Richard Campbell, director of horticulture at Fairchild Tropical Botanical Garden for more than 20 years, who left to join Ciruli Brothers, one of America's major mango importers. “It caused such a stir. Until the Haden was discovered, there had never been anything like that. It was a true ‘Aha!’ moment in mango genetics. ... It was just one of those lucky rolls of the dice that created the Haden.”

Over the decades, growers have crossed the tree with others to create new varieties (called cultivars). And today, 70 to 80 percent of mangoes grown commercially are descendants of the Haden.

But the world moved on. The Haden fell out of favor in other parts of the world. It is susceptible to disease, and other crosses have produced smoother fruit, with fewer fibers and more refined flavors. That said, Ciruli brothers still imports more than nine million boxes of Hadens from Mexico every year, Campbell said.

Campbell took budwood off that original tree more than 30 years ago. His father, Carl — the late professor emeritus at the University of Florida's Tropical Research and Education Center in Homestead, a consultant for 22 countries — took him to visit it. Together, they created a clone from that branch of the original Haden and planted it at the Fairchild Farm, where it remains for visitors to see and taste.

But 30 years is a long time to remember where a single tree, in Miami's most wooded neighborhood, stood.

That's where the photo comes in.

MANGO MADNESS

Alex Salazar took two of his colleagues on what you might call a trip to mango mecca.

A mango grower in West Palm Beach, he was in Miami for the annual open house at the USDA's research office off Old Cutler Road, where dozens of different mango varieties, including a Haden clone, grow. He asked fellow mango growers if they wanted to visit the original Haden mango tree. They knew he had been on its trail for years.

Salazar had set aside his University of South Florida international studies degree to grow mangoes after he left school to care for his ailing father in Ormond Beach. He started reading up on mangoes to tend to the trees in his father's backyard. Before he knew it, his hobby had become a mango madness. He rented land in the heart of West Palm Beach and now grows 230 varieties of mangoes at his Tropical Acres Farms.

CONTINUED

When he looked into all the varieties of mangoes he was growing, he realized they had one thing in common: They were all descended from Haden.

“The Haden is the parent to the best Florida mangoes,” Salazar said.

Salazar started reading everything he could on the Haden mangoes, sifting through articles that Florence Powers Haden had written at the turn of the century. If Haden came up in a search, he devoured it.

That led him to a treasure map. A 1956 article in “Tequesta: The Journal of the Historical Association of Southern Florida” led the way. In “[Mango Growing Around Early Miami](#),” writer Harold Dorn delves deep in a 16-page article about his travels with his brother through Florida, an exhaustive bit of research in which he concludes that “the Haden set a standard difficult to surpass.”

About halfway in, Dorn writes that Haden’s original tree was planted “east of the extension of Douglas Road south from the old Coconut Grove road, now known as Ingraham Highway.”

Like an Ahab searching for his golden mango, he started down the road. He, Mark Young and Cecil Brumfield — all mango growers in Palm Beach County — searched backyards as they slowed the car to a crawl as they passed the Ingraham Highway split.

And there, less than a block south, on the corner of Klebba Lane, they found a 25-foot-tall mango tree with a wide trunk and gnarled roots. Hanging from it were green Haden mangoes.

“Sure enough, there was an ancient Haden, exactly where the article said it was,” Salazar said. “You could tell by looking at it immediately that it was really quite old. ... I’m, like, 90-something percent sure that’s the tree.”

He and his friends circled the tree, taking pictures of themselves with it. Even Richard Campbell, when told about their find, says, “That’s got to be it.”

“That’s the great granddaddy of all Florida mangoes,” said Brumfield, who owns a 1.3-acre farm with about 50 varieties of mango trees. He imagined what the first growers thought when they first saw this golden-red mango: “The mango people probably thought they’d died and went to heaven.”

Young grew up in Hawaii with only two types of mangoes. The Haden was one of them.

“It was kind of awe-inspiring,” Mark Young said.

Salazar snapped a picture of the tree and posted it to the Wikipedia entry for Haden mangoes — which is how I found it last year.

NO PROTECTION

It’s the improbability that caught my attention. How easily could that tree have been cut down over the last 100 years? All you have to do is look around and see the glut of newer houses around it. Imagine the many chainsaws it had to escape.

There’s nothing to protect a historic tree like this, not really. There’s no ordinance, no proclamation, not so much as a plaque to tell a homeowner of its history. There’s nothing to stop a new owner with no sense of history (or a taste for mangoes) from hiring a local crew to reduce it to kindling.

Roger Hammer had visited the tree with Carl Campbell in the early 1980s, when he still ran the 120-acre Castellow Hammock Preserve & Nature Center in the Redland, as a retired “long-hair hippie” who lived for eight months in a Volkswagen van.

Hammer, an author, botanist and former Miami-Dade County senior naturalist, tells the story of visiting the country’s largest gumbo limbo in Miami to check on it after Hurricane Andrew on an assignment for the state. He found that new owners from Belize had moved in and razed it. The shade, they told him, was shrouding their impatiens.

“Somebody could buy that house and decide, ‘That thing sucks,’ cut it down and that’d be it. It’d be lost to history,” Hammer said.

Longwood, Florida, was once home to a 125-foot-tall tree nicknamed The Senator, the biggest and oldest bald cypress in the world, estimated at 3,500 years old, which president Calvin Coolidge visited and dedicated with a plaque. In 2012, a Florida woman burned it down while smoking meth.

That a 100-year-old mango tree survives in suburbia is a credit to homeowners like Rudy Kranys. The retired engineer bought the house on Klebba Lane, with the massive Haden out front, when he moved to Florida in the 1980s. He remodeled the house. But he never touched the tree.

He hadn’t tasted a mango in years, not since a co-worker offered him one while he was working on a rocket research base in New Jersey. His first thought: Meh, they’re OK.

“But they weren’t Haden mangoes,” he said.

After he bought the house, Kranys tried a mango for only the second time in his life.

“I thought, These are better than anything I’ve ever tasted,” he said.

Every year, he ships mangoes to his daughters in Indianapolis, Charlotte, New Jersey and Pennsylvania.

One year, he got a phone call out of the blue from Salazar, who was researching the Haden mango. Kranys was skeptical at first — “What’s this guy up to?” — before he realized he had met a fellow mango aficionado who told him the story of his Haden tree.

“He was just a guy who was so excited about finding the first Haden mango tree,” Kranys said.

Now Kranys is the keeper of the tree, a historical site that bears delicious fruit every year.

Bruce Matheson remembers this tree, too.

It sits on property his grandfather, Hugh — the son of W.J. Matheson for whom Matheson Hammocks Park is named — bought from the widow Florence Haden. They became neighbors, and she lived just on the other side of Douglas Road in the original wooden house she built with her husband.

Bruce Matheson, 70, remembers baking cookies for her with his mother and walking through his grandfather’s backyard (grabbing a handful of ripe, dark mulberries on the way there to hand to her). On his way, he passed the old Haden mango tree he had rarely noticed.

He’s standing in the middle of Klebba Lane on a recent Friday afternoon, squinting his eyes as he tries to see into the past.

He motions to a pair of houses across the street that sit on property that used to be where John and Florence Haden’s house was. Between them, there is an old mango tree that has been severely cut back, but a developer made the conscious decision not to cut it down, even though it is less than three feet on either side from the new houses.

For years, Matheson thought maybe this was the original tree.

That is, until Dr. Noris Ledesma arrives.

Ledesma, who became curator of tropical fruit at Fairchild after Campbell left, hugs Matheson when she meets him in the middle of the road, then turns to the tree on Klebba Lane, the reason I asked them to meet here today (she for her expertise, Matheson for his remembrances). With us is Jorge Zaldivar, who helped start the months-old email chain with other fruit tree experts.

Before any of us realize it, Ledesma is climbing the tree.

She’s hopped up between the split trunk and reaching for three softball-sized mangoes, which she carefully plucks and hands down to Matheson. She hops down, holds the mangoes to her nose and breathes in their scent as she appraises the tree.

“This is a tree that’s been here for at least 100 years,” says Ledesma, [author of more than 30 academic journals](#) and contributor to eight different books on tropical fruits. “This tree has been here a long time.”

Looking at the branches, she can tell it has survived several hurricanes. The hurricane of 1926 would have blown in west, right to left, from the bay, and the tree leans to the left.

“This has been through three or four hurricanes, maybe more,” she says, placing her hand on the trunk and looking up into the canopy.

Storms have toppled the tall branches. South Florida’s limestone ground has forced the roots into a ball that protrudes from the surface. It’s essentially a 25-foot bonsai, she says, older than it looks to the untrained eye.

She holds one of the mangoes in her hands and feels its weight.

“This was the discovery that changed the history of mangoes,” she says. “This mango helped to create a culture of mango lovers in South Florida. ... This is a part of our heritage.”

Ledesma has stood under the canopy of 300-year-old Indian mango trees in the shadow of the Himalayas. She’s a scientist but also a romantic and a self-described “mango maniac.” And when she looks at the Haden, she sees thousands of years of history that led to this improbable discovery: “This mango has the blood of the mangoes that came here with the pirates.”

What she isn’t is a clairvoyant. Although core samples could prove the age of this mango tree, no one can say with certainty it is the single mango tree that started it all. The evidence is overwhelming but circumstantial.

As I drive her back to her office at Fairchild, she points out smaller mango trees around the neighborhood. It’s clear, she says, that the Hadens’ discovery inspired others to plant clones of a mango unlike anything anyone had seen in Florida.

What John and Florence Haden started more than 100 years ago doesn’t end with a single tree.

“The original Haden is not gone,” Ledesma says. “It’s all around us.”

Mango Tango fruit smoothie prepared at Spykes Grove’s Fifty Cal Cafe in Davie, Florida. BY CHARLES TRAINOR JR.

Carlos Frías: [305-376-4624](tel:305-376-4624), [@Carlos_Frias](https://www.instagram.com/Carlos_Frias)

Correction: Roger Hammer is an author, botanist and former Miami-Dade county senior naturalist, not an environmental lawyer.

The 28th Annual International Mango Festival

The 28th Annual International Mango Festival may not be held this year due to the closure of the Fairchild Tropical Botanic Garden and the Government's 'Stay-at-Home' and 'Social Distancing' Orders issued in response to the COVID-19 Virus outbreak. An update on this event will be provided in the June/July issue of the FGSWF Newsletter.

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Bruce Matheson holds a Haden Mango along with Dr. Noris Lesdesma, Curator of Tropical Fruit from Fairchild Tropical Botanic Garden at the site of what could possibly be the first Haden Mango tree in South Florida. C.M. GUERRERO. CMGUERRERO@ELNUEVOHERALD.COM

Fighting Citrus Greening

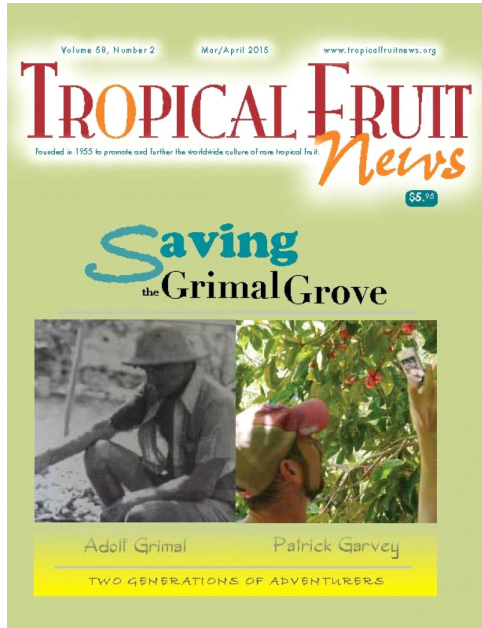
In Dr. Jawwad Qureshi's presentation March 10 at the Bonita Springs Tropical Fruit Club he referred to 435 Oil, a Drexel Chemical Company product, which is sold in a minimal amount of five-gallon bulk [two 2½-gallon containers]. The oil is 98.8 % mineral oil which is used in solution [diluted at 2½ Tablespoons per gallon of water] as a floral spray. Mineral oil, available at grocery markets and pharmacies, can be substituted and sprayed on citrus every two weeks to combat Leaf Miners and Asian Citrus Psyllids (which carries the bacteria which infects the citrus trees with Huanglongbing or HLB). Dr. Qureshi also referred M-Pede, an insecticidal soap, [retailing for about \$125US per 2½ gallons] that can also be used, in a similar concentration, as a floral spray to help combat this citrus tree disease. Micro-nutrients and neem oil can also be mixed with either 435 Oil or M-Pede. It is recommended that these insecticides not be applied after September each year as it may affect the quality of the citrus fruit, thus limiting the effectiveness of these insecticides.

Selective predatory insects (i.e., certain spiders, two varieties of ladybugs, lace wings and 'mealybug destroyer') can be introduced into citrus grove, to consume the Psyllid eggs and nymphs. The difficulty with most predatory insects is that they tend to migrate away from the groves in favor of other plantings. 'Tenting' of citrus trees, either individually or in groups is another method used to protect citrus trees from the Psyllids.

Note: There is no known cure for Citrus Greening. Some success has been claimed by club members who water daily and 'heavily' fertilize their citrus trees.

Saving Grimal Grove

On Sunday, February 23 Lisa Hare stopped in at Grimal's Grove on Big Pine Key. She met with Patrick Carvey who told her that he has about given up attempting to preserve the Grove and has place the Grove on the Market to be sold. It is a shame that it's future is still impearl even after two persons tried to save it.



The Legend Begins in the Mid 1950's . . .

Adolf Grimal, a Lithuanian American, was an inventor, engineer, amateur filmmaker, and gardener. He left his life in Detroit for a life of adventure, ingenuity, and solitude. He traveled across the wilderness of America observing nature. He continued his journey until he reached what he felt was his destination, the Florida Keys, where he decided to settle on the unpopulated Big Pine Key, ***A Refuge for a Recluse***. At the time he was primarily experimenting with underwater three-dimensional film, but an even older hobby would ultimately define the man. Grimal, an avid gardener up north, would spend the rest of his years working the land to create an unparalleled tropical fruit grove.

Grimal carved reservoirs and waterways from solid rock. He raised the elevation by pouring 40 raised beds of concrete. He imported tons of rich soil from the mainland in order to create viable planting conditions for his collection of tropical fruit trees. To supplement infrequent rains, Grimal dynamited large catchment basins to store water. His irrigation system, a labyrinth of underground piping, connected six cisterns, wells, and pools. He experimented by creating microclimates for the various plants he acquired from his travels around the world. Professionals from the USDA, the University of Florida, and tropical parks frequented this rare creation. The ***Old Man and the Grove*** was already becoming a legend in the eyes of tropical fruit enthusiasts and his grove had been coined the *Garden of Eden*.

By the time he died in 1997, Grimal was renowned worldwide for his remarkable achievement. However, he died with a fear that no one would carry on his mission at the Grimal Estate. His fears became a fact since his family trust was unable to manage it, and shortly after his death sold it. The new owner was also unable to manage it and after years of misuse by tenants, vagrants, and drifters, Monroe County put a lien on the property and this historical landmark was all but consumed by overgrowth and invasive plant species.

All was Not Lost!

Fifteen years later a government worker by the name Patrick Garvey stumbled upon the grove while working on a food empowerment program he was creating. By this time, county fines on the decaying property had topped \$850,000. Without any promise of return, he quit his job to save the old grove. With support from some friends and family, he invested thousands of hours and capital into planning a restoration endeavor, all while confronting compounding legal issues that came along with the property. In November 2013, Garvey overcame many initial obstacles and was able to purchase the property. It was a risky endeavor, but it was one he was willing to take to save an historic property and ignite a local food movement.

Over the next two years he toiled on the property, petitioned the county, enlisted help, managed volunteers, wrote grants, redesigned the gardens, and researched the history. With a vivid imagination, a stubborn work ethic, and an inclusive spirit, he was able to pull off what many said was impossible. He devoted his life and sanity to reclaim Grimal's paradise.

Today, as it is emerging as a profitable enterprise, it has evolved into something far greater than what many initially saw as simply a preservation project. Three years ago the grove was a thorn in the side of the community: a place for vagrants, drugs, violence, invasive trees, and a dumpsite. Now it is a community resource for local agriculture, the arts, education, and events.



Fruits which Ripen in April & May



Avocado, banana, Barbados cherry, blackberry, black sapote, canistel, cherry of the Rio Grande, coconut, custard apple, fig, grumichama (May), guava, jaboticaba, jackfruit, loquat, mango (early varieties in May), miracle fruit, mulberry, monstera, muntingia, natal plum, nectarine, mulberry, miracle fruit, strawberry tree, papaya, pineapple (early), sapodilla, Surinam cherry, tamarind, and white sapote.

APRIL / MAY CALENDAR OF EVENTS

With the current National Health Emergency, individual events may be cancelled. Please check with the individual sponsors before attending.

- Friday, April 3 Ruskin edition of the **SWFL Small Farmers Network** at the UF/IFAS has been Cancelled. All UF/IFAS Workshops have been Cancelled through April 30.
- Tuesday, April 7 Monthly Meeting: **Caloosa Rare Fruit Exchange**, 7:00 PM, Fort Myers-Lee County Garden Council Bldg., 2166 Virginia Ave., Fort Myers.
- Tuesday, April 14 Monthly Meeting: **Bonita Springs Tropical Fruit Club**, Tasting Table 6:45 PM, Meeting 7:00 PM: Revive Wellness Center, 3521 Bonita Bay Blvd., Bonita Springs. On Route 41, opposite Terry Drive, turn onto Bonita Bay Blvd. Bear left before the entrance to the gated community, then turn right into the Bonita Bay Executive Center.
- Wednesday, April 15 Monthly Meeting: **Rare Fruit Council International, Miami**, Cancelled
- Tuesday, April 21 Monthly Meeting: **Collier Fruit Growers**, Formal Meeting 7:30 PM: Tree of Life Church, Life Center, 2132 Shadowlawn Drive. Mr. James Farwell of Farwell Fruit Farm will speak. CFG will attempt to broadcast the meeting live on Facebook.
- Thursday, April 23 **UF/IFAS Collier County Extension - Beyond Basic Produce Food Safety: A Hands-On Analysis**: Cancelled , email Jessicaryals@ufl.edu for more information.
- Friday, April 24 **UF/IFAS Collier County Extension - Build Your Own Farm Food Safety Plan Workshop**: Cancelled, email Jessicaryals@ufl.edu for more information.
- Tuesday, April 28 **UF/IFAS Collier County Extension - PSA, FSMA Grower Training**: Cancelled
- Please note** that the UF/IFAS Collier County Extension Office on Immokalee Road in North Naples as canceled all group activities through April 30, The Staff will be available via telephone, text messages and emails to answer any specific questions until then.
- [Tuesday, April 28 BSTFC Workshop: Bonita Springs Tropical Fruit Club, Workshop starts at 7:00 PM: Revive Wellness Center, 3521 Bonita Bay Blvd., Bonita Springs. On Route 41, opposite Terry Drive, turn onto Bonita Bay Blvd. Bear left before the entrance to the gated community, then turn right into the Bonita Bay Executive Center.](#)
- Friday/Saturday, May 1 & 2 The 30th Annual Farm Safety Day, UF/IFAS SWFREC, 2685 FL-29, Immokalee FL, Detailed information including registration is attached or visit: <https://swfrec.ifas.ufl.edu/docs/pdf/events-agendas/2020-05-0102-Farm-Safety-Day.pdf>
- Tuesday, May 5 Monthly Meeting: **Caloosa Rare Fruit Exchange**, 7:00 PM, Fort Myers-Lee County Garden Council Bldg., 2166 Virginia Ave., Fort Myers.
- Tuesday, May 12 Monthly Meeting: **Bonita Springs Tropical Fruit Club**, Tasting Table 6:45 PM, Meeting 7:00 PM: Revive Wellness Center, 3521 Bonita Bay Blvd., Bonita Springs.
- Wednesday, May 13 Monthly Meeting: **Rare Fruit Council International, Miami**, 7:00 PM in the Science Village Classroom next to the Butterfly Exhibit at Fairchild Tropical Botanic Garden, 10901 Old Cutler Road, Coral Gables.
- Tuesday, May 19 Monthly Meeting: **Collier Fruit Growers**, Formal Meeting 7:30 PM: Tree of Life Church, Life Center, 2132 Shadowlawn Drive. Mr. Har Mahdeen will speaker on hybridizing new Annona varieties. CFG Will attempt to broadcast the meeting live on Facebook.
- Tuesday, May 26 BSTFC Workshop: **Bonita Springs Tropical Fruit Club**, Workshop starts at 7:00 PM: Revive Wellness Center, 3521 Bonita Bay Blvd., Bonita Springs.
- Saturday, June 6 **The Mango Grafting** Class with Dr. Noris Ledesma, Dr. Stephen Brady, and Jorge Zaldivar is still scheduled. Participates will be notified as to its possible cancellation by email.

PLEASE NOTE: The Southwest Florida Fruit Growers Newsletter will continue to be published every other month throughout the continuing National Covid-19 Emergency. The next issue will be June/July 2020.



Bonita Springs Tropical Fruit Club



Feel free to join BSTFC on **our Facebook group**, where you can post pictures of your plants, ask advice, and find out about upcoming events!

<https://www.facebook.com/groups/BSTFC/>

Link to the **next meeting**: <https://www.facebook.com/groups/BSTFC/events/>
Meetup Link (events/meetings sync with the calendar on your phone!):

<https://www.meetup.com/Bonita-Springs-Tropical-Fruit-Club/>

Our **Website** (and newsletters with tons of info):
<https://www.BonitaSpringsTropicalFruitClub.com/>

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The Collier Fruit Growers Inc. (CFG) is an active organization dedicated to inform, educate and advise its members as well as the public, as to the propagation of the many varieties of fruits that can be grown in Collier County. The CFG is also actively engaged in the distribution of the many commonly grown fruits, as well as the rare tropical and subtropical fruits grown throughout the world. CFG encourages its members to extend their cultivation by providing a basis for researching and producing new cultivars and hybrids, whenever possible. CFG functions without regard to race, color or national origin.

REMEMBER TO RENEW YOUR MEMBERSHIP!

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The Collier Fruit Growers monthly meetings are now broadcast live on Facebook at 7:30 pm on the third Tuesday of each month. The meetings are posted on the 'Collier Fruit Growers Group's Facebook page. Access the page by requesting to be a Member.