

## Avocados and Tropical Fruits

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The list of tropical fruits of commercial value in Florida today, stated in order of their present value is, Avocado, Pineapple, Mango, Banana, Guava and Coconut. To these may be added some day Cherimoya and Mangosteen, and possibly Litchi, or some naturalized hybrids of these families.

Avocados are divided into three distinct types, or families, West Indian, Guatemalan and Mexican, named from the locality in which they are most largely found. The first class embraces practically all the fruit which we see in the summer and autumn markets, and thrives on the tropical coastal plain. It will withstand very little cold, and the seed is often loose in the cavity, which makes it a poor shipper. The Guatemalan is found on the tablelands of Guatemala, where the climate is cooler than the coastal plains, yet where severe frosts are not frequent. Its season of ripening is opposite that of the former type, being winter and spring. The seed is always tight and the rind is thick, hard and woody; often approaching the nature of a shell, which characteristics tend to make it an ideal shipper. However, in Florida we have practically sea level conditions, and our location would be suited to the West Indian type, if we had no frost. Trees brought down to the coastal plain from altitudes of 3000 to 5000 feet find conditions to which they are unaccustomed, and which do not entirely suit them. We have many excellent Guatemalan varieties which are producing fine crops of valuable fruit, and yet we believe that we are going to develop a new strain which will still better suit Florida conditions. The hot sun scorches the Guatemalan trees more or less, and the outside of the fruit suffers from the attacks of fungus, which tend to render it unsightly in appearance, even though it may not go so far as to injure the meat.

It has been discovered, accidentally, by planting seedlings from Guatemalan trees growing here in close proximity with the West Indian, that the latter cross pollinize the former, and that the resultant seedlings almost invariably prove to be hybrids. From these chance hybrids some very promising trees are being selected which combine the winter fruiting habit of the mother with the adaptability of the father to sea level conditions. Prof. Fairchild has been naming these seedlings, as they have fruited, and been pronounced worthy, according to their origin; Winslowson, the best seedling from the Winslow; Collinson from the Collins; Collason from the Colla; Taylorson from the Taylor; and so on. Not all have shown great merit, but several have, and Mr. Simmonds at the Miami Experimental station is artificially cross pollinizing, working the natural hybrids back on the parents to form three quarter casts, quadroons and octoroons, so that we may look forward for great improvement in our Florida avocados in the near future. Old trees are very easily top-worked, and at any time that a new variety is developed which we think worth while we can transform our bearing trees at the expense of two or three crops, into the new type.

The third type is found most extensively growing in the tablelands of Mexico, where the altitude and latitude result in exposure to frost, and even occasionally ice and snow. This type is more hardy than the orange and is usually rather small in size with a very thin skin, and often a loose seed, while it is usually very rich in fat. They are splendid, vigorous growers in Florida, but seem inclined to be rather shy bearers.

With regard to stocks, we find the Mexican quite un-adapted to our sandy or rocky coast soils, and the Guatemalan a close rival to the West Indian, for some localities, though it is far from having established its superiority as some people claim. The Mexican has not been tested out in the custard-apple hammocks, but the West Indian thrives wonderfully there and unless, as some think, it is better adapted to withstand overflowed conditions, there is no reason to consider a change to the Mexican. In central and northern Florida on the clay subsoil lands the latter thrives, and is probably the best stock for that region. Mr. Sebring will tell of avocado growing on custard-apple hammock, and Mr. Carrier will treat the same subject on the sandy soil of the interior.

Twenty years ago pineapples stood at the head of the tropical fruit industry in Florida, thousands of acres along the east coast, Florida Keys, and some small acreages under shed in the interior were producing valuable crops. Various causes combined to ruin the industry, from discriminating transportation rates, favoring Cuba, to soil exhaustion, and attacks of nematodes, finally winding up the past few years in deficient rainfall. Prices are advancing, soil is becoming revived by rest, and we are learning by experience many ways of remedying unfavorable conditions, and last year we had a splendid rainy season, so that a rapid increase in this industry is to be expected. Mr. Carroll Dunscombe, of Stuart, has been one of the most successful growers of pineapples during the past ten years, when the majority of the fields had been abandoned, and most of the growers had gone out of the business entirely. He writes as follows:

"Pineapple growing is again taking in new life in this section as most of the old faults have been done away with and new stock introduced that is enabling the growers to again produce profitable crops. The crop on the East Coast has advanced steadily in quantity since 1919, and this year's crop is expected to run around 75,000 crates, which will be good sized fruit. Heavier plantings this summer are anticipated and it is expected that the volume will steadily increase.

"Disposition of crop: In the past few years there has been a movement to utilize a portion of the crop through manufacturing plants. At Lake Worth a glaze plant has been established, while at Stuart a large cannery is in operation, both of these plants expect to use considerable locally grown pines this summer. It is exceedingly important for this industry that some provision be made for taking fruit off the market in times of poor prices, as the fruit can be canned and sold to a trade that wants this quality of pineapple and cannot obtain it elsewhere. The Johnson factory in Nassau was the only other plant using this hard white pineapple; these people had a good business but shut down due to their inability to obtain fruit. This fruit does not compete with the Hawaiian pineapple, the Florida pine being a harder fruit of much higher flavor and is used to a great extent in the soda fountains and confectionery trade. Cuba is steadily increasing her output and it is up to the Florida growers to make some preparations to care for part of their crop should it come in direct competition with the Cuban crop, due to a late season there and an early season in Florida.

"Profits in pineapple growing: While there is a fair profit in growing pineapples there are several other angles to the situation that make these profits greater than the ordinary examination would reveal. One of these is the growing of grove trees, either citrus or avocados, among the pines. By planting trees in a young pineapple field a grove of citrus or avocados can be matured with almost no cost and without the long delay waiting for returns, incident to ordinary planting as the pineapples start to yield a revenue in twenty-two months, and by the time the pines are done the grower has a large tree bearing fruit in paying quantities. Another method is to buy a tract of land at a low figure near some growing Community, plant it in pineapples and hold it for ten years, and at the expiration of this time, if the land was well located, the grower has a tract good for a subdivision and which has cost him nothing to carry.

"Care and cultivation: Probably there is no crop grown in Florida that is as free from insect pests as is the pineapple. With good healthy stock planted on new land the field should mature about ten crops. The only insects that bother are red spider and mealy bugs. Both these are only numerous during dry periods and a mixture of about 800 pounds to the ton of tobacco dust in the spring fertilizer will generally keep these down. It is not necessary to spray or fumigate, the only insecticide being used is the fertilizer mixture as above stated. Three or four cultivations a year for young pines and cleaning out the walks twice a year in the old pines is about all the cultivation necessary."

The Mango thrives particularly well on the high sandy ridges along the coast, and whenever we have a dry spring we may reasonably expect a good crop) of fruit. In India the trees bloom and mature their crop wholly in the dry season when no rain falls, and we find that much rainfall causes attacks of fungus diseases, which destroy the young fruit. In Indochina there is a less pronounced dry season and the Chinese strain of mangos (to which belongs the Sundersha, Philippine and Saigon) are, therefore, more resistant to fungus and are likely to produce full crops in spite of the wet spring. The fruit of this branch of the family lacks the bright color of the Indian strain, and the rich musky flavor and aroma. Mr. Simmonds has hybridized them and We hope will produce a strain possessing the beauty, flavor and aroma of the Indian, with the fecundity of the Chinese. A natural hybrid, chance seedling of Sundersha (probably fertilized by Haden or Mulgoba, which were adjoining trees) promises to be a valuable addition to our fruit industry. It originated on the property of a colored man named Brooks, and is known as Brooks' Late. For three successive seasons it produced a very late crop, ripening in October, and some hanging on into December. The tree was neglected, and practically destroyed, but a tree top-worked from it produced a late crop Fast year, coming on in September. It is of excellent quality with red cheek like the male parent, and some aroma, good size and free from fibre.

The subject of bananas will be discussed by Mr. Shanibarger and Dr. Harris quite exhaustively.

The Guava is one of the easiest grown of all tropical fruits in Florida, seeds planted by cattle or birds taking root, and holding their own with the native growth in the fields, and by the roadsides. It is too soft to stand long shipments, and hence must be used in the fresh state locally. Hundreds of bushels are going to waste every year now for want of a market to utilize them. The same is true, by the way, of the common seedling mango.

The Coconut palm is well adapted to the coast from Santa Lucia inlet around to the Caloosahatchee River on the west coast. Heretofore the nuts have been used entirely for food, planting or souvenirs, but now the Palm Beach Post announces the purchase of a tract of muck and marle land near Delray by Mr. C. A. B. Zook, President of the Pennsylvania Soap Company, of Lancaster, Pa., to be planted to 120,000 coconuts. This grove is to supply oil for soap making.

The Cherimoya stands with the eight tropical fruits which may be of commercial value in Florida. It ranks with the choicest fruit in the world in quality, and its home is in the American tropics, near the equator, but at a great altitude where the climate is cool. Brought down to sea level in Florida it seldom produces any fruit at all, and never more than one or two in a season, even when trees are quite old and well grown. The custard-apple, which makes such forests around Lake Okeechobee, is as closely related to it as the orange is to the grapefruit. So is the sugar apple, which is so productive along the sandy and rocky lands of the coast. In order to get a fruit which will combine the qualities of the Cherimoya and the productive habit of the sugar apple, Mr. Simmonds, and before him Mr. Wester, have been hybridizing the two, back and forth, and hope in time to get something valuable.

The Mangosteen has been said by many travelers to be the finest fruit in the world (and the same has been said of the Cherimoya, for that matter). At the Miami Experimental Station there are rows of trees of this family (*Garcinia*), thriving well and perhaps some day the problem of producing a Mangosteen in Florida may be solved. At the present it is considered impossible to fruit it any great distance from Malay peninsula, Trees planted in Florida have taken ten years to make ten leaves. Something must be done to infuse vigor, and adapt it to Florida conditions. The British have tried to fruit it in Jamaica and many of their tropical American possessions, but have failed. Our experience with the Chinese Lichi has been little more encouraging, although it has been fruited at Oneco.

Pooler I would like to hear from Mr. C. S. Donaldson, of Avon Park.

Donaldson: I had no written report on this subject because I am simply a novice. We look to the Avocado growers for counsel and advice. Mr. Beach has given us the results of many years' experience and so has Mr. Niles of Lucerne Park. We have gotten much good information from Mr. Krome and others.

I wish that information was gathered together and assembled in book form where one could turn for counsel and suggestions. One of the troubles in the Avocado industry is that the authorities are pretty much of the same opinion. The way to get a first class paper or book is to first get up a real controversy.

My experience covers only six years on the high sand ridges of South Florida, which is essentially different from this region. I have some experience which coincides with that of these authorities who have blazed the way. My little developments in planting at the outset was in the matter of digging very deep holes for the trees. I had seen in the North, the blasting of holes for the tree, in order to break up the soil, and encourage the roots to travel down to more moisture and more food. On our high lands blasting does not do any good, so I undertook to dig very deep holes, five feet down to the red clay, through the covering strata and the extra cost has well borne out the expense. The

result has been very satisfactory.

The fertilizer schedule, given by Mr. Morley last year, I have cut just in half. In other words there is a distinction to be made between citrus and avocados. On our sand hills, the root system of the rough lemon life is very vigorous, and it travels out easily. The avocado has a more tender root system and I had an idea it would not travel so readily downward where I wanted the roots to go quickly. The avocado, of course, sends down a tap root, but I was anxious to encourage a quick growth in the tap root and it turned out that way. I dug very deep holes, five feet deep and four feet across and in filling in, used top soil and I dug the hole deep enough to encourage the root growth to go down to get plenty of water and what extra food they might gain. Clay is always richer in plant food than sand. You will see then the desirability of getting the avocado root growth down into the clay soil as quickly as possible.

I noticed in the Florida Grower recently an article by Lindley Heimberger, in which he says to take advantage of all that nature offers to us and that was my motive in this experiment.

I am firmly convinced of the necessity of irrigation. On the sand hills we cannot grow avocados for commercial purposes without irrigation. I have an avocado tree that is twenty-seven years old and is the oldest one in the country. I have owned it twenty-three years. I bought the place from an old German who had started it. Finding the avocado popular on the market, I commenced to play in the avocado field. The tree did not fruit until it was twenty-three years old. The tree started to bear a little more heavily, a little over a year ago. It is located right next to the cottage of my superintendent and he changed the pump and all the waste water ran there. Immediately the tree jumped from fifty fruits to near 700.

It showed to me what a great water lover the tree is. In connection with this, I have a brother in Los Angeles who told me when I met him in Washington this spring that he had an avocado tree that in 1914 yielded \$400 worth of fruit, I asked him in particular about the water and jotted down what he told me. When the fruit begins to set, the ground is flooded to six inches twice a week for three months and that old tree is the most profitable in the whole country, Irrigation appears to mean so much in the growing of avocados that I want to bring it particularly to your attention.