

Observations on Avocado Production Made From a Trip to Florida and Central America in February and March of 1927

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The writer recently took a two months trip embracing Florida and parts of Central America, made possible by invitations to judge citrus and sub' tropical fruit displays at the South Florida Fair at Tampa and to study certain banana production problems at the Tela division of the United Fruit Company, Honduras, Central America. The trip afforded an opportunity to recheck the survey of the Florida avocado industry made in 1926 and to study the effects of hurricanes and frosts which have occurred since that time. It also made it possible to gain some idea of the possibilities of commercial avocado culture in tropical America.

The material presented in this report is partly the result of personal observation, especially the portion referring to Florida, and partly the result of interviews with horticulturists and shippers interested in and familiar with avocado culture in tropical America. For the information given in this portion of the report, I am chiefly indebted to J. R. Mathers and Hamilton Michelsen of Miami; to Dr. Wilson Popenoe, for many years agricultural explorer for the United States Department of Agriculture, now superintendent of agricultural experiments for the United Fruit Company; to W. H. Fielding, wharf superintendent at New Orleans for the United Fruit Company and to Joseph Chalona of the Joseph Chalona Fruit Company of New Orleans.

The Florida Avocado Industry

North and Central Part of the State—As indicated in a previous report the commercial avocado acreage in north and central Florida is almost negligible, consisting of a total of something less than one hundred acres, mostly in the form of small scattered plantings, usually with lake frontage to the north to provide frost protection. Several of the largest plantings are located on islands or peninsulas. Dooryard trees or groups of trees of both seedling and budded varieties abound, however, being found in nearly all of the citrus sections.

The cold weather of the past season, consisting of three frosts in January, the 1st, 11th and 15th, caused widespread and severe injury to avocados in all parts of central and north Florida. Most of the commercial plantings, principally of West Indian varieties, were killed back to branches 4 or 5 inches in diameter, in many cases to the ground even with large trees. All West Indian trees suffered in like degree. By far the majority of the dooryard trees of Guatemalan varieties were also badly injured and even Mexican seedlings were considerably damaged. The greater resistance of the Mexican and Guatemalan varieties was very striking, in numerous cases the Mexican seedling trees standing the cold fully as well as oranges.

What little orchard heating was done was largely ineffective and it is certain that the Mexican race is the only one safe to plant either as dooryard trees or for commercial purposes. It also seems clear that commercial development with avocados in these parts of the state will not occur for many years to come, if ever, and can never be expected to be permanently successful with anything other than Mexican varieties.

Southwest Florida—The development of a commercial avocado industry in this section has been slower than would be expected in view of the suitability of climatic conditions which in ordinary years are fully as mild as in any part of the state, permitting the growing of mangoes, papayas, bananas, pineapples and other tender subtropicals. The two factors which seem to be chiefly responsible for the lack of development in this section are lack of transportation and the necessity for drainage, which can be accomplished only by extensive installations.

What commercial plantings of avocados there are in this section, not to exceed 150 acres total, are principally West Indian seedlings, with a small acreage planted in recent years to budded varieties.

This part of the state was subjected to unparalleled climatic vicissitudes during the past year, suffering from the famous September hurricane and later from the coldest winter weather on record since 1895. Almost without exception the older bearing trees were badly broken and then severely frosted. The young trees escaped serious wind damage only to be killed to the ground by the freeze. The industry was given a setback from which it will be slow in recovering; in this respect suffering more than any other part of the state. It will certainly be years before any real interest in commercial planting will be developed. And in addition, until extensive and costly drainage projects are installed the industry cannot undergo any marked expansion on account of the very limited amount of land not subject to periodic floods and high water table.

The Everglades Region—No bearing acreage of avocados occurs in this part of the state, the extensive plantings of recent years having been prevented from reaching bearing age by floods in 1924 and frosts every year since. The remnants left, some 150 to 200 acres, were completely destroyed by the unparalleled flood which accompanied the September hurricane, and the cold weather of the past winter.

On account of its proximity to West Palm Beach and Miami new plantings will undoubtedly be made, possibly on an extensive scale for subdivision promotion.

It is certain, however, that all plantings are destined to failure until adequate drainage, is installed accompanied by provision for controlling flood waters, and this seems to be a long way off.

Moreover, frost damage is a factor which must be reckoned with in the Everglades region, as the combination of drainage and peat soils furnishes conditions favorable to the occurrence of radiation frosts, which have come with increasing frequency in recent years. On the other hand, these conditions also favor successful orchard heating. It is, therefore, my opinion that eventually there may be extensive plantings of avocados in the Everglades region, protected against frost by the use of orchard heaters, and maintained under great drainage and water regulation projects. Such will not occur for many years to come, however.



One of the Oldest and Largest Avocado Trees in Florida.
Near Frost-proof South Ridge Section

The Southeast Coast—The commercial Florida avocado industry is located in this region and occurs nearly altogether in the area extending south from Miami to Homestead, some 40 miles. From an acreage said to have reached 3,000 or more in 1923 and 1924 the commercial plantings in this part of the state have shrunk to not to exceed 600 acres, 500 probably being closer to the actual situation. These losses, mostly of young acreage, were occasioned mainly by three factors, the flood of 1924, frosts two years in succession and subdivision activity, and did not materially affect the bearing acreage which has never exceeded 400. In 1926 the bearing acreage in this region is estimated to have been about 350 with some 150 or 200 acres of young trees about to come into production.

This area, involving 85 per cent or more of the commercial production of the state, was the center of an unprecedented series of hurricanes in the summer and fall of 1926, one of which far exceeded in violence anything on record in tropical America. Recorded wind velocities of 130 miles an hour were obtained before the instruments themselves were blown away. The first of these storms, with a wind velocity of 80 miles an hour, occurred in July and damaged considerable fruit which was just ready to pick. The second and most severe, occurred in September and virtually destroyed the entire remaining crop, with the exception of what was harvested and shipped in the interim. The third, of lesser severity, occurred in October and blew down many trees which had been propped up after having been broken and blown down by the September hurricane.

The principal damage was caused by the September hurricane, which almost demolished many of the finest and oldest orchards and caused heavy property damage from Homestead to Palm Beach and resulted in the loss of many lives and injury to many more. The violence of this hurricane was almost inconceivable and its effects remarkable, to say at least. Scores of barges and boats were washed ashore and left stranded blocks inland. Huge waves dashed entirely over the reefs skirting the east coast and completely inundating the towns and cities located thereon. Hundreds of small buildings collapsed or were crushed by the force of the wind and thousands of large forests were snapped off or uprooted.

All large avocado trees, ten years or older, were broken badly, in most cases necessitating cutting back to stumps. Many were split down to the main crotches. On the lime-rock soils hundreds were uprooted. The trees thus affected were mostly seedlings, although some were budded varieties.

The younger and smaller trees, practically all commercial plantings of budded varieties, escaped serious breakage, the damage consisting chiefly of defoliation and salt water burning. The ocean spray was carried inland for miles and severely burned the foliage of all tender plants. Fortunately heavy rains followed the hurricane, probably greatly minimizing the salt water injury.

It is certain that the older bearing trees cannot recover for 2 or 3 years and will not resume bearing to any appreciable extent before that time. On the other hand the younger trees may be expected to recover within a year or two and will bear some fruit during the present season. At the time I was there many of them were blooming and putting out vigorous new foliage. The remarkable recuperative powers of trees growing in the greenhouse Florida climate was evident from the fact that large avocado trees blown down during the September hurricane, and blown down again in the opposite direction by the October hurricane were making a vigorous growth the following February.

Most of the older acreage will undoubtedly be rehabilitated and will be back in good bearing within 3 or 4 years at most. All of the younger acreage will be back to normal within 1 to 2 years.

The best data available concerning past production and probable future yields is as follows:

<i>Crop year</i>	<i>Crates</i>	<i>Pounds</i>
1924-25	15,000	600,000
1925-26	6,000	240,000
1926-27	estimated 9,000	360,000
	Shipped 2,000	80,000
1927-28	(estimate) 1,000 to 1,500	40,000 to 60,000
1928-29	(estimate) 6,000 to 8,000	240,000 to 320,000

There seems to be no reason why the 1929-30 crop may not equal the 1924-25 crop of 15,000 crates or 600,000 pounds.

The possible and probable futures of the industry in southeast Florida are difficult to

estimate. It seems likely, however, that within a year or two when land values have reached an agricultural plane and nursery trees are again available the industry will enter a period of expansion. Much land tied up in the recent boom will undoubtedly revert to agricultural usage. If avocados continue to be relatively profitable, considerable land now planted to citrus may eventually be planted to avocados. It is estimated that there is a total of between 10,000 and 12,000 acres of land adapted to avocado culture in the Miami region. It is not at all unlikely that eventually most of it will be planted, with a potential annual production of 3 to 4 million pounds or more.

Land values are declining from the high point reached during the boom and already there are indications of impending promotional activity along agricultural lines. The avocado will undoubtedly receive its share of attention in this connection and it is to be expected that small acreage avocado farms will shortly be exploited as a means of developing the southeast part of the state and attracting settlers.

Some planting will undoubtedly occur within a year or two, as soon as nursery trees become available. I personally look for a rapid expansion in the industry, starting in about 1930.

The industry is now based primarily on West Indian varieties with some plantings of West Indian-Guatemalan hybrids, principally Winslowson and Collinson and a few Guatemalans such as Taft, Taylor and Linda. The industry of the future in my opinion will continue to be based primarily on West Indian varieties, with some acreage of hybrids, for the following reasons:



Hurricane Damage to Bearing Avocado Grove in South Florida. In 1925 One of the Best Groves

1. The remarkable adaptation of West Indian varieties. There is no question but that the West Indian avocado is thoroughly at home in South Florida and perfectly adjusted to its environment. This is conclusively shown by its greater vigor and more certain fruiting. The Guatemalan varieties show much evidence of lack of

adjustment, being less vigorous and much more uncertain in fruiting. The hybrids seem to be more or less intermediate.

2. 2 The fact that no other section of continental United States can grow West Indian varieties, which means that eventually South Florida will have a monopoly in the production of this type of fruit for which there is an unquestioned market demand. (I expect to see Cuban competition eventually eliminated on account of dangerous insect pests.)
3. Growing the West Indian varieties gives Florida a marketing season (June 1? to December 15), when there will always be the least competition from California.
4. The West Indian avocado is already well established in the consuming markets of the country and definitely associated with Florida origin, an asset already in existence in favor of the Florida industry.
5. By growing varieties of this race the growers experience a minimum hazard from hurricane and frost damage since the crop is largely or entirely out of the way by the time hurricanes or frosts usually occur.

The best commercial West Indian varieties appear to be the Pollock, Trapp, Simmonds, Butler and Waldin.

Cuban competition has in recent years become an important problem for the Florida growers. Produced at very low costs and put up in very unattractive form, Cuban avocados have nevertheless markedly affected price levels in the markets to the detriment of the Florida shippers, who are anxious to see competition from this source eliminated.

South Central Florida—While at the present time there are few or no commercial plantings in this section, the behavior of the many dooryard trees indicates that the southern end of what is popularly termed the ridge section of central Florida, centering about Sebring and Frostproof, may eventually become an avocado producing region. If there is any part of the state adapted to growing Guatemalan varieties and possibly the hybrids, this seems to be the area. There seems little likelihood of any immediate or very extensive development along these lines, however, interest being confined largely to citrus plantings.

General Summary—There is every reason for believing that commercial avocado culture in Florida for many ears to come will be confined largely to the southeast coast region centering near Miami, with a maximum possible area of 10,000 to 12,000 acres. The industry will undoubtedly recover from its recent setbacks within two or three years and is likely then to undergo fairly rapid development, reaching its maximum expansion within ten or twelve years. It will probably continue to be based mainly on West Indian varieties with a marketing season from June 15 to January 15.

It will be many years before safe expansion can take place in the Everglades region and such may never occur. Little development can be looked for in southwest Florida for many ears. There may be some commercial development with Guatemalan varieties in the south, central part of the state but this is not imminent. Avocado culture in north and central Florida will never be commercial with anything other than Mexican varieties and this is not likely to occur in the near future. Dooryard trees will always occur in all parts

of the citrus producing regions, but these will be badly damaged periodically by frost.

Comments and Reactions—The recent visit to Florida has strengthened my conviction that the natural and logical division of the marketing season is for Florida to occupy the markets during the summer and fall months and for California to concentrate mainly on varieties which can be shipped from November to July 1. Some overlapping is bound to occur but there seems to be a natural and desirable division in the marketing season as between the two states.

I am more convinced than ever that the Guatemalan and Guatemalan-Mexican hybrids as grown in California produce fruits which are distinctively different in shipping quality and flavor from those grown elsewhere, an asset of greatest importance in marketing them. I have yet to eat a Guatemalan avocado grown in Florida which compares in flavor with the California product. They seem to be universally stronger flavored and even slightly to strongly bitter in comparison. After eating Florida grown Guatemalan fruits, I can testify that the West Indian varieties are better but far inferior to California Guatemalan fruits.

Miscellaneous Observations—Calavos were observed in the markets in Miami. They were in good condition and selling at 75 cents a pound.

The Fuerte *is* reported as clearly not adapted to culture in South Florida. None of the recent U. S. D. A. introductions have done well in South Florida.

September and October are the principal shipping months for West Indian fruits.

Due to one of the driest winters on record the mite (spider) has been worse than ever before, causing serious injury to many trees.

California avocados can be shipped into Florida without restriction, there being no quarantine regulation relating to this fruit.

The Calavo publicity has been widely used even in Florida where the sentiment is fairly strong in favor of retaining the name Alligator pear and quite caustic in regard to the term Calavo.

The Cuban Avocado Industry

Most of the avocados grown in Cuba are located within a radius of 15 to 20 miles from Havana, with a few small plantings on the Isle of Pines. The bulk of the production occurs from individual trees and scattered groups of trees rather than from plantings in orchard form of which there are only a few. Nearly all of the bearing trees are seedlings, budded trees constituting a small part of the total. Approximately 85 per cent of the acreage is in heavy production, the remainder consisting of four or five young plantings of budded trees in orchard form aggregating less than 75 acres. The total acreage if planted in orchard form would not exceed 250 to 300 acres.

Guatemalan varieties in general have failed in Cuba, the West Indian race being the only one adapted to the climatic conditions. The Trapp is reported to have succeeded only indifferently.

The season is early, May to October and only summer fruit is produced, practically the entire crop being seedling fruit. The fruit is said to be softer and tenderer even than the

Florida West Indian fruits, for which reason it does not ship and carry well.



The Primitive Type of Avocado from Which All the Other Races Are Believed to Have Arisen, Growing in Its Native Environment in the High-lands of Honduras

The best data available from the Department of Commerce and commission men in New Orleans indicates a total annual production of approximately three million pounds, the greater part of which goes to New Orleans, either direct by steamship or indirectly via Key West in carlot shipments. New York is also an important market, followed by Tampa and Miami.

Average shipments during the height of the marketing season (May to October) are as follows:

New Orleans, 1,500 to 2,000 crates per week.

New York, 800 to 1,000 crates per week.

Tampa and Miami, each 500 crates per week.

The fruit is shipped in short pineapple crates of which there are two sizes, holding 60 and 90 pounds respectively. Practically all the water shipments are handled by the United Fruit Company.

The principal dealers handling Cuban avocados in New Orleans are the Joseph

Chalona Fruit Company of 231 Poydras Street, handling from 75 to 80 per cent of the importations, and John Bomira of 200 Poydras Street, who handles the rest of the crop.

The range of prices reported by them and also the U. S. Department of Commerce is 75 cents to \$4.00 a crate with an average of \$2.00 to \$2.50 for the 90-pound crates. The fruit frequently retails in New Orleans at five cents each or two for fifteen cents.

New Orleans is said to be the greatest avocado consuming center in the United States, taking most of the importations. Shipments are made from New Orleans as far north as Chicago and to other points in the Mississippi Valley, and as far west as San Antonio, Texas.

The crop is handled in New Orleans on a straight commission basis.

All reports indicate that the Cuban producers have not made money and that there is little incentive to expand the industry, even though Cuba possesses several distinct advantages over Florida. These seem to be the following:

1. Lower production costs (cheaper land and labor).
2. Better soils (less fertilisation).
3. Less frost hazard.
4. Earlier season.

There is always the imminent possibility, however, of the introduction of the avocado seed weevil which would inevitably result in the exclusion by quarantine of Cuban avocados from the markets of the United States.

Reports on the damage caused by the hurricanes of 1926 indicate that the 1927 crop will not be greater than 25 per cent of normal, possibly not over 15 per cent, and that the crop should be back to normal in another season or two at most.

Avocados in Other West Indian Countries

Avocados of the West Indian race can be grown in practically all of the West Indies, there being considerable areas where soil and climatic conditions are suitable. Unless permitted import into the United States, however, there will never be much incentive for commercial development, consumption by the native populations being inconsiderable and their buying power too low to offer much hope of attractive financial returns.

Aside from Cuba, the principal islands offering commercial possibilities for avocado culture for export to the United States are Puerto Rico, Jamaica and Santa Domingo, none of which are at present quarantined for avocado pests. The general situation is similar to that in Cuba, however, development on any considerable scale being regarded as too hazardous to warrant the effort. The fear of quarantine measures, justified or not, will probably always deter American and foreign capital from embarking in extensive avocado developments in tropical America. Some quantities will doubtless be grown both for local use and foreign export but probably never large amounts. In this connection it should be remembered that avocado culture in these regions involves not only the danger of quarantine on the part of the United States but also the practical certainty of local export taxes and the likelihood of import tariffs as well.

In spite of these general conditions, however, some experimental work is being done with avocados in most of these countries, especially in Puerto Rico and Haiti, in the

latter country with Guatemalan varieties growing in the higher areas. Varieties of this race do not appear likely to succeed, although in all probability the West Indian and hybrid varieties will do very well indeed.

Avocados in Central America

Central America is undoubtedly the home of the Guatemalan type or race of avocados and probably also of the primitive form or prototype from which all the races have arisen. Dr. Wilson Popenoe believes he has discovered this primitive form and I had the pleasure of seeing one of the trees which was reached, however, only by climbing through the tropical forest to an elevation of something more than 1,000 feet. The fact that in the tropics wild trees of the Guatemalan race are found only in the highlands and do not succeed at sea level is fairly conclusive proof that the avocado is strictly subtropical in character, rather than tropical. The only type which succeeds at all at low elevations is the West Indian, which is undoubtedly a tropical form.

Both races require almost perfect drainage, however, the wild trees never occurring except in places where the soil is naturally well drained and plantings invariably failing on lands not well drained. In this respect it is certain that the avocado is even more sensitive than most citrus species, failing where the citrus trees do tolerably well. Most of the lowlands in Central America are poorly drained, for which reason even the West Indian varieties do not succeed. The result is that trees and plantings of avocados are relatively scarce near the seacoast, practically all of the fruit being produced from the wild Guatemalan seedlings growing on the highlands in the interior.

The principal avocado producing region is that centering about the ancient capital of Guatemala, Antigua, where the climatic conditions are strictly subtropical and not dissimilar from those of Southern California. Few or no solid plantings have been made, what trees there are having been planted mostly for shade in the coffee plantations. The fruit is of excellent quality and is abundant at extremely low retail prices. March and April are the months when the fruit is most abundant and of best quality.

On account of the widespread distribution of the seed weevil, avocados cannot be shipped into the United States from Mexico or Central America and so long as this condition exists there will be little incentive for the commercial development of the industry. There appears to be little likelihood that the quarantine restriction will ever be lifted.

The rapidity of growth of avocado trees in the tropics is truly remarkable as is evidenced from the fact that at the Experiment Station at Lansetilla, Honduras, Dr. Popenoe has produced first class three-quarter inch caliper nursery trees in eight months from the time of planting the seed. The propagation method found most successful is herbaceous cleft grafting, similar to the method employed by several of the Florida nurseries. Trees grown under favorable soil conditions grow faster than any place I have ever observed them, even in the Everglades of Florida, five year old trees easily averaging as large as ten to fifteen year old trees in California.

Avocados in Colombia

There are no commercial plantings of avocados in Columbia, what trees there are being groups of West Indian seedlings growing on or near the banana plantations of the

United Fruit Company. The production is not large, although it is reported that in 1925 the shipments from the port of Santa Marta amounted to 4,500 tomato crates averaging about 60 pounds each. All shipments are made on United Fruit banana boats. Little expansion in planting is likely to occur and there is very little interest in avocado culture.

The seed weevil is said to be present in the interior of Colombia and if such is the case will probably eventually appear in the avocado plantings near the coast. It is not unlikely, therefore that within a few years at most it will be necessary to quarantine against Columbian avocados which will eliminate competition from this source.