

The Brazilian Avocado Industry

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Introduction

Following its introduction in 1809 at Rio de Janeiro, avocado culture in Brazil experienced a continuous growth in the past century, first as a backyard fruit and then as an important commercial fruit. This growth makes Brazil presently one of the three major avocado producers in the world, according to the data available (5). According to FAO statistics, in 1976 Brazil produced 110,000 tons (5); and in 1981, was the third largest producer with 140,000 tons (1). The IBGE, however, estimated the production at more than 200,000 tons in 1975 (6).

During the first period, the avocado was propagated mainly by seeds, normally from the West Indian (Antillean) race. Today, this method is used only by owners of small properties and in backyard orchards. The second period, which began less than half a century ago, is characterized by the planting of grafted trees of local and foreign selections, the former made by growers and nurserymen. The study of those varieties and their behavior under Sao Paulo state climatic conditions was made in Piracicaba, by Dr. Montenegro.

About ten years ago, large avocado plantations were made in Brazil, with money from income tax, based on a law that provides incentive to forestry plantation, and some fruit crops were included. Some of these plantations were not well cared for and were not well planned as regards cultivars, rootstocks, use of good nursery trees, etc., resulting in unproductive orchards.

Major Avocado Areas

The most important Brazilian avocado areas are located in the states of Sao Paulo, Minas Gerais, Rio de Janeiro, Espirito Santo, Goias, Santa Catarina, and Parana. In the north and northeast regions the avocado is found in few backyards, mainly because in these tropical areas other fruit, some of them native, like the cashew, are more adapted and better known by the consumers. The map (Figure 1) shows the regions and the states and their latitudes in the major areas.

In Sao Paulo state, the avocado areas are located at 400 to 800 m altitude, but the avocado is found at low altitudes in backyards, too. Sao Paulo is the major avocado producer in Brazil, with more than 65% of total production. Its production in 1980 was 98,500 tons, from 1.1 million trees. In the market of Sao Paulo city (Ceagesp), alone, more than 26,000 tons are marketed each year (2). In Sao Paulo state, it is possible to

produce avocado practically year round from January to November, because of the climatic differences mostly between northern and southern areas. For example, the same variety that is picked in the north in July may be picked in the south in September-October.

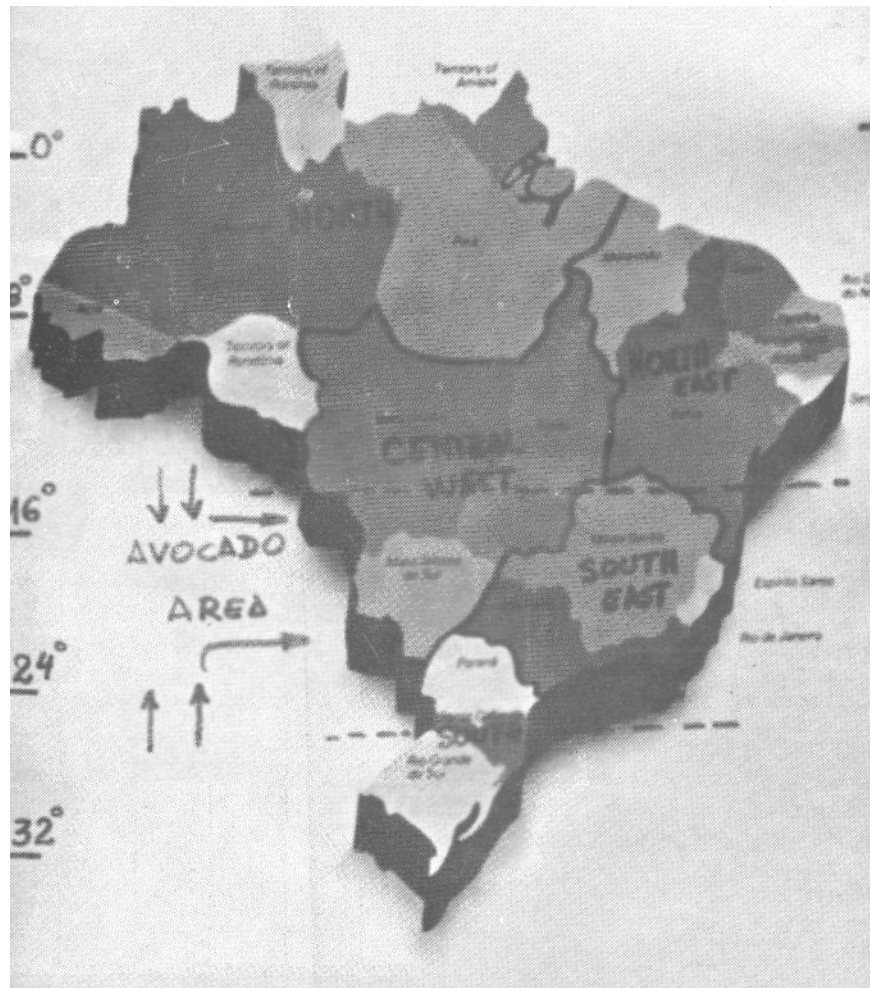


Figure 1. Brazilian avocado area, shown by dotted line, between the 15° to 25° south latitudes, part of the central west, south east, and south regions.

In Minas Gerais, higher altitudes are used to grow avocado, with a predominance of some Guatemalan cultivars. In Santa Catarina and Parana states, colder areas are used to cultivate avocado, with occasional freeze injuries.

Climate and Soils

The adaptability of the three avocado races to different climates makes possible its planting over practically the entire country. Limitations exist in relation to the very humid areas or badly drained soils because of the occurrence of root rot, but with choice of the

areas best adapted to avocado culture in a given state or region the limitations can be removed. Generally, the avocado performs best in Brazil between 15° to 25° S latitude. Mainly, the West Indian and Guatemalan races and their hybrids are grown. The possibility of successful culture of the avocado in the north, southern, and north-eastern regions, however, depends only on more research and improved technology.

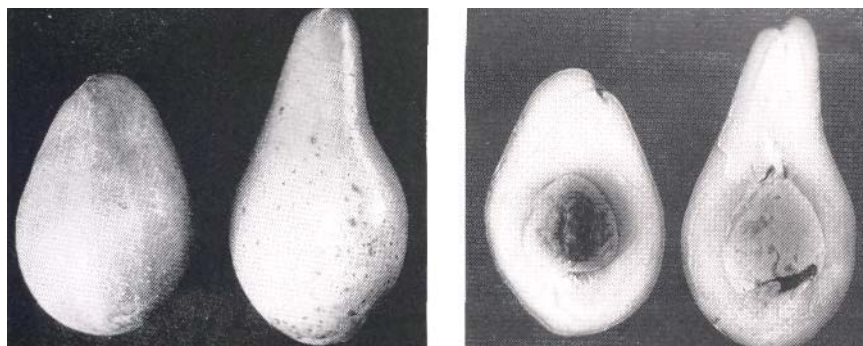
In the states where the avocado grows today, mainly Parana and Sao Paulo, good rich soils of high fertility are used. An exception is the "cerrado" area, where the avocado proves to grow well only with pH correction and heavy fertilization. Generally no irrigation is needed. In Sao Paulo, with only 3 months of dry season and 1200 mm of rain per year, the avocado produces more than 8 tons/hectare with little or no fertilization and no irrigation. For most of the cultivars and under the practices now in use, a density of 100 trees/hectare without pruning is the normal procedure.

Cultivars

Each Brazilian state or area has its own cultivars, mostly local selections. In some areas foreign cultivars are important. In Sao Paulo state, for example, the most important cvs. are: Pollock, Fuchs, Simmonds (early), Collinson, Fortuna and Quintal (midseason), Prince, Linda, Wagner and Ouro Verde (late). These cvs. comprise about 70% of the commercial production. The other 30% is made up by fruit from seedling trees and relatively new local selections or recent introductions. Examples of these are Geada, Imperador, and Solano (local), and Hass and Rincón, two California introductions that only recently are being planted. Figure 2 and Table 1 show some of the Brazilian cultivars. It is important to mention the massive predominance of the two local cultivars, Quintal and Fortuna, that are probably West Indian x Guatemalan hybrids with favorable reputations on the local market. Quintal has more West Indian characteristics than Fortuna. Both are high producers. The recent interest of some growers in planting Hass and others is concerned with their potential for export to Europe.

Some of the cultivars cited above are planted in the areas of Minas Gerais, Rio de Janeiro, and Parana, but local cvs. and seedling trees are predominant in these areas.

Figure 2. Some avocado cultivars from Brazil, and other aspects of avocado Brazilian industry.



Fruits of Fortuna (left) and Quintal (right), the two most important Brazilian mid-season cultivars.



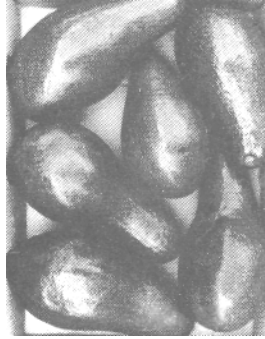
Tree of Solano, a highly productive, cold tolerant Brazilian cultivar.



Large trees on red latosol at Jaboticabal, S.P. Trees 8 years old.



Seedling tree 5 years old, showing high juvenility in Jaboticabal, S.P.



Fruits of Quintal in a carton box, normally not used to market avocados in Brazil.

Table 1. Some Brazilian cultivars and their characteristics in the Sao Paulo state production area.

Cultivar	Period of ripening	Pulp ¹ %	Oil ² %	Flower type	Shape ³	Size ⁴ (g)
Quintal	Apr-Jun	H	L	B	ob/neck	400-600
Fortuna	May-Jul	H	M	A	pyr	600-800
Ouro Verde	Jul-Sep	H	M	B	elip	500-700
Prince ⁵	Jul-Sep	H	M	B	pyr	600-700
Solano	Aug-Nov	H	M	B	pyr	600-750
Tatui	May-Jun	M	H	B	rd	300-400

1. H (high) >68%, M (medium) 68-64%, L (low) <64%
2. H (high) >20%, M (medium) 16-20%, L (low) <16% [oil in pulp]
3. ob/neck = oblong/necked, pyr = pyriform, elip = elipsoid, rd = round
4. Variable in relation to time of picking and cultural practices
5. Imported from California in 1930-decade by Dierberger Agricola, S.A.

In Parana state, some cold tolerant cultivars have been selected; but during the last five years, Solano has been planted extensively in this state. In Minas Gerais, some old Guatemalan cvs., introduced by Rolfs from the United States in 1925, were planted (2), as were others adapted to high altitude areas.

Solano is one of the most important of the relatively new cvs. It was selected in Itarare, south of Sao Paulo state, where it showed some cold tolerance, more than Wagner and Prince. Its production from September to November is sold at a price three to five times greater than that of the midseason Quintal (4). New cultivars are selected every year, normally by nurserymen or growers, and some of them have qualities good enough to

justify planting them commercially. Some of the recent cvs. named at Sao Paulo are: Imperador, Betania, Brasilia, Bertanha, Geada, Ermor, Paulista, and Francisco.

Research

Research on the avocado in Brazil is aimed at answering the needs of the big industry it represents. The main center is the Escola Superior de Agricultura Luiz de Queiroz, at Piracicaba city, where Dr. Montenegro (retired) formerly studied cultivars and cultural practices. Next in their order of contribution are the Instituto Agronômico de Campinas, Instituto de Tecnologia de Alimentos (ITAL) of Campinas, the Faculdade de Ciências Agrárias e Veterinárias de Jaboticabal (UNESP), the Instituto Biológico of Sao Paulo (IB), and the Centro de Pesquisa Agropecuária dos Cerrados, of Embrapa, in Brasilia (CPAC). The ITAL is conducting some interesting research on avocado industrialization; the UNESP has a small program for selecting new cultivars. The IB is investigating avocado pests and diseases. Because of the few researchers working directly with avocado much potentially important technical information on the fruit is lacking.

Economic Aspects

The economic data available show the magnitude of the Brazilian avocado industry as indicated by number of trees, production, and the number of orchards planted in response to government incentive with income taxes resources. But they show, too, that some abnormalities occurred during the period from 1972 to 1976.

In 1973, the production of Sao Paulo state was 82,800 tons from 860,000 trees, with more than 500,000 of these below full production (less than 4 years old), half of them from incentive orchards. The average productivity was 96.4 kg/tree. At that time, the new plantings in Brazil totaled more than 370,000 trees (3).

From 1974 to 1976, another 780,000 trees were planted in Brazil with income tax money, with more than 480,000 at Sao Paulo alone. The total plantings in Sao Paulo were 850,000 trees from 1968 to 1976, in Minas Gerais 147,000 trees, in Santa Catarina 160,000 trees, and in Goias, only 2,000 trees, totaling in Brazil approximately 1,160,000 trees (3). After that period, few orchards were planted with income tax money.

In 1980, some estimates of the production resulting from those tremendous plantings were made (3), and the expected production that would result from it was 132,000 tons, considering a productivity of 11.5 kg/tree, 34.5 kg/tree, 69.0 kg/tree, and 138.0 kg/tree, for trees four, five, six, and seven years of age, respectively. At that time (1980), however, the total Brazilian production was only 150,000 tons. These differences may be explained by the deficiencies in care and planning that were discussed in the introduction.

The Main Problems

The most important aspects of the Brazilian avocado industry may be summarized as

following: lack of intensive research and extension assistance, resulting in inefficient use of technology; no one national or state plan to deal with the production, trading, and advertising the avocado inside and outside the country.

The research facilities discussed show the few institutions and researchers working with avocado. Extension assistance is performed in Sao Paulo by a state institution named CATI, and in other states by the Federal Government jointly with a state institution named Embrapa. These would be more effective if Brazil had a national plan for avocado development, or if more information from research were available. The avocado in Brazil is only used as a fruit dessert, mixed with sugar and lemon juice or with milk and sugar ("vitamina"). The acceptance of other ways to consume the avocado is a possibility, including use of the oil as a substitute for olive oil (3). Canto et al. (3) compared the quantity of avocado oil produced per hectare with peanut, soybean, and cotton oils, and concluded that the avocado produces four to five times more oil/hectare than each of the other cited crops, considering their productivity in Brazil. Considering that a high percentage of the total production (perhaps more than 10%) is lost, nevertheless the average annual per capita consumption of avocados in Brazil is more than 1.5 kg. The losses are mainly because of the low quality of the production resulting from poor picking, packing, and disease control practices.

One of the major problems is the picking, packing, and transport of avocados in marketing. Picking fruit generally involves dropping them to the ground. The fruit are then put in a box of 52x25x36 cm (the same used for marketing) and go to a packing house where they are manually arranged in the box for sending to market. The grades commonly used are designated "extra" - 18-35 fruits/box, "special" - 40-60/box, and "first" -65-80 fruits/box. The flat box of 40x30x10 cm is used mainly for export and represents only a low percentage of fruit marketed locally. No control of picking time for each variety is made which sometimes leads to the picking of under mature fruit, lowering the quality.

Acknowledgements

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