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Present status of Brazilian avocado industry

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SYNOPSIS

A general review of the avocado culture in Brazil is given. The industry is strong in relation to the number of trees and the size of the planted area, but mainly local cultivars are used and only the local market is supplied.

The main problems are root rot disease and the lack of research.

INTRODUCTION

Following its introduction in 1809 at Rio de Janeiro, the avocado culture experienced a continuous growth during the past century. This makes Brazil one of the most important avocado producers in the world at present. Suitable soils and climates for avocado culture are found in regions extending from south to north, but the main production regions are located from latitudes 15° to 25° South. After the introduction of some foreign cultivars, several Brazilian cultivars were selected, which possessed the general characteristics accepted by the consumers. The result is that the Brazilian avocado production is not yet competitive in the export market.

MAJOR AVOCADO AREAS

The major avocado areas in Brazil are located in the states of the southern, south-eastern and central regions, mainly Sâo Paulo, Minas Gerais and Parana between latitudes 15° and 25° S (Figure 1).

Other regions of less importance are the Ceará state, in the north-east, situated at latitude 5° S, which comprises 11 per cent of the total avocado area under cultivation in Brazil; Rio Grande do Sul state situated at 30° S is the fifth region and five per cent of the total area is under cultivation (Table 1).

In relation to production, Sâo Paulo state is the foremost and in 1984, according to IBGE (6) produced 42 per cent of the total, followed by Minas Gerais with 21 per cent, Rio Grande do Norte with 9,8 per cent, Paraná 3,4 per cent and Rio Grande do Sul with 2,8 per cent. This situation has been virtually the same for a long time and the cited states excluding Rio Grande do Sul produced more than 70 per cent of the avocados in Brazil.

CLIMATE AND SOILS

In spite of the size of Brazil from latitudes 0° to 32° S (Figure 1), and the different climates found there, it is possible to cultivate avocados practically in all regions of the country if cultivars and soil conditions are matched. The avocado is more often planted between latitudes 15° and 25° S where rich podzolic soils are present. In this type of soil in Sâo Paulo state, the avocado root growth was about 3 m (4), with 80 per cent of the root system at 1,50 m. Climatic differences make production possible throughout the year. In the Ceagesp in Sâo Paulo, avocados produced in Minas Gerais and Parana states out of the main season, are often marketed at higher prices. It is interesting to observe that these states were responsible for 6 per cent and 2 per cent respectively for avocados marketed in Sâo Paulo in 1986.

In several areas of the central region and in the Minas Gerais state and north-east region, avocados are planted in poor unfertile soil, but are planted deep and are well drained. In Minas Gerais avocados are grown at high altitudes, with a predominance of Guatemalan cultivars. In the south (Parana, Sâo Catarina and Rio Grande do Sul) avocados are cultivated in colder areas and are occasionally injured by frost. Generally no irrigation is used. In Sâo Paulo there is a dry season of three months, with a rainfall of 1200 mm per year. The altitude varies between 400 m and 700 m and 40 per cent of the total area is ecologically adapted to all races of avocado (3). The average annual temperature is higher than 19°C. In this state the production of avocado averages 8 ton/ha, without irrigation.

CULTIVARS

The avocado cultivars used in Brazil include some foreign cultivars introduced long ago like Pollock, Fuchs, Simmonds, Prince, Linda and Wagner (8) and local selections of which the most important are Geada, Fortuna, Quintal, Ouro Verde and Solano. The cited cultivars are responsible for more than 70 per cent of the actual production. New local selections were made by the producers and have been planted, namely Imperador, Dourado and Margarida and their characteristics according to some authors (2,5,7,8,11) are compared in Table 2. The main characteristics of the Brazilian cultivars are the same as the West Indian race, like Quintal and Geada, or the hybrid West Indian x Guatemalan (Fortuna) or more related to Guatemalan, late in the season, like Solano, Ouro Verde and Margarida.

The general characteristics are the size of the fruits, the green or light-green colours and low level of oil content. Researchers in Sâo Paulo state found that the oil content in Prince, Collinson and Wagner (7), averaged 16,73 per cent, 12,97 per cent and 20,55 per cent respectively. New cultivars Dourado and Margarida of Parana state, averaged 16,10 per cent and 12,60 per cent respectively (2). Selection of early cultivars has been tried (10,11) with the purpose of substituting Pollock and Fuchs which are poor producers.

CULTURAL PRACTICES

The nursery tree production is well developed in some states, but the control of root rot by using sterilised soil, resistant rootstocks or treatment of seeds is not practised. The importance of this disease is increasing and it is common to find orchards severely affected. It is necessary to care for the new trees after planting to avoid scorching. This can be done by covering the trunks of the trees with dry grass or paper. The use of fertilisers, lime and manure in the planting hole is common practice.

Generally speaking the cultural practices in adult avocado orchards in Brazil are very simple, consisting of weed control by mechanical and manual tillage, fertilisation and occasionally spraying. In orchards where the predominant cultivars are West Indian or their hybrids diseases very seldom affect the fruit. A low percentage of avocado orchards is sprayed frequently against pests and diseases which occur when Guatemalan cultivars are grown. In this case scab is the most important disease followed by *Cercospora* and *Oidium.* Anthracnose is not very important and in the West Indian cultivars, the fruits are normally marketed with a few spots of this disease. No pruning and irrigation are used and the common spacing is 10 m apart.

It was calculated (12) that a good production programme would entail about 36 working days, seven tractor days per hectare per year. The consumption of materials would be: fertiliser 1,70 ton; manure 4,00 ton; lime 2,00 ton; fungicides 55,00 kg, insecticides 8,00 kg and herbicides 3,00 kg/ ha.

Picking and packing practices are rudimentary. The fruit is dropped on the ground and plastic boxes or trucks are used to transport it from the field to a packing house, where it is handled, classified and put into wooden boxes in which it is sold at the markets. The usual boxes are those with 22 kg net capacity or 52 x 25 x 36 cm and 28 kg net capacity or 56 x 30 x 30 cm. There is no control of fruit maturity and picking time by an official body, and whether or not this is done depends on the owner of the orchard or the buyer.

RESEARCH

Research into avocado culture in Brazil is not adequate for the size of the industry it represents. The main centre is the Escola Superior de Agricultura Luiz de Queiroz, at Piracicaba city, where cultivars and cultivation practices are studied. Next in order of contribution are the Instituto Agronomico de Campinas, Instituto de Tecnologia de Alimentos (ITAL), the Faculdade de Ciencias Agrarias e Veterinarias de Jaboticabal (UNESP), the Instituto Biologico de Sâo Paulo (IB), and the Centro de Pesquisa Agropecuaria dos Cerrados, of Embrapa, in Brasilia (CPAC). The ITAL conducted some interesting research on avocado industrialisation; the UNESP has a small programme for selecting new cultivars. The IB is investigating certain pests and diseases. Because of the small numbers of researchers working directly with avocado, much potentially important technical information concerning the fruit is lacking.

THE MAIN PROBLEMS

The most important aspects of the Brazilian avocado industry may be summarised as follows: lack of intensive research and extension assistance, resulting in inefficient use of technology and no central national or state plan to deal with the production, marketing and advertising the avocado inside and outside the country.

A high percentage of the total production (perhaps more than 10 per cent) is lost. The annual average per capita consumption of avocados in Brazil is about 1,5 kg. The losses are mainly because of the low quality of the product, resulting from poor picking, packing, and disease control practices. Phytophthora root rot is increasing. A high percentage of death of trees in orchards occurs in some areas, but practically no control is being undertaken. Only a few growers use phosetyl-Al in their orchards. Another problem is the lack of production for export because the cultivars found in the country provide avocados that are too big and sometimes not suitable for transporting over long distances. Spraying is not a common practice, resulting in bad disease control.

ECONOMIC ASPECTS

There is a critical lack of statistics in Brazil for some crops and avocado is one of them. The information available (6) estimates a total production of approximately 200 thousand tons per year. This number puts Brazil in third position in world avocado production. This shows the magnitude of the Brazilian avocado industry in terms of numbers of trees and growth in the last 15 years, when a strong incentive was given to plant fruit trees with state assistance. From 1974 to 1976 780 000 avocado trees were planted in Brazil (1). However, a high percentage of those trees were not cared for and became unproductive or even died.

Considering the average price of avocados for 1986 in Ceagesp, Sâo Paulo's main market, the total Brazilian production in that year valued Cz$ 526 million or more than 37 million US dollars. Comparing those figures, the exportation of Brazilian fresh avocado is incipient and averaged about 200 tons in the last few years. The main reasons for this are the lack of appropriate cultivars, the low quality and long distances from the main foreign markets, as well as the lack of an organisation to promote avocado export.

Beside the production in the main states, avocados are produced in small plantings or backyards, commonly from seedling trees. Even some important production states like Parana and Rio Grande do Sul import avocados fro Sâo Paulo, and this state also sends a large quantity to Rio de Janeiro. Sâo Paulo receives some avocados from Parana and Minas Gerais, mainly later in the season.

The production in Sâo Paulo state in 1986 is given in Table 3 and the regions in order of importance in Figure 2. The number of trees in production is 15 per cent of the total. The productivity is about 8 ton/ha, considering an average of 100 trees/ha.

In the city of Sâo Paulo market more than 30 000 tons were marketed in 1986. This is the main centre of avocado marketing in Brazil. The main period of marketing is from February to July, totalling 77 per cent (Table 4). Total production of this state is about 80 000 tons.

The prices of avocados in Ceagesp vary during the year and are related to the amount of fruit sold during each period. Figure 3 shows the average prices and quantities for 1986. This represents the common trend for any given year (9).

TABLE 1 The 1984 areas of avocados (ha) in the five most important Brazilian states, according to IBGE.

States	1984
São Paulo	10 513
Minas Gerais	2 732
Ceara	2 465
Parana	1 165
Rio Grande do Sul	1 146
Brazil	22 155

TABLE 2 Some Brazilian avocado cultivars and their main characteristics

Cultivar	Harvest period[1]	Pulp %[2]	Oil %[3]	Flower type	Shape[4]	Size (g)
Geada	Jan-Feb	H	L	B	pyr/elip	600-750
Quintal	Apr-Jun	H	L	B	ob/neck	400-600
Fortuna	May-Aug	H	M	A	pyr	600-800
Ouro Verde	Jul-Sep	H	M	A	elip	500-700
Solano	Aug-Nov	H	M	B	pyr	600-750
Tatui	May-Jun	M	H	B	rd	300-400
Dourado	Oct-Dec	M	M	A	orb	580
Margarida	Oct-Dec	H	L	B	obv	750
Reis	Aug-Sep	H	L	B	pyr/neck	700-800
Campinas	Sep-Oct	H	M	B	elip	600-700

[1]Variable with region and climate.

[2]H (high) = 68%; M (medium) = 68 - 64% and L (low) = 64%.

[3]H (high) = 20% M (medium) = 16 - 20% and L (low) = 16%.

[4]ob/neck = oblong/necked; pyr = pyriform; elip = elipsoid; rd = round; orb = orbicular; obv = obovate.

TABLE 3 Main regions of avocadoculture in Sâo Paulo state in 1986 and number of trees in production

	Number of trees (1 000)	Production

Regions	unprod	in prod	(1 000 boxes)
Sorocaba	45	70	270
Campinas	40	365	1 840
Rib Preto	10	140	750
Bauru	30	190	565
SJ Rio Preto	10	15	8o
Aragatuba	-	50	130
Pres Prudence	10	5	10
Marilia	15	30	75
Others	-	5	40
Total	160	870	3 760

TABLE 4 Round number of boxes (1 000 boxes of 22 kg) of avocados marketed at Ceagesp, São Paulo and the average monthly percentage in 1984-1986

	YEAR		
Month	1984	1985	1986
Jan	72	109	112
Feb	162	156	180
March	189	221	218
April	178	219	228
May	194	239	209
Jun	158	203	166
Jul	112	222	120
Aug	64	187	69
Sep	27	121	55
Oct	10	79	16
Nov	2	27	4
Dec	13	17	11
Total	1 183	1 804	1 393

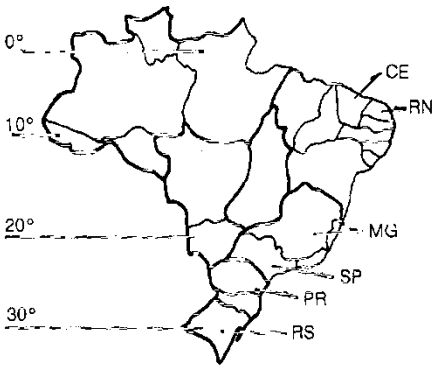

Fig 1 Brazilian avocado main regions: CE = Ceará; RN = Rio Grande do Norte; MG = Minas Gerais; SP = São Paulo; PR = Paraná; RS = Rio Grande do Sul states.

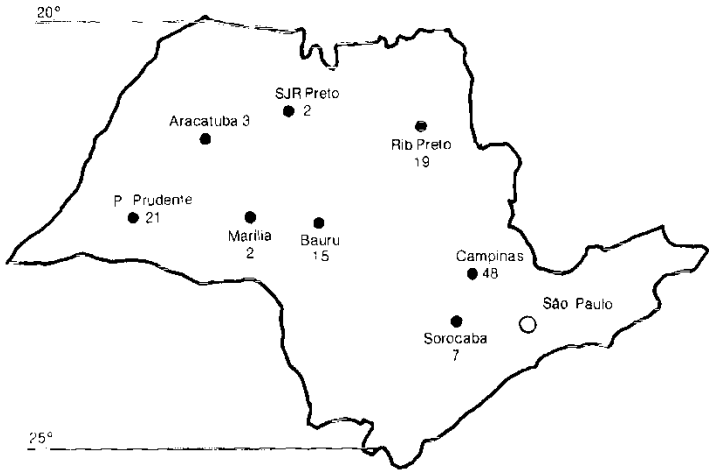

Fig 2 Main areas of avocado production in São Paulo and percentage of total production in 1986.

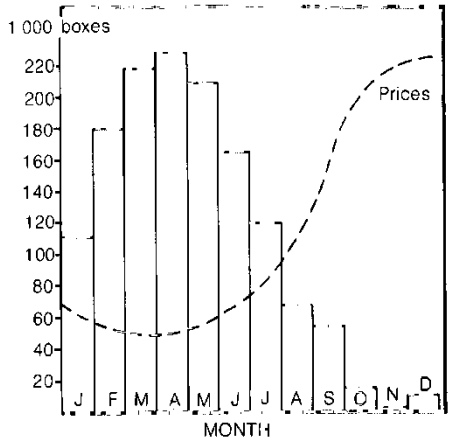

Fig 3 Avocados marketed at Ceagesp, São Paulo in 1986, in 1 000 boxes of 22 kg

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