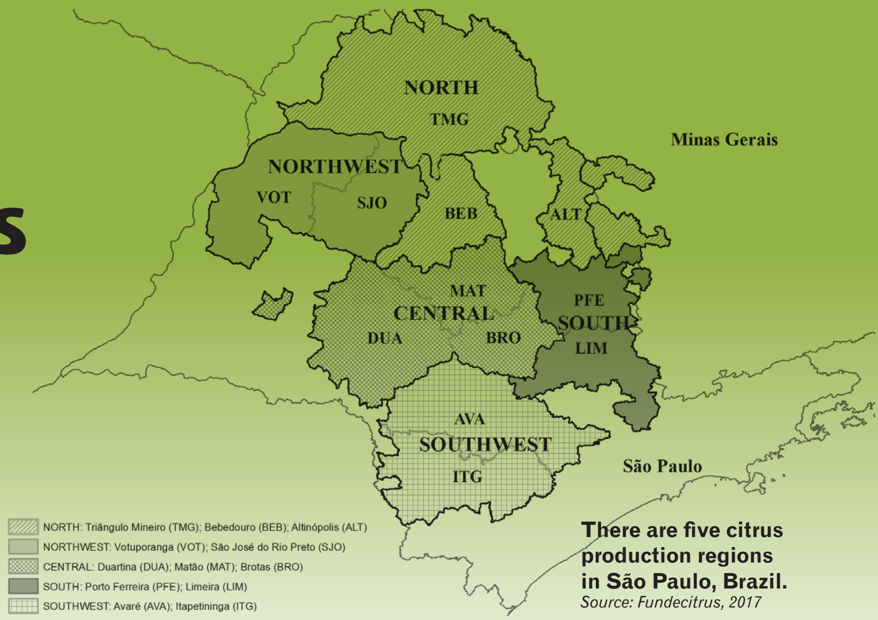
An inside look at Brazil's citrus production practices

By Stephen Futch and Ariel Singerman



There are five citrus production regions in São Paulo, Brazil.
Source: Fundecitrus, 2017

This article summarizes observations on citrus production during a June 2017 trip to Araraquara and the Southwest region of the state of São Paulo, Brazil.

INDUSTRY OVERVIEW

The citrus industry in São Paulo is divided into five production regions (North, Northwest, Central, South and Southwest). This regional classification is based upon climatic characteristics and historical aspects of citrus production within the state.

The total area devoted to citrus production in 2017 was approximately 994,762 acres with 192 million trees; 91 percent of the trees are bearing age. Total orange trees decreased by 320,000 compared to 2016.

Most of the acreage, roughly 97 percent, is planted with Hamlin, Westin, Rubi, Valencia Americana, Valencia Argentina, Seleta, Pineapple, Pera Rio, João, Nunes, Valencia, Valencia Folha Murcha and Natal varieties. However, nearly 90 percent of the acreage is planted in only five varieties: Pera Rio (34 percent), Valencia (29 percent), Hamlin (12 percent), Natal (10 percent) and Valencia Folha Murcha (4 percent). Less popular varieties make up the remainder, including Washington Navel, Baianinha, Shamouti acidless sweet oranges and sweet limes.

For groves planted in 2016, the average tree density was 291 trees per acre, which is nearly twice the planting density compared to groves planted 30 years ago. On average for the 2017–18 season, production per tree is estimated at 2.09 boxes. The estimate for the 2017–18 season is 383 boxes per acre.

The Brazilian orange production forecast for the 2017–18 season is 364.47 million boxes, up 49 percent (119.16 million boxes) compared to the previous season. However, it is worth noting that in the 2016–17 season, Brazil produced the smallest crop in the last 28 years due to very dry conditions after bloom.

The above information on acreage, tree age and yield was compiled from an annual report published by Fundecitrus, which is an association of citrus growers and processors from São Paulo. Fundecitrus' mission is to foster the sustainable development of the Brazilian citrus industry. More information can be found at www.fundecitrus.com.br and is available in both Portuguese and English.

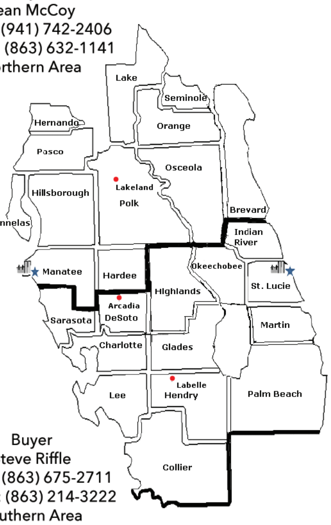
GROVE REPLANTING

In Brazil, growers typically push the entire block or grove when production decreases to an unprofitable level, which is usually around 300 to 350 boxes per acre. Once the grove is removed, growers plant crops such as corn, sorghum or soybean for two or three years to build soil organic matter and suppress soilborne pathogens prior to citrus replanting. Brazilian growers only reset trees within a block for the first five or six years after planting the entire block, except along the borders of the blocks where they continue to remove HLB-infected trees.

One of the main reasons to remove the entire block is that, Rangpur, a very popular rootstock used in the past, begins to suffer heavy tree losses due to citrus blight at about 15 years of age, causing yields to begin to decline. Rangpur became popular because it is very vigorous and performs well without irrigation.

HLB AND PSYLLID MANAGEMENT

A recent survey conducted by Fundecitrus found that the average



incidence of HLB in 2017 was 16.73 percent, slightly down from 16.92 percent in 2016. Fundecitrus also found that the smaller the farm, the larger the impact of HLB. In farms with up to 10,000 trees, the incidence of HLB is 36 percent. In farms with up to 500,000 trees, the incidence is 2.37 percent. Researchers argue that this is the result of the "border" effect; the largest number of infected trees is usually within 656 feet of the grove border.

Many of the larger growers in the Southwest citrus production region of São Paulo have found it economically beneficial to work with nearby property owners in their management of psyllids and HLB. Their strategy addresses both psyllids and HLB in a regional approach and can extend as far as 1.25 to 3 miles beyond their property. In one case, a grower hopes to extend this management plan as far as 12 miles over time.

This regional approach includes offering adjacent property owners (usually residential properties) a fruit tree (other than citrus) free of charge in exchange for removing their citrus tree. In cases where neighbors do not have the ability to physically remove the tree themselves, the grove company will remove the tree and then plant the alternative fruit tree in its place. If the property owner is not willing to remove the citrus but allows for spraying, the company will spray the citrus tree monthly at no cost to the property owner.

In cases in which the neighbor does not accept the tree replacement or does not allow for spraying, growers release a parasitic wasp (*Tamarixia radiata*) of citrus psyllids. Releasing the wasps in their own groves is unlikely to be beneficial due to the frequent psyllid sprays, but releasing them in areas with infrequent sprays seems to provide some benefit in reducing psyllid numbers.

In some cases, growers have found "volunteer" citrus plants in adjacent pastures and native land that were likely spread by animals that have eaten citrus fruits and then distributed the seeds in their manure as they traveled to other areas. Managing these volunteer trees is just as important as those in residential properties.

The strategy of external (beyond the grower's own grove) actions has been promoted by Fundecitrus and described at various meetings and in publications. Such regional approaches for psyllid control seem to be working much better in Brazil than what has been achieved in Florida. Part of the success of the program in Brazil is likely due to the large size of some groves. However, one should not underestimate the benefit of psyllid control and HLB inoculum reduction in as large of an area as possible around groves.

By reducing psyllids and sources of HLB around their groves, growers in Brazil can better manage production impacts within their properties. While this process can be expensive, one grower indicated that for every $1 spent on external actions, $8 or more in internal actions can be saved, thereby providing a greater return on investment.

One large grower we visited has a team of 12 full-time employees — whose combined cost is $120,000 per year — that work exclusively visiting neighbors to implement the external actions previously described. As a consequence of these efforts, the grower has been successful in keeping the incidence of HLB at 1 to 2 percent per year. This justifies the expenditure of funds as very cost effective.

Most growers also place yellow sticky trap cards along their property borders to detect where the psyllids are coming from into their groves, and also to concentrate their external actions as well as border sprays. When growers detect psyllids, they apply pesticide. In most cases, these border sprays are triggered by having on average just one psyllid per trap.

In addition to using the sticky traps, growers will spray the borders weekly using a smaller sprayer that sprays rows up to 328 feet from the grove border to keep psyllids from further spreading into the grove. Some of the sprayers that were used for this purpose were mounted on a three-point hitch of the tractor. This allows the driver to back out of the row without driving down the entire row, where needed. In areas where the rows are parallel to the border, growers still spray an area of 328 feet into the block, but use a sprayer that has a larger spray tank and is pulled behind the tractor. This border spray, when properly timed, seems to keep the psyllids from spreading into the main part of the grove.

Border rows within a grove are planted at higher tree density to allow trees to act as a trap crop. When any tree in the border is found to be HLB positive, it is quickly removed and then replanted. This removal and replanting keeps the border fully functional in acting as a trap for entering psyllids. Otherwise, psyllids continue to move deeper into the grove over time. During our visit, we saw many examples of how the border areas of the grove had greater infection levels than areas within the grove.

Most of the growers we visited time their insecticidal sprays to coincide with new vegetative growth flushes. Female psyllids lay their eggs onto new flush, and if young flush is not present, then they forego reproduction. By treating new flushes, growers are better able to control psyllid numbers over time. Brazilian growers are thus monitoring psyllid nymphs on flushes on a frequent basis. Some growers monitor for both adults and nymphs. Other growers will monitor only for nymphs, as the adults

When HLB is detected along the edges of a grove, trees are rapidly removed and replaced.

are more difficult to detect consistently.

When sprays are necessary, most growers have sufficient inventory of sprayers and tractors to cover their entire production acreage in a matter of about one week. The inability to quickly cover large areas in a timely fashion will compromise the ability to effectively manage psyllids and HLB.

FUTURE PRODUCTION IN FLORIDA

Many growers in Florida would probably argue that it would be futile to try to control psyllids across the state given that HLB is endemic. However, a partnership of growers could plant a large, isolated, new grove and agree to consistently and uniformly manage it against psyllids and HLB. The management could include external actions, which have proven to be cost effective in Brazil. Such effort is likely to keep psyllid populations very low and, therefore, the impact of HLB at bay, enhancing the probability of this new grove to enter production with lower HLB levels. Thus, a new grove managed in this fashion is likely to be more sustainable than current practices, and have higher chances of being profitable.

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