

Brazil citrus tours increase Floridians' knowledge



By Stephen H. Futch

Floridians in Brazil

The University of Florida Extension Service conducted a citrus grower tour to Brazil in August 2012. This is the seventh trip with more than 100 growers, production managers or related industry representatives participating in one or more of the citrus tours.

Each trip departs from Miami for an eight-hour direct flight into São Paulo, SP, Brazil. The city of São Paulo is the largest city in Brazil, the largest city in South America and the world's seventh largest city by population.

Brazil is a country with large, diverse agricultural operations. Its farms are generally very large with excellent quality land. The land is capable of producing a wide range of crops including sugarcane, citrus, coffee, soybeans, row crops, cattle, timber, rubber from rubber trees and more.

In the state of São Paulo, the production of biofuel from sugarcane is an enormous agricultural enterprise with more than 11 million acres growing sugarcane in 2008; the acreage has continued to increase rapidly since that date. More than 100 mills process sugarcane into either ethanol or sugar. The production of biofuel from sugarcane and petroleum oil helps Brazil be one of the few countries in the world that is energy self-sufficient.

Several of the citrus operations we visited in previous trips have been converted from citrus production to sugarcane operations due to economic considerations and various diseases impacting citrus. Land rental rates to plant sugarcane can easily exceed U.S. \$400 per acre per year, and vary depending on proximity to refining mills.

DISEASES AND PESTS

Over the years, Brazil's citrus industry has been confronted with numerous

diseases and pests. In the 1930s and 1940s, citrus tristeza virus (CTV) devastated the industry, resulting in a shift away from sour orange rootstock to Rangpur lime. Rangpur lime is tolerant to CTV and well adapted to Brazilian growing conditions.

In the 1970s, citrus canker threatened the industry in the state of São Paulo while the adjacent state of Parana chose to "live" with citrus canker. São Paulo embarked on an extensive eradication campaign that limited the spread of canker. However, within the last year, citrus canker has been spreading as the government has backed away from inspections and forced eradication efforts. While not widespread, the incidence of citrus canker is increasing. From 2000 to 2009, approximately 2.2 million trees were removed due to citrus canker eradication programs, as reported by Fundecitrus.

In the 1990s, citrus black spot, citrus verigated chlorosis (CVC), postbloom fruit drop (PFD) and leprosis began to significantly impact the industry. CVC is a bacterial pathogen that is vectored by sharpshooters.

Once infected, trees produce small fruit which are hard, decreasing the ability to process them. Fundecitrus reported that from 2000 to 2009, approximately 26.4 million trees were eradicated due to CVC in Brazil. To slow the progression of the disease, Brazilian growers control the vector and remove the symptomatic limbs on trees that are 3 to 8 years of age. In later years (after year 10), they do not aggressively remove infected limbs because entire blocks are generally removed due to declining production at 15 to 20 years of age.

In the 2000s, sudden death began to threaten the citrus industry in the northern parts of São Paulo where the climate is hotter and has longer drought periods. The disease has remained confined to this northern region and has not continued spreading throughout their industry. The actual cause of sudden death has not been determined, but growers have used inarching with rootstocks other than Rangpur lime to minimize the impact of the disease on existing plantings.

In 2004, citrus greening or huan-



CVC symptoms in two fruit at right



Rubellosis symptoms

glongbing (HLB) was first diagnosed in the state of São Paulo. As we all know, the disease causes tree decline and reduced yields. Greening is vectored by the Asian citrus psyllid in both Brazil and Florida. In Brazil, the vector for HLB was reported as early as the 1950s, but HLB was not introduced until the late 1990s or early 2000s.

Rubellosis has been in Brazil for many years and is caused by the fungus *Corticium salmonicolor*. When limbs are infected, the bark is destroyed, the branches are girdled and subsequently die. The disease is suppressed with copper sprays.

Other significant citrus pests in Brazil include citrus black spot, post-bloom fruit drop (PFD), leprosis (vectored by the Brevipalpus mite), scales, mites and scab, to name a few.

INDUSTRY FOCUS

Approximately 80 percent of the Brazilian citrus industry's acreage is devoted to the production of citrus for the processing industry with the remaining 20 percent going to the fresh markets, mainly within Brazil.

Approximately one-third of the industry is controlled by three large groups with an additional 10 to 20 growers making up an additional 15 percent of the industry. When you combine these two groups, you have almost 50 percent of the acreage controlled by less than 20 growers or grower groups.

The major citrus varieties produced include Valencia (30 percent), Pera (30 percent) and Hamlin (20 percent), with the remaining 20 percent of the acre-



Fruit being placed on a trailer

age consisting of Natal, Folha Murcha, Tahiti lime, Valencia Americana and other varieties. In Brazil, the Hamlin orange produces good yields, but has lower internal quality than Valencia. The Pera will produce less total fruit than Valencia, but has excellent internal juice quality, will produce multiple blooms per year and can be marketed as both fresh and processed. Natal oranges tend to have less acid and lower internal juice color than Valencia, and mature as late as December, which is Brazil's summer season.

PLANTING SPACING

Older groves in Brazil were planted at a spacing that resulted in 120 trees per acre (25' x 15'). In newer plantings, densities are being increased to upward of 200 trees per acre with some plantings reaching 350 trees per acre.

Growers in Brazil have also noted that they must match the rootstocks to the scion growth habits because vigorous rootstocks like Rangpur are too vigorous to be grown under higher densities.

ROOTSTOCKS

Rangpur lime is the predominant citrus rootstock used in Brazil and represents approximately 80 percent of the total rootstock use. Rangpur lime produces a vigorous tree and is well adapted to Brazil's drought conditions, which occur in the late winter and early spring. A drawback to the use of Rangpur lime is that it is highly susceptible to citrus blight and to sudden death in the more northern part of the state of São Paulo. The use of Swingle citrumelo has increased in recent years, especially where water for irrigation is available. Other



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frequently used rootstocks include Cleopatra mandarin, Sunki mandarin and Volkamer lemon.

IRRIGATION

More citrus growers are beginning to adopt the use of irrigation to enhance yields. Where sufficient water is available from surface sources (rivers and lakes), growers have traditionally used overhead irrigation systems consisting of mainly volume guns. Where groundwater is available, they are drilling deep wells to provide sufficient water for irrigation. These deep wells are regulated by the government and are more expensive to install than in Florida. Many of the newer plantings are using drip or microsprinkler irrigation systems instead of the volume gun systems. Because growers are not concerned about using irrigation for cold protection, and the soils are less sandy with higher clay content, the use of drip irrigation is greater in Brazil's production systems than in Florida.

Even where irrigation water is available, growers will withhold irrigation during the late winter to induce stress to aid in regulating floral production. By withholding water, the trees are stressed and when the irrigation is resumed or rains occur, the citrus trees begin to flush and bloom.

PRICING OF FRUIT

In the 2010-11 season, the industry had record crops which created a large carry forward of juice into the 2011-12 season. Part of the excess supply was caused by large crops. Oversupply was also due to economic issues in Europe that reduced demand for citrus juice and to fears caused by traces of carben-dazim in some Brazilian juice imports to the United States. The combined effect caused record juice inventories and further depressed prices growers received for their fruit. Growers without multi-year contracts for Hamlin oranges were faced with poor market

conditions, resulting in large quantities of Hamlin oranges not being harvested. Estimates of the number of boxes of Hamlin oranges not harvested in 2011-12 season exceeded 20 to 40 million boxes of fruit. Small farmers are particularly struggling with the low prices, lack of long-term fruit contracts and the inability to market Hamlin oranges in the current season. These low prices will also impact the ability for growers to provide proper production inputs to maintain healthy citrus groves.

MANAGEMENT OF HLB

It was estimated that total production cost has increased by as much as 30 percent due to the management of HLB. Increases in pest management costs are greatly impacted by surveying for infected trees, infected tree removal and additional pesticide applications to control HLB-spreading psyllids.

Many growers indicated that they are removing HLB-infected trees and spraying mature blocks up to 12 or more times per year to reduce the vector of HLB. Blocks are targeted for a pesticide application when psyllids are found in weekly surveys. Additionally, some locations apply sprays around the border of blocks or groves to target areas where psyllids are frequently found.

Growers state that the control of HLB is greatly impacted by their neighbors' management practices (tree removal and psyllid management) or the lack thereof. The "edge" effect of the disease is well documented with higher incidences of the disease located along the border of the grove and along the edges of the blocks within the grove.

Systemic materials like imidacloprid are applied until the tree is about 3 years old and applied only during the rainy season. Where only imidacloprid was applied, it was found to be insufficient to completely control all psyllids, and additional foliar sprays are now incorporated into the production system.

In areas where growers are not removing HLB infected trees, the incidences of HLB are increasing.

MANAGEMENT OF PESTICIDES

The processing industry is actively involved in developing a list of pesticides that are allowed to be used for fruit they purchase. This list is intended to aid in management of pesticide residues to ensure that products exported to foreign markets will meet all tolerance requirements of receiving countries.

HARVESTING

Finding sufficient labor to harvest



Harvested fruit

the large citrus acreage is an important issue within the state of São Paulo. Much of the local labor has transitioned into non-agricultural occupations as the Brazilian economy has strengthened. To attract sufficient labor, harvesting costs have had to increase significantly in recent years with much of the harvesting labor coming from the northeast part of Brazil. Estimates of total harvesting costs ranged from a low of U.S. \$1.25 to \$1.75 per box, and are impacted by the distance to the processing plant.

Governmental regulations require that harvesters be supplied with eye protection (glasses), gloves, leg protection for snakes, uniforms and shoes during harvesting operations. These and other regulations are greatly increasing the cost to harvest citrus in Brazil.

ENHANCED FOLIAR NUTRITIONAL PROGRAMS

The use of enhanced foliar nutrition programs is being adopted in some areas as an alternative to removing infected trees. This is especially true in areas of high HLB infection or in areas where the grove size is small with numerous groves located adjacent to one another.

CITRUS TOURS

This and other tours conducted to view citrus in Brazil have been very effective in educating Florida citrus growers and increasing their understanding of production practices and pests that are found in other citrus producing areas.

One Brazilian citrus grower summed up Brazilians' attitudes of the future by stating that, "Citrus growers are optimists – always look forward and not backward."

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