

winds is along the lower east coast and near the coastline of the *panhandle*. Even in these areas, the probability of wind damage from hurricanes on a particular farm in a particular year is low. By far, most hurricanes that seriously affect Florida occur during August, September, and October, which is after the fruit has been harvested. Blueberry plants on well-drained soil are not readily damaged by high winds, but where a high water table has prevented development of a deep root system, plants may be uprooted by winds well below hurricane force (75 mph). Such strong winds in Florida occur more commonly from thunderstorm downbursts than from hurricanes. Excessive rains from hurricanes and tropical storms can occur anywhere in Florida, and represent a greater threat to the blueberry grower than do high winds.

Occasionally during April, strong westerly winds that follow the passage of cold fronts can blow part of the fruit off highbush blueberry plants in Florida. Some rabbiteye blueberries may also be blown off the bushes by severe thunderstorms that occur during rabbiteye ripening season. Hail can be very damaging to blueberries during the fruiting season, but hailstorms are rare in Florida.

In summary, the Florida climate presents both problems and opportunities for the potential blueberry grower. High mean temperatures during January, February, and March suggest that some low-chill cultivars grown in Highlands County could ripen fruit at least a month before the start of blueberry harvest in the areas from southeast Georgia through southeast Texas and at least 7 weeks before North Carolina. On the other hand, freezes during February and March will frequently put the crop in jeopardy. Florida's normally low rainfall and bright sunshine from

January through May enhance berry quality and facilitate harvest, but heavy summer rains can cause problems with flooding and with *Phytophthora* root rot.

#### Literature Cited

1. Baldwin, John L. 1968. Climatic Atlas of the United States. National Climatic Data Center, Federal Building, Asheville, NC 28801.
2. Crane, J. H. and F. S. Davies. 1988. Flooding duration and seasonal effects on growth and development of young rabbiteye blueberry plants. *J. Amer. Soc. Hort. Sci.* 113:180-184.
3. Crane, J. H. and F. S. Davies. 1989. Flooding responses of *Vaccinium* species. *HortScience* 24:203-210.
4. Eck, P. and N. F. Childers. 1966. Blueberry Culture. Rutgers Univ. Press, New Brunswick, NJ.
5. Harrison, Dalton, J. S. Gerber, and R. E. Choate. 1974. Sprinkler irrigation for frost protection. *Fla. Coop. Ext. Serv. Cir.* 348.
6. Lyrene, P. M. 1987. Early-flowering, early-ripening blueberry germplasm for central Florida. *Proc. Fla. State Hort. Soc.* 100:296-300.
7. Lyrene, P. M. and W. B. Sherman. 1988. Cultivation of highbush blueberries in Florida. *Proc. Fla. State Hort. Soc.* 101:269-272.
8. Lyrene, P. M. and W. B. Sherman. The rabbiteye blueberry industry in Florida—1887 to 1930—with notes on the current status of abandoned plantations. *Economic Botany* 33:237-243.
9. Ploetz, R. C. and B. Schaffer. 1987. Effects of flooding and *Phytophthora* root rot on photosynthetic characteristics of avocado. *Proc. Fla. State Hort. Soc.* 100:290-294.
10. Sharpe, R. H. 1954. Horticultural development of Florida blueberries. *Proc. Fla. State Hort. Soc.* 66:188-190.
11. Sharpe, R. H. and G. M. Darrow. 1959. Breeding blueberries for the Florida climate. *Proc. Fla. State Hort. Soc.* 72:308-311.
12. Sharpe, R. H. and W. B. Sherman. 1971. Breeding blueberries for low-chilling requirement. *HortScience* 6:145-147.
13. Sharpe, R. H. and W. B. Sherman. 1976. 'Sharpblue' blueberry. *HortScience* 11:65.

*Proc. Fla. State Hort. Soc.* 102:212-213. 1989.

## GUAVA AND PASSIONFRUIT AS COMMERCIAL CROPS IN FLORIDA

MATT J. MURRAY AND CRAIG A. CAMPBELL  
*J. R. Brooks & Son*  
*P.O. Drawer 9*  
*Homestead, FL 33090*

**Abstract.** Guava and passionfruit are commercial crops in Dade County. About 80 acres of guava and 30 acres of passionfruit have been planted in South Florida (J. Crane, personal communication, 1989). Their popularity with growers and shippers varies considerably between seasons and year-to-year. Disease, storage problems, and varying market, however, are serious problems of the two new crops. Many grower questions are still unanswered. What can I do to fight disease? Which variety should I plant? What are the best handling methods? Can the fruit be stored successfully? Volume shipped of either fruit can exceed 100,000 pounds annually. An uncommonly large percentage of fruit shipped is rejected. The customer's minimal knowledge of the fruit and improper handling can cause rejections; so can overproduction at certain peak times. These fruits are inherently difficult to store and ship because of their rapid ripening. Both fruits are extremely well suited for processing but little or none of this is done in Dade County. Growers, packers, and buyers must work together and educate themselves about growing re-

quirements, proper handling practices, and marketing strategies for the expansion of these fine fruits in the U.S. marketplace.

Passionfruit and guava have been grown in South Florida for many years, primarily as dooryard fruits. Attempts to cultivate guava on a commercial scale have met with limited success over the years. Recently, however, these two fruits have seen a dramatic increase in consumer popularity. Along with this popularity has come an increase in acres cultivated and pounds shipped from Dade County. The cultivation, harvest and shipping of these crops presents the grower with a unique set of problems and challenges.

#### Passionfruit

Passionfruit is a woody, perennial vine (1). There are currently about 30 acres of passionfruit in Dade County. A commercial passionfruit planting consists of a wire and post trellis. Most are made to a height of 6 feet to allow management of the system entirely by hand. The arrangement of the trellis may vary from a simple upright post to a "T" configuration. Posts and wire should be strong

enough to support a heavy load of fruit and to withstand high winds. After planting, the passionfruit vine has a useful life of no more than five years. After this time fungal diseases, nematodes, and viruses weaken the vine resulting in declining vigor and production (1).

Harvest is accomplished by hand. Harvesters are sent into the field with a picking lug in hand. The lug holds about 20 pounds of fruit. Fruit is generally picked from the ground after it has fallen from the vine. Fruit that is on the vine is difficult to judge with regards to stage of maturation. Fruit that is picked immature will not color up correctly and often shrivels and decays rapidly. Passionfruit in Florida is used primarily in the fresh state but is processed in many tropical countries (3).

After harvest, the fruit is brought into the packing-house in the picking lug. The passionfruit is then washed in a 250 ppm chlorine solution. This has two purposes: remove leaf litter and inhibit the growth of fungi. After the fruit has been allowed to dry it is loaded by hand onto a slow-moving conveyor. It is then graded by hand as it moves down the belt. Fruit is culled that is decayed, shriveled or marred by physical damage. Packout of 40-50% is not uncommon. Fruit are then packed into flats containing tray inserts. Trays are made in counts of 28 to 44. There are two passionfruit types, yellow and purple. Customers tend to prefer purple fruit. After packing, information about color of fruit and count is printed on the carton. Passionfruit is then placed in storage at 45°F. Several diseases exist for passionfruit at the preharvest and postharvest stage. Fungal decays are the most damaging, appearing on the fruit as spots or larger coalesced lesions. Fungal spots account for a large percentage of packing-house gradeout. Windscar is the second major concern. Fruit shriveling, caused by desiccation, is another problem that can occur after packing. Although this does not affect internal quality, it is a major cause for rejection at the market end. More information to the produce buyer and consumer could reduce the importance of shriveling.

### Guava

Guava is a small tree that has been grown in South Florida's yards and gardens for many decades (4). Currently there are about 80 acres planted of various ages. Most trees are propagated by air-layering but grafting is also practical (2). Fruit production per tree can exceed 600 pounds a year. There are several local selections and a few named varieties. A selection from South Florida will be named 'Homestead' this year. Fruit development requires

about 120 days from anthesis to mature fruit. Pruning can be used to influence fruiting in guava. Coordination of the fruiting cycle can help to maintain fruit supplies during most months. There are, however, times when fruit is scarce or over-abundant.

Harvest is done by hand and must be done every few days. Fruit must be harvested when still hard to avoid problems with infestation by Caribbean fruit fly. Guava is an excellent host for the Caribbean fruit fly. It is important to harvest fruit that is physiologically mature so that it will ripen properly. Fruit harvested at an improper stage of maturation will either fail to ripen or will become senescent before reaching the marketplace. Immature fruit will become rubbery and never attain good interior color. Fruit harvested too ripe will become soft in 2-3 days and may develop decay lesions.

The cull rate during packing of guava usually is high for several reasons. Ripe fruit, wind scar, scab, and fruit fly damage can cause 40% or more of total production to be culled. Cull fruit currently is not utilized except for some minor production of jelly. Cull guavas should be utilized in other ways.

### Conclusions

Passionfruit and guava are popular dooryard fruits in South Florida with a long history of cultivation there. Recently, however, they have begun to become important commercial crops. The introduction and selection of superior varieties and renewed consumer interest in fresh fruits are likely reasons for the commercialization. Expansion of acreage will undoubtedly continue. Much work needs to be done in order to support this growing segment of the fresh fruit industry. At this writing few spray materials are approved for use on these crops. Consumers need further information about how to utilize guava and passionfruit. Finally, the utilization of cull fruit for processing is an area that has not been adequately explored in Florida.

### Literature Cited

1. Knight, R. J., Jr. and J. W. Sauls. The passion fruit. Fruit Crops Fact Sheet (FC-60). IFAS, Univ. of Florida.
2. Malo, S. E. and C. W. Campbell. The guava. Fruit Crops Fact Sheet (FC-4). IFAS, Univ. of Florida.
3. Martin, F. W., C. W. Campbell, and R. M. Ruberte. 1987. Perennial edible fruits of the tropics: an inventory. U.S. Department of Agriculture, Agricultural Handbook No. 421, 252 p., illus.
4. Popenoe, W. 1892. *Manual of tropical and subtropical fruits*. Facsimile of the 1920 ed. Macmillan, New York. 474 p., illus.