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HS-858

Tomato Production in Miami-Dade County, Florida[1]

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Situation

The tomato plant is a member of the nightshade family, called Solanaceae. The fruit of the plant, tomatoes, are an important vegetable around the world. Florida ranks first for potato production in the nation for both acreage and values. The annual planted acreage in the state is roughly 35,000 acres, generating an annual value of approximately $4.4 billion. Miami-Dade County is a top two county with planted acreages varying between 3,650 and 13,403 acres since 1980. Yields range from less than 300 CWT/acre to more than 500 CWT/acre. The production cost was approximately $18,295/acre for seepage and $18,557/acre for drip irrigated tomato plants for an acceptable yield (Rogers et al. 2014, http://edis.ifas.ufl.edu/fe960). Tomatoes produced in Miami-Dade County are sold nationwide for the fresh market during the winter and spring.

Tomato Varieties

Refer to Chapter 18 in the *Vegetable Production Handbook of Florida* (Freeman et al. 2017, http://edis.ifas.ufl.edu/pdffiles/cv/cv13700.pdf) for variety selection. Currently the major varieties grown in Miami-Dade County are as follows:

'Sanibel': a late-midseason, determinate, jointless hybrid. Fruit are deep oblate with a green shoulder. Disease tolerant or resistant to: Verticillium wilt (race 1), Fusarium wilt (races 1 and 2), Alternaria stem canker, root-knot nematodes, and gray leaf spot.

'Florida 47': a mid- to late season, determinate, jointed hybrid. Fruit are deep globe shaped and uniform green. Resistant to: Verticillium wilt (race 1), Fusarium wilt (races 1 and 2), Alternaria stem canker, and gray leaf spot.

Minor large-fruited varieties include: 'Agriset 761', 'Solar Set', 'Solimar'.

Plum types: 'Spectrum 882', 'BHN 410', 'BHN 411', 'BHN 404', 'Plum Dandy', 'Puebla'

Cherry types: 'Cherry Grande', 'Super Sweet 100'

Grape types: 'Santa Claus', 'Tropical Ruby'

Soils, Land Preparation, and Transplanting

Tomatoes in Miami-Dade County are grown mainly on gravelly soils (Krome or Chekika soil series). Most gravelly soils are rock-plowed on a regular basis, a process that creates 6–12 inches soil depth above consolidated bedrock. The optimization of fertilizer and irrigation management for these gravelly soils is essential to obtain high yields. Sandy soils (west Kendall area) are also suitable for tomatoes. At the present time, tomatoes are not grown on marl soils.

1. This document is HS-858, one of a series of the Horticultural Sciences Department, UF/IFAS Extension. Original publication date June 2001. Revised April 2006 and November 2017. Visit the EDIS website at http://edis.ifas.ufl.edu. This document is written specifically for growers in Miami-Dade County as a supplement to *Vegetable Production Guide for Florida* (SP170) (http://edis.ifas.ufl.edu/MENU_CV:VEGPROD). We thank many colleagues, growers, and representatives from seed and chemical companies and grower services for reviewing the document.

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However, prior to the 1950s, tomatoes were only produced on marl soils. Most marl soils are at low elevations and are prone to frequent flooding.

Typically, tomato beds are 36–40 inches wide and 6–8 inches high with 6 ft between the centers of adjacent beds (Freeman et al. 2017, http://edis.ifas.ufl.edu/cv137). Pre-plant fertilizer should be applied in two parallel bands, each about 9 inches from the center of the bed. Next, the bed should be rototilled to a depth of 4 to 6 inches, and then the bed must be re-formed. The bed should be irrigated and kept moist for at least one week to promote the germination of weed seeds. If the bed has become dry, it should be irrigated again one day before the application of a fumigant. During the fumigation operation either one or two drip irrigation tubings, 12 to 14 inches apart, are installed in the surface layer and the bed is immediately covered with plastic mulch. Immediately after fumigation and mulching, a herbicide (i.e., methibuzin at the rate of 0.25–1.0 lb a.i.) should be applied to furrows.

In order to allow the fumigant to dissipate completely, tomato seedlings should not be transplanted into a fumigated bed until at least a week after application of the fumigant. Transplanting season in the area is from August to late February. However, the ideal period for transplanting is from September to late January. Transplants should be spaced 18 to 24 inches apart and set 2–3 inches deep, either in a single row or in two rows ("double row"), with 10 to 15 inches between these rows. When planted in a single row the plants are held upright with twine attached to stakes. However, when planted in double rows (two rows per bed), the plants are not supported with twine and stakes. Since wooden stakes can be used only on sandy soils, on most fields in Miami-Dade County rebar rods are used. Rebar rods are pounded into the limestone bedrock by means of an air-hammer or with a 3-pound hammer. Plants should be pruned, both before staking and at the early flowering stage, in order to increase fruit size.

Fertilizer

Calibrated soil tests for the calcareous soils of Miami-Dade County are not available at present. Therefore, tissue analysis is recommended to determine the composition and rates of fertilizers to be applied. Instructions for tissue sample collection, preparation, and submission are provided in Plant Tissue Information Sheet (Mylavarapu et al. 2017), which is available online at http://edis.ifas.ufl.edu/ss182 and from your local UF/IFAS Extension office. Information on plant tissue analysis for tomato is provided in Chapter 2 in the *Vegetable Production Handbook for Florida 2017–2018* (Liu et al. 2017, http://edis.ifas.ufl.edu/cv296). The total amount of fertilizer required in Miami-Dade County depends on the variety, soil fertility, and other environmental factors. Less inorganic fertilizer should be applied if a cover crop has been grown and the residue incorporated into the soil, or if a soil organic amendment (compost, biosolids, manure) has been applied. Pre-planting fertilizer formulas of 6-6-12, 6-3-12, 10-10-10, or similar formulas are satisfactory. Somewhat less than one-half of the fertilizer should be applied to the beds prior to planting. Fertigation should be initiated with a 4-0-8 or similar formula 3–4 weeks after transplanting to provide the remaining fertilizer. The beds should be fertigated once or twice a week with daily rates ranging from 0.5 lb N to 2.5 lb N; the rate adjusted upwards at 3–4 week intervals as the plant biomass increases. Magnesium nitrate or sulfate and EDDHA-chelated iron should be applied if soil test reports show low nutrients (please see this EDIS publication at http://edis.ifas.ufl.edu/hs1208).

Irrigation and Freeze Protection

Drip irrigation systems are used for tomato production in Miami-Dade County. Generally one drip irrigation tubing per bed provides adequate water for plants, although a second is beneficial especially while the plants' root systems are small. Water requirements for young plants are very low. Irrigation frequencies of once or twice a week suffice for most plastic mulched young plants until 5 weeks after transplanting. A tensiometer installed at 6" depth can be used for irrigation scheduling. Mature plants require approximately 1,500 to 3,500 gallons per acre per day. Over irrigation should be avoided since it stresses plants and leaches fertilizer out of the root zone. Optimal plant growth and yields are achieved when the soil moisture is maintained at tensiometer readings between 10 to 15 cbars. The Miami-Dade County Cooperative Extension Service provides relevant information and services regarding tensiometers. More information on irrigation is also available online in Chapter 3 of the *Vegetable Production Handbook for Florida 2017–2018* (Zotarelli et al. 2017, http://edis.ifas.ufl.edu/cv297).

Tomato sustains chilling injury when temperatures drop 2°F below freezing. Therefore, growers in Miami-Dade County arrange for freeze protection of tomato from the beginning of December through February. A high volume sprinkler irrigation system which applies 0.25 inch depth of water per hour should be used.

Insect Management

Refer to Chapter 18 of the *Vegetable Production Handbook for Florida 2017–2018* (Freeman et al. 2017, http://edis.ifas.ufl.edu/cv137) for extensive information on insect control. The silverleaf whitefly, *Bemisia argentifolii*, arrived in Florida around 1985. The feeding of this pest causes uneven ripening of tomato. In addition it is a highly efficient vector of gemini viruses. One of the latter, the devastating Tomato Yellow Leaf Curl Virus, appeared in Homestead in 1997. In order to prevent the transmission of this virus, growers are spending approximately $200/acre more than before every growing season for insecticides—mostly for Admire^{R} -. Good field sanitation is essential for the suppression of the silverleaf whitefly. Other major insects include leafminer, armyworm, tomato fruitworm, looper, and aphids.

Weed Management

Refer to Chapter 18 in the *Vegetable Production Handbook for Florida 2017–2018* (Freeman et al. 2017, http://edis.ifas.ufl.edu/cv137).

Disease Management

Refer to Chapter 18 in the *Vegetable Production Handbook for Florida 2017–2018* (Freeman et al. 2017, http://edis.ifas.ufl.edu/cv137).

Harvest

The harvest season extends from December to May. Most tomatoes are picked by hand as "mature greens" for market in the northeastern states. "Vine-ripe" tomatoes, those which are to be shipped moderate distances or to local markets, are usually harvested by hand at the "breaker" stage or the "pink" stage.

Multiple Cropping/Rotation

After completion of the tomato harvest, squash, okra, cucumber, watermelon, cantaloupe, okra, and other specialty vegetables or herbs often are seeded or transplanted into the existing beds. Crop rotation is dependent on good field sanitation to suppress pathogens and insects.

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