

# TOMATO

## Introduction

Fresh market tomato is the No. 1 vegetable crop in Florida, with 31,000 acres harvested for a total crop value of \$564 million in the 2010–2011 season. Cultivars from the UF/IFAS tomato breeding program have been among the primary reasons for tomato's commercial success in Florida, and several of its varieties have been innovations with major impacts on the tomato industry worldwide. The tomato industry faces several challenges today, including competition from Mexico and the greenhouse industry, water use concerns, low market prices, and increasing costs to produce the crop. New cultivars are needed that produce greater yields for less cost and require fewer inputs.

## From the Beginning

The tomato breeding program began in 1922 when a grower donated just under five acres of land to the university for the purpose of developing disease-resistant cultivars. Early work resulted in the release of several such cultivars, including a variety resistant to nailhead rust that actually eradicated the disease, before a full-fledged tomato breeding program was established in 1942. Resistance to Fusarium wilt race 1 was introduced in the 1940s. UF/IFAS plant breeders released 'Walter', the first cultivar with resistance to Fusarium wilt race 2, in 1969. The discovery of this gene alone has saved the Florida tomato industry an estimated \$200 million or more per year in losses ever since and is among the most widely used genes in tomato breeding around the world. In the 1980s, the UF/IFAS tomato breeding program discovered resistance to Fusarium wilt race 3 and developed germplasm that has been used in breeding efforts worldwide.

Cooperative work between the UF/IFAS tomato breeding program and the H. J. Heinz Company in the 1960s resulted in 'Florida MH-1', the first fresh-market cultivar that allowed for the possibility of mechanical harvest with its high fruit firmness and jointless pedicels. Fruit firmness has been of profound significance to both the fresh market and processing industries around the world.

The heat-tolerant hybrid 'Solar Set', released in 1989, was widely grown in early fall crops and North Florida for a decade. The miniature dwarf tomato 'Micro-Tom', also released in 1989, has been used in molecular genetics labs around the world to study fleshy-fruited mutations. More recently, the Tasti-Lee® brand 'Fla. 8153' hybrid, released in 2006, has been marketed in supermarkets in the eastern United States with considerable success as a vine-ripened, high-lycopene tomato with superior flavor and internal color. This cultivar provides Florida growers with a product of considerable crop value.

## Today and Tomorrow

In the last 15 years, much emphasis has been placed on the use of molecular markers linked to traits of interest. A large marker-assisted selection (MAS) crossing program is under way primarily to incorporate disease resistance genes into elite recurrent parent lines. Molecular markers have helped breeders locate resistance genes, delimit introgression size, and eliminate linkage drag. Considerable progress has been made with Tomato Yellow Leaf Curl Virus (TYLCV) genes *Ty-3* and *Ty-1*, which UF/IFAS plant breeders and a cooperating lab in the Netherlands have shown to be alleles at the same locus. The short introgression lines developed should allow tomato breeders for the first time to develop TYLCV-resistant hybrids that are horticulturally as good as susceptible hybrids. Genomic markers are being used to facilitate breeding for resistance to bacterial spot, bacterial wilt, and graywall. Once verified, markers could be used to eliminate graywall in all future tomato cultivars.

In addition to continued breeding for disease resistance, the UF/IFAS tomato breeding program is focusing on releasing more heat-tolerant cultivars and on developing compact growth habit (CGH) tomatoes that do not require staking, pruning, or tying. These CGH lines have a concentrated fruit set, firmness, and jointless pedicels that could allow for once-over mechanical harvest that requires much less labor input. The search for lines with superior flavor is ongoing and will continue to be one of the traits integrated into future cultivars.



## Tomato Lines and Hybrids Released from 2002

Release Date	Title
10/15/02	Fla. 7692B - Tomato Breeding Line
10/15/02	Fla. 7804 - Tomato Breeding Line
10/15/02	Fla. 7946 - Tomato Breeding Line
10/15/02	Fla. 7973 - Tomato Breeding Line
7/1/03	Fla. 7770 - Tomato Breeding Line
7/1/03	Solar Fire (Fla. 7943B) - Hybrid Tomato Cultivar
10/15/03	Fla. 7514 - Tomato Hybrid Cultivar
10/15/03	Carson (Fla. 7964) - Tomato Hybrid Cultivar
10/4/06	Fla. 000592-2 (Gc9), Fla. 024525-9 (Gc171), Fla. 024652-Y1 (Gc173) - 3 Tomato Breeding Lines
10/4/06	Tasti-Lee® Brand 'Fla. 8153' - Tomato Hybrid Cultivar
10/4/06	Fla. 7907 - Tomato Breeding Line
10/4/06	Fla. 8059 - Tomato Breeding Line
1/8/08	Fla 8000 - Tomato Germplasm
1/8/08	Five Tomato Breeding Lines (678, 685, 701, 707, 726)
1/8/08	Tribeca (Fla. 8363) - Hybrid Tomato Cultivar

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