2013 UPDATE

# New Plants for Florida

## Varieties Developed by the
## UF/IFAS Florida Agricultural Experiment Station

UF UNIVERSITY of FLORIDA IFAS

**FOR OVER A CENTURY, THE UNIVERSITY OF FLORIDA IFAS** has been developing new cultivars that resist disease, grow more efficiently, and are more flavorful, nutritious, and attractive to consumers. This work has helped position Florida as an international leader in agricultural production, with tremendous impacts to the health of Florida's economy and communities.

These successes are rooted in the hard work and accomplishments of generations of UF/IFAS faculty. By building on this foundation, IFAS scientists continue a legacy of service, excellence, and innovation. This booklet provides a brief history and overview of the UF/IFAS plant breeding program.

Our scientists' successes and contributions are built on two important platforms. First, the strong partnership with Florida's agricultural community has been key. We appreciate and acknowledge growers' assistance in identifying needs, testing new cultivars, and providing feedback about challenges in the field. We look forward to many years of future collaboration.

Second, state, federal, and private research funding has provided a critical base for our work, resulting in new patents and licenses that have generated millions for Florida growers and contributed to a better quality of life and healthier living.

As we look to another century of innovation and discovery, we remain steadfast in our commitment to serve Floridians by providing excellence in scientific research and development in agriculture and natural resources.

John P. Hayes
Dean for Research, UF/IFAS
Director, Florida Agricultural Experiment Station

# Introduction

Plant breeding and cultivar development have been key to human success since we turned from hunter-gatherers to an agrarian society. From humble origins using simple selection techniques to domesticate wild plants and increase yield, plant breeding now uses cutting-edge science and technology to address some of the most daunting issues in agriculture. Contemporary plant breeders help create crops that are resistant to disease, have improved nutritional value, outcompete weeds, have superior yield, taste better, use less water, and are less susceptible to fluctuations in climate and weather. We benefit from the work of these scientists every day.

UF's Institute of Food and Agricultural Sciences (IFAS) integrates teaching, research, and outreach in agriculture, natural resources, and related disciplines. The IFAS research mission is led under the Florida Agricultural Experiment Station, formed in 1887 by the Hatch Act to complement the Morrill Act that established U.S. land-grant universities. IFAS Research embodies the core mission of land-grant universities: developing new knowledge to address critical needs and sharing that understanding with the public. The UF/IFAS plant breeding program is an integral part of this work. It is among the strongest and most diverse in the country and is a major contributor to plant breeding efforts worldwide.

UF/IFAS scientists have long been at the forefront of plant breeding, and Florida's climate and growing conditions have placed the UF/IFAS plant breeding program in a unique position globally. It is a proving ground for a large and growing number of diverse species to see how they stand up to different seasons, growing conditions, and weather patterns, all of which often create considerable disease and insect pressures.

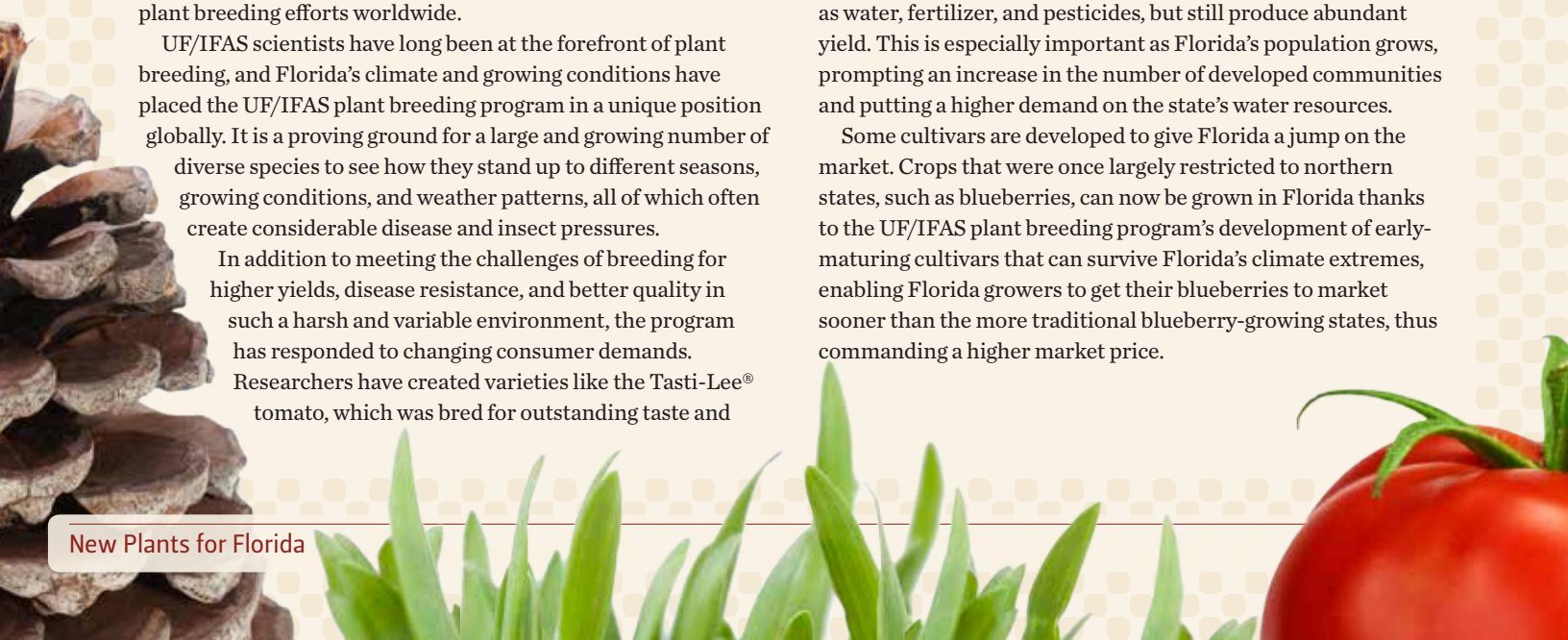
In addition to meeting the challenges of breeding for higher yields, disease resistance, and better quality in such a harsh and variable environment, the program has responded to changing consumer demands. Researchers have created varieties like the Tasti-Lee® tomato, which was bred for outstanding taste and can also withstand Florida's growing conditions and disease pressures. The strawberry breeding program released Winterstar™ 'FL 05-107' (U.S. Patent PP23,042), which was bred for its sweet flavor but also exhibits early yields, firmness, and good size and shipping quality. The citrus program breeds not only for disease resistance, but also for early ripening, easy peeling, seedless fruit with an attractive peel.

Winterstar™ 'FL 05-107' photo provided by Ekland Marketing Company of California, Inc.

Specialty crops, which include ornamental flower and foliage plants, vegetable and fruit crops, turfgrasses, and forage crops, are one of the important focal areas of the plant breeding program at UF and agricultural production in Florida. No other public program researches, refines, and breeds such a large variety of plant species, many of which can also be cultivated in other states and countries that have growing environments similar to Florida's.

New cultivars are sometimes developed to save money and resources in response to changing economic conditions. One example of this is breeding plants that require fewer inputs, such as water, fertilizer, and pesticides, but still produce abundant yield. This is especially important as Florida's population grows, prompting an increase in the number of developed communities and putting a higher demand on the state's water resources.

Some cultivars are developed to give Florida a jump on the market. Crops that were once largely restricted to northern states, such as blueberries, can now be grown in Florida thanks to the UF/IFAS plant breeding program's development of early-maturing cultivars that can survive Florida's climate extremes, enabling Florida growers to get their blueberries to market sooner than the more traditional blueberry-growing states, thus commanding a higher market price.



# History of Cultivar Development in Florida

In the early years, the UF/IFAS plant breeding program focused on developing forage varieties and "green manure" cultivars like velvetbean, a viny legume that was tilled back into the soil to provide nitrogen for the next crop. Up until the 1950s, new cultivars were mainly selected from introduced material, with the notable exception of the peanut program. The UF/IFAS peanut breeding program is the country's oldest, and in 1928 it achieved the first successful artificial hybridization of peanut. Artificial hybridization allowed breeders to select for disease resistance, increased yields, and better quality. It is a labor-intensive process that involves crossing plants and evaluating successive generations before a cultivar can be deemed an improvement upon what is currently available to the industry. The first peanut cultivar developed using this method, 'Dixie Runner', was released in 1943 and was widely grown in the southeastern United States for many years.

The GI Bill was a boon for the plant breeding program. Upon return from World War II, many soldiers took advantage of GI Bill benefits and went to college. Universities expanded their faculties to accommodate swelling enrollment. The UF/IFAS plant breeding program benefitted from this increase in scientific brainpower and began researching and releasing more new plant varieties. At first, these scientists primarily used traditional means of selection, but gradually they began developing new cultivars using artificial hybridization. Because cultivars often take 10–20 years to research, develop, and release, the true payoff from the postwar years was not seen until the 1960s, when 77 new cultivars were released. Compared to the early days of the program, when only two or three varieties were released in a decade, this was a significant accomplishment.

Succeeding decades saw increasing numbers of released cultivars as old cultivars were improved upon. When a widely grown high-yield peanut variety known as 'Florunner' succumbed to Tomato Spotted Wilt Virus, UF/IFAS researchers developed a new class of peanut cultivars that was resistant to the disease, marking the first time peanuts had been bred for disease resistance and rescuing the industry from impending collapse. Today, all of the major peanut cultivars grown in the Southeast trace much of their parentage to these disease-resistant cultivars.

Recent innovations in plant breeding include the development of marker-assisted selection (MAS), a method that gives breeders the ability to easily track the genes that lead to resistance to a particular disease before they ever cultivate and evaluate a new plant variety. This method is particularly useful for diseases that don't express themselves in young plants. MAS is especially helpful in UF/IFAS's tomato breeding efforts today. As researchers work to develop elite breeding lines that incorporate a number of different disease resistances, MAS and other molecular approaches help them select for the traits they want to see in the finished product.

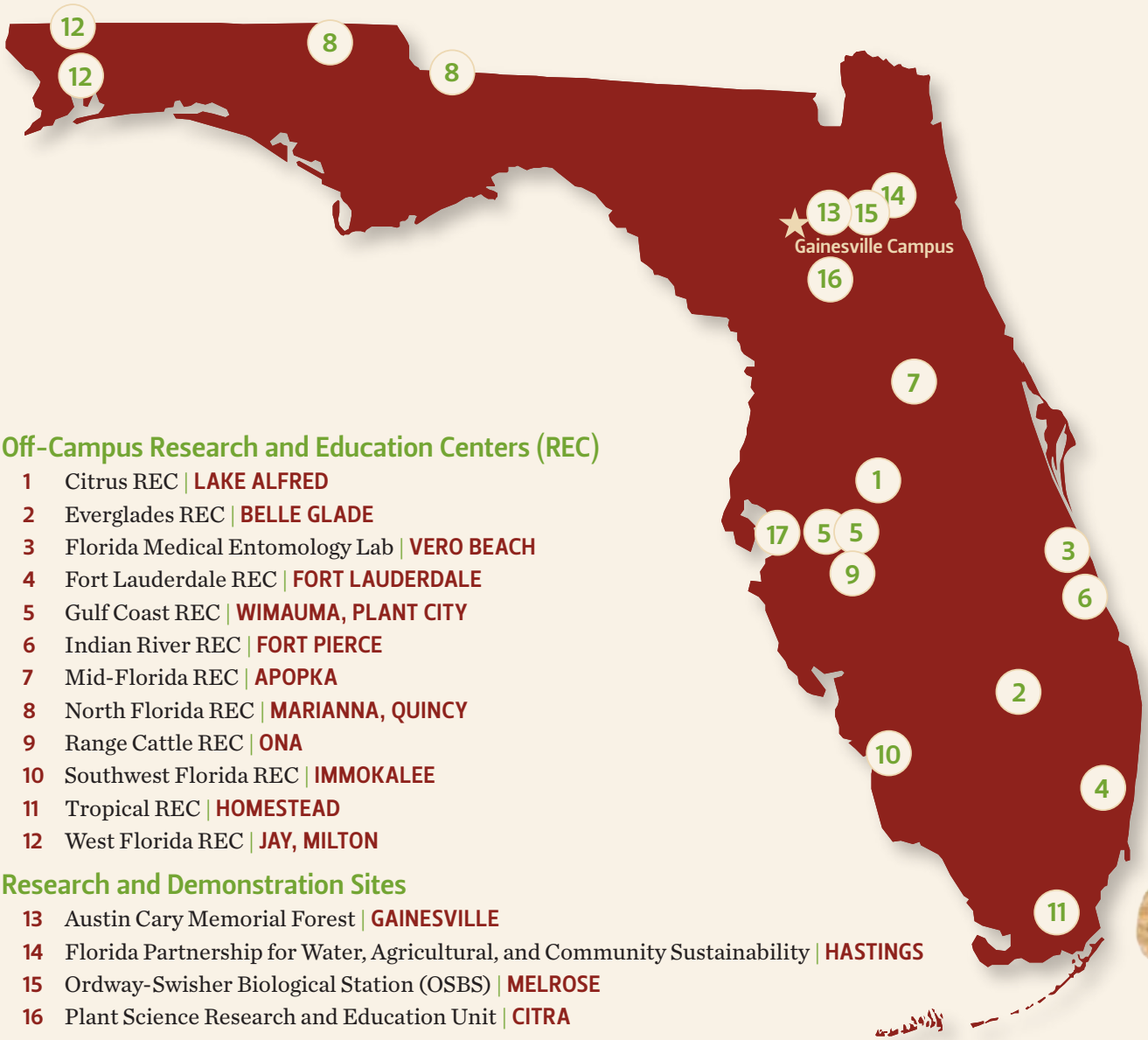
| IFAS INVENTIONS | | | |
|---|---|---|---|
| Fiscal Year | OTL[a] Invention Disclosures | FAES[b] Cultivar Releases | TOTAL |
| 2002 | 22 | 34 | 56 |
| 2003 | 28 | 17 | 45 |
| 2004 | 32 | 21 | 53 |
| 2005 | 29 | 21 | 50 |
| 2006 | 33 | 44 | 77 |
| 2007 | 44 | 29 | 73 |
| 2008 | 30 | 36 | 66 |
| 2009 | 33 | 33 | 66 |
| 2010 | 32 | 16 | 48 |
| 2011 | 34 | 24 | 58 |
| 2012 | 39 | 32 | 71 |
| TOTAL | 356 | 307 | 663 |

[a]OTL = Office of Technology and Licensing
[b]FAES = Florida Agricultural Experiment Station

In the last five years, most of the major plant species have been genome-sequenced, opening up the field of genomic science to plant breeders. Knowing the gene sequences in a species helps make plant breeding more effective and efficient.

Since the UF/IFAS plant breeding program began over a century ago, the scientific knowledge base has grown and expanded significantly, giving plant breeders more tools in their toolbox, but the basic mission of the program has not changed. The program continues to release ever-improved cultivars that are bred for pest and disease resistance, yield, quality, nutrition, taste, and appearance. As one of the most diverse plant breeding programs in the country and one of a dwindling number of public institutions involved in plant breeding, UF/IFAS continues to innovate and streamline its breeding methods to meet the needs of agricultural producers and society.

# IFAS Research Facilities




## Off-Campus Research and Education Centers (REC)

1 Citrus REC | **LAKE ALFRED**
2 Everglades REC | **BELLE GLADE**
3 Florida Medical Entomology Lab | **VERO BEACH**
4 Fort Lauderdale REC | **FORT LAUDERDALE**
5 Gulf Coast REC | **WIMAUMA, PLANT CITY**
6 Indian River REC | **FORT PIERCE**
7 Mid-Florida REC | **APOPKA**
8 North Florida REC | **MARIANNA, QUINCY**
9 Range Cattle REC | **ONA**
10 Southwest Florida REC | **IMMOKALEE**
11 Tropical REC | **HOMESTEAD**
12 West Florida REC | **JAY, MILTON**

## Research and Demonstration Sites

13 Austin Cary Memorial Forest | **GAINESVILLE**
14 Florida Partnership for Water, Agricultural, and Community Sustainability | **HASTINGS**
15 Ordway-Swisher Biological Station (OSBS) | **MELROSE**
16 Plant Science Research and Education Unit | **CITRA**
17 Tropical Aquaculture Laboratory | **RUSKIN**

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AN EQUAL OPPORTUNITY INSTITUTION. Florida Agricultural Experiment Station, Institute of Food and Agricultural Sciences, University of Florida, Dr. John Hayes, Dean for Research, publishes this information to further programs and related activities. Information about alternate formats is available from IFAS Communications, University of Florida, PO Box 110810, Gainesville, FL 32611-0810.