

# SUGARCANE AND BIOENERGY GRASSES

## INTRODUCTION

Sugarcane has been vital to Florida since 1572, when it was first grown by the Spanish founders of St. Augustine. Today, the state produces about 400,000 acres annually with an estimated farm-gate value of \$750 million. This crop has become increasingly important in recent years for its bioenergy production potential.

High-biomass grasses such as energy cane, napier grass, and sorghum promise to become primary feedstock for Florida's emerging biofuels industry. Energy cane produces biomass with elevated fiber and reduced sucrose content. Napier grass is a major livestock feed because of its excellent forage quality and tolerance of multiple annual harvests. These two grasses are the most productive perennial biomass grasses on marginal land in the coastal southeastern U.S. and are considered dedicated feedstocks for production of lignocellulosic biofuel. Sweet sorghums and high-biomass sorghums are annual bioenergy crops with exceptional drought tolerance.

## FROM THE BEGINNING

Florida's sugarcane-breeding program began in the 1960s at Canal Point under an agreement between the USDA, the University of Florida, and the Florida Sugar Cane League. The main purpose of the program was to develop high-yielding and disease-resistant sugarcane cultivars for sucrose production. More than 90 percent of Florida's sugarcane acreage is planted with cultivars from this program.

Breeding bioenergy grasses began at UF/IFAS in the early 1980s with the creation of the napier grass-breeding program by Stanley Schank. The increased interest in renewable energy from low-input crops stimulated the formation of the energy cane cultivar development program at the UF/IFAS Everglades Research and Education Center through the collaborative efforts of Robert Gilbert (UF/IFAS) and Jack Comstock (USDA, Canal Point) in 2006. The bioenergy sorghum-breeding program, founded the following year, benefitted from Daniel Gorbet's grain sorghum-breeding program at the UF/IFAS North Florida Research and Education Center which included germplasm with excellent disease resistance.

## TODAY AND TOMORROW

The primary focus of the current **UF/IFAS sugarcane-breeding program** is to improve biomass and sucrose content in new cultivars with greater resistance against major diseases, such as brown rust and orange rust, with strategies focused on developing molecular techniques to improve screening of clones against these diseases.

The **UF/IFAS energy cane-breeding program** is focused on developing high-biomass and disease-resistant cultivars for lignocellulosic ethanol production on marginal or sandy soils. Some top priorities of the program include improving genetic diversity and resistance against biotic and abiotic stresses.

The **UF/IFAS sorghum-breeding program** is focused on developing cultivars adapted to low-input agriculture in the southeastern U.S., including sweet sorghums with enhanced bioprocessing characteristics. Genetic marker-assisted selection is helping breed for disease resistance.

The **UF/IFAS napier grass-breeding program** is implementing conventional and marker-assisted breeding strategies for improved biomass production. Genetically distant napier grass genotypes were identified with molecular markers and used as parents for diallel crosses. Progenies with hybrid vigor were selected and field-tested in different locations throughout Florida, showing significant yield increases compared to earlier cultivars.

While Florida currently contributes 50 percent of the nation's cane sugar and 25 percent of all U.S.-produced sugar, bioenergy grasses recently bred by UF/IFAS breeding programs will begin to be commercially grown in Florida when dedicated biofuel conversion facilities for these feedstocks are completed.





## SUGARCANE AND BIOENERGY GRASSES RELEASED SINCE 2006

Release Date	Cultivars
<b>Sugarcane</b>	
11/19/07	'CP 00-1446', 'CP 00-2180', 'CP 00-1101'
10/21/08	'CP 01-1372', 'CPCL 97-2730'
11/09/09	'CPCL 99-4455'
02/18/11	'CP 03-1912', 'CPCL 00-4111'
08/19/11	'CPCL 95-2287', 'CPCL 02-0926', 'CPCL 02-1295', 'CP 04-1566', 'CP 04-1844', 'CP 04-1935'
09/07/12	'CPCL 05-1791', 'CPCL 05-1526', 'CPCL 02-6848', 'CPCL 05-1102', 'CPCL 05-1201'
<b>Sweet Sorghum</b>	
04/15/14	Gusher, Caramelo, Fortuna, Sweet Florida, Candycane
07/21/15	12 Inbred Breeding Lines
<b>Energy cane</b>	
10/07/13	UFCP 74-1010, UFCP 78-1013, UFCP 82-1655, UFCP 84-1047, UFCP 87-0053

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