



Photo provided by
Dr. Brian Boman

Dr. Brian Boman, IRREC Professor of Agricultural Engineering, is conducting experiments with two candidate crops for use in biofuels production.

Inside this issue of the UF/IFAS Indian River Research and Education Center Newsletter, the two candidate crops' potential for successful biofuels production is highlighted.

A second newsletter edition feature is the "Fallow Fields Working Group" meeting held at IRREC on October 1, 2014.

Hosted by the Treasure Coast Research Park, the event attracted research scientists, legislators, citrus producers and national industry representatives.

It is anticipated that a new biofuels production industry will emerge in Florida's yearlong production fields.

At the center of the new industry is UF/IFAS, and the Indian River Research and Education Center.

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UF/IRREC PROFESSOR DR. BRIAN BOMAN EXPERIMENTS WITH PROMISING CROPS FOR BIOFUELS PRODUCTION



Local National Public Radio affiliate station Local National Public Radio affiliate station WQCS-FM 88.9 newscaster Tiffany Termine interviews Dr. Brian Boman in the biofuels production field

Florida agriculture is one of the nation's leaders in agriculture crop production and innovation. While efforts to start a biofuel industry have been exploratory, a research professor has a good idea what the best candidate crops are to fuel the new industry--and how to produce them sustainably. There are only a few crops that, in the short term, are suitable for biofuel feedstocks in Florida. The crops must be economical to grow; readily convertible to fuel using existing technology; tolerant to heat, drought, and excessive rain; and available as feedstocks year round.

CANDIDATE CROPS

According to University of Florida Professor of Agricultural and Biological Engineering, Dr. Brian Boman, the most promising crops for bio

fuel production are the eTuber™ (industrial sweet potato), sweet sorghum, and energybeets (non-edible sugar beets).

“These crops can be grown throughout South Florida and use processing technology that is ready now,” said Dr. Boman. “A crop rotation using the three crops can provide feedstocks for biofuels eleven months of the year.”

Dr. Boman is conducting research to evaluate two of the candidate crops' efficacy for production in the state where yearlong production is possible. He tested the eTuber™ and energybeets using a center-pivot irrigation system, on a 24-acre experimental field located at the UF Indian River Research and Education Center. The center is part of the university's statewide Institute of Food and Agricultural Sciences.

THE eTUBER (TM)

SPONSORING ORGANIZATIONS

The work was funded by the Florida Department of Agriculture and Consumer Services, Office of Energy. Participating in the research project were Boman’s IFAS colleagues Dr. Ann Wilkie, Academic Leader of the BioEnergy and Sustainable Technology Laboratory at UF in Gainesville; and Dr. Edward “Gilly” Evans, Assistant Professor and Associate Director at the UF Tropical Research Center in Homestead.

Additional partners and cooperators include: Treasure Coast Education, Research, and Development Authority (TCERDA); National Corn Ethanol Research Center (NCERC), in Edwardsville, Indiana; CAREnergy, located in North Charlestown, South Carolina; University of California, Berkeley; Renewable Energy Group (REI), in San Francisco, California; Mozaic Fertilizer, in Lithia, Fla.; Doreva Produce, in Livingston, California; and Penford Corporation, Centennial, Colorado.

ENERGY

Both starch and sugar are used in the production of biofuels. Starch must be converted first to sugar and then formulated to fuel; however, sugar is converted directly to biofuel.

THE eTUBER

The eTuber™ has 50 percent more dry matter than current leading varieties of sweet potatoes grown in Florida.



A traditional sweet potato sits alongside the eTuber (tm)

And, as a result, the energy crop potatoes offer a greatly increased ethanol producing potential. The crop’s starch can also be processed with current technology used to produce ethanol from corn.

The eTuber (tm) tolerates heat, requires little irrigation, and produces up to five times more starch per acre than corn.

Additionally, eTubers require less water, fertilizer, and pesticides than do most other crops; they grow well in nutrient-poor sandy soils; recover well after drought and heat stress; are resistant to many nematodes and insect pests; don’t compete with food crops for prime land; and, the processing waste is a high values protein product.

ENERGYBEETS EXPERIMENTS

ENERGYBEETS

Energybeets produce simple sugars and ferment without the need for enzymes, which eliminates a step in ethanol production. Energybeets produce twice the amount of sugar per acre as corn. Additionally, stems and leaves may be sold as byproducts suitable for livestock feed products.

Perhaps the most valuable aspect for the crop is that it will tolerate below freezing temperatures, which makes it a very attractive winter crop in Florida. Beets, however, will not produce well in Florida's hot, humid summer seasons, and therefore must be harvested by early June. Both crops have the advantage of storing well in the ground and will continue to grow until harvested.



Senior Engineer Technician Gerry Britt holds an Energybeet produced at IRREC

greenhouse gas (GHG) analysis for eTuber from field and processing data, and testing syrup as a putative feedstock for e-coli, algae, and yeast to make biodiesel, jet fuel, etc.

“We are also looking to develop a method of producing biogas using culled sweet potatoes, vines, and stillage through anaerobic digestion,” said Boman.

ECONOMIC ANALYSIS

Dr. Boman said a very important part of the study is an economic analysis. This analysis will include factors such as the costs for the crops' production, economics for their conversion to ethanol and biofuels, a market potential analysis, and evaluation of the impact of commercialization of the energy crops and biofuel industry on economic development in Florida.

RESEARCH OBJECTIVES

The major objectives of the field trials are: experiments on planting density, rotation crops, fertilizer and irrigation rates, pest and disease control and, planting and harvest times.

Regarding plant processing, research objectives were: to optimize protocols for conversion into ethanol and by-products,

“We are focused on developing the information needed for growers who are considering an investment in the equipment necessary to produce energy crops.

Growers are not going to produce the crops until there is a market,” said Boman. “We are a few years away from the industry taking off, but we need to be working on it now.”

A NEW INDUSTRY

FALLOW FIELDS WORKING GROUP



Derrick Chennault and John Lubinir, with Eastwood Environmental, Inc., explain the value of nutrient reclamation for production of biofuels crops

The University of Florida, Indian River Research and Education Center (IRREC) and the Treasure Coast Education, Research & Development Authority (TCERDA) jointly hosted a rousing workshop, “Advanced Bio-Fuel Feedstock” as part of its Fallow Fields Working Group on Wednesday, October 1, 2014, at the IRREC facility in Fort Pierce.

LEADERSHIP

Longtime St. Lucie County cattle ranch owner and TCERDA Chair Mike Adams opened the meeting along with research park CEO & Executive Director Ben DeVries to about 40 attendees.

Adams noted St. Lucie County had purchased the land for the research park and applauded the local leadership in establishing the park in an effort to support research for the betterment of the community. He then introduced Research Park CEO Ben DeVries.

DeVries summarized his comments by saying, “We are interested in using marginal lands for alternative crops,” he emphasized. “We don’t want to lose the citrus industry and are seeking crops to produce alternative fuels—not to replace citrus—but to sustain the industry in the region by putting fallow fields back into production.”

NATIONAL FUEL EXPERTS ENCOURAGED FLORIDA BIOFUELS INDUSTRY

“We don’t want to lose the citrus industry and are seeking crops to produce alternative fuels—not to replace citrus—but to sustain the industry in the region by putting fallow fields back into production.”



Commercial Aviation Alternative Fuels Initiative Executive Director Emeritus, Richard L. Altman

UF RESEARCH PRESENTATIONS

Event presenters were UF research professors who have completed and are continuing research projects with biofuels candidate crops such as Energybeets and the eTuber®.

University of Florida research professors Dr. Brian Boman, and Dr. Maninder Singh made crop agronomy presentations, and addressed a number of questions posed by attendees.

NATIONAL INDUSTRY PRESENTERS

Other presenters represented national production interest groups and firms, one of which was the Commercial Aviation Alternative Fuels Initiative Executive Director Emeritus, Richard L. Altman.

Also presenting was President for EnerGenetics Consulting, Steve Libsack, presenting about conversion processing; and, Derrick Chennault and John Lubinir, with Eastwood Environmental, Inc., about nutrient reclamation.

In an interview with Richard Altman, he said, “A Florida biofuels industry is a great opportunity for both transportation needs, and to address the critical

ENERGYBEETS PRODUCE SUGAR WHICH IS CONVERTED TO FUEL



Four stages in the conversion of Energybeets to fuel

needs for Florida growers. We are interested because it makes both of those things come together.”

Altman summarized his recommendations for the local biofuels industry, urging research park leaders to consider the five points required for the industry’s success:

KEY RECOMMENDATIONS

1. Projects need to be local and unique;
2. biofuels crops must have feedstock potential;
3. the biofuels industry must have strong local private leadership, and a supply chain;

4. end customers must be in place: and,
5. the U.S. Department of Agriculture must back the biofuels production as a priority citrus substitute in rural development as a top goal.

Altman enthusiastically urged attendees to move forward with the planned biofuels industry as the aviation industry is in need of alternative fuels.

“Walt Disney World realized an energy shortage recently and considered shutting down operations for a day,” said Altman.

“There are critical needs and fuel shortages.”

BIOFUELS PRODUCTION INDUSTRY WELL SUPPORTED



USDA Florida Farm Service Agency (FSA)
Executive Director, Rick Dantzler

INFLUENTIAL SUPPORT

In attendance were Doug Bournique, representing the Indian River Citrus League; former state Senator and current St. Lucie County Property Appraiser Ken Pruitt, Martin County Commissioner Ed Fielding, representatives from the Florida Department of Agriculture and Consumer Services Office of Energy, representatives from the University of Florida, Florida Atlantic University, South Florida State College, and local growers.

The final speaker, USDA Florida Farm Service Agency (FSA) Executive Director, Rick Dantzler, announced his commitment to promote biofuels production at the research park to his Washington D.C. constituents.

Dantzler closed his comments with, “I am so enthused with what I have heard today; I would like for you to come up with a program, and I will go to work with you in Washington, DC. Please give me a list of things you want me to work on in Washington--this is exciting.”

Event participants demonstrated passion and support for the beginning of a new biofuels production industry that will commence at the Treasure Coast Research Park, as the event continued for nearly an hour following its scheduled conclusion.