

GLOBAL FOOD SYSTEMS

Advances in transportation and communications technology enable scientists to address crop-production issues worldwide, research that can help feed the hungry and provide solutions to domestic production challenges. With this increasingly global approach to agriculture comes a greater understanding that crop yields, economic prosperity and political stability are interconnected, particularly in developing nations.

As the world's human population climbs towards a projected 9.6 billion people in the year 2050, food production will assume an ever-greater role in human affairs. New technologies are needed to help farmers grow food in previously underused locations, with the help of innovative crop varieties and management techniques.

Researchers with the University of Florida Institute of Food and Agricultural Sciences are committed to improving food security at home and abroad, by pursuing studies aimed at reducing crop losses, increasing productivity, improving efficiency and ensuring that harvested crops are properly handled, stored and processed. The long-term result will be enhanced agricultural production and improved food security, across Florida and around the world.

NATURAL
RESOURCES



AGRICULTURE



HUMAN
SYSTEMS



Ongoing Research



NEW CROPS FOR FLORIDA

Many of Florida's best-known crops originated in other countries and were successfully adapted to the state's hot, humid growing conditions. Now, a team of UF/IFAS researchers is assisting the state's nascent olive-oil industry by investigating methods for growing olive trees, *Olea europaea*. Entomologist Jennifer Gillett-Kaufman notes that one of the most important hurdles has been cleared – surveys of potential pest insects and insect-vectored pathogens revealed no unexpected concerns that could hinder production. Gillett-Kaufman helped organize a working group to assess growers' needs and develop recommendations for variety selection, management practices, harvesting and processing. Florida currently has more than 200 acres of olive groves statewide; acreage will likely expand 10-fold in the next several years. Growers are focused on agritourism and producing private-label olive oils for the farm-to-table market.



BACTERIAL RESISTANCE IN RICE

Rice is the world's most important staple crop, and steady population growth makes it imperative to ensure adequate global rice production. Frank White, a professor with the UF/IFAS Department of Plant Pathology, is part of a multi-institution research team funded by the Bill and Melinda Gates Foundation to develop rice varieties resistant to all strains of a serious disease, rice bacterial blight. Caused by the bacterium *Xanthomonas oryzae* pv. *oryzae*, bacterial blight reduces yields up to 60 percent and has no effective chemical control; the disease is a constant threat to subsistence farmers in Asia and Africa. White's team is adapting novel genome editing technology to prevent the bacterium from accessing nutrients within a host plant. Ultimately, the researchers will help existing rice-breeding programs to incorporate this resistance strategy.



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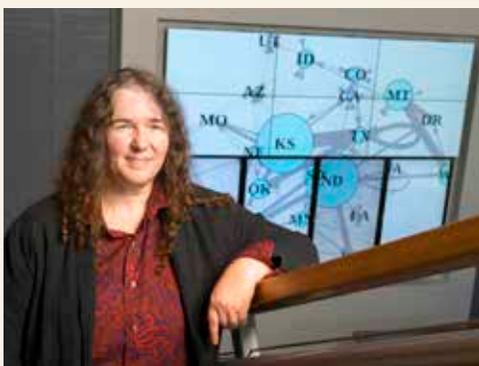
Increased consumer awareness of global concerns such as food security and economic development has spurred demand for locally produced food nationwide. A UF/IFAS study conducted in 2011-2012 showed that local food accounted for about 20 percent of all groceries purchased in Florida, four times the expected percentage, according to Alan Hodges, an Extension scientist with the UF/IFAS Department of Food and Resource Economics. Local food sales benefit Florida's economy by circulating consumer and retailer dollars in-state, Hodges said. He suggests several explanations for Florida's robust local-food trade, including the year-round growing season and the Florida Department of Agriculture and Consumer Services' "Fresh From Florida" marketing campaign. Hodges believes local food consumption will continue to increase gradually; his next study will examine local food sales by retailers.

Research with Impact



ADVANCING PROTECTED AGRICULTURE

Protected agriculture, the practice of growing plants in greenhouses or other shelters, offers greater yields per acre compared to field cultivation and is an emerging method for producing highly valued specialty crops. In 1991, Florida grew 66 acres of greenhouse food crops; the 2013 statewide total was 385 acres. During that time, numerous UF/IFAS studies evaluated alternative structures and shading options, soilless media, irrigation systems, nutrient management methods, and crop cultivars; as results were obtained, researchers and Extension faculty communicated the findings to producers. Hydroponics expert Bob Hochmuth, a regional specialized Extension agent for vegetable crops with the Suwannee Valley Agricultural Extension Center in Live Oak, credits UF/IFAS for popularizing protected agriculture statewide by demonstrating its potential for profitability and identifying systems and practices best suited to growing conditions in Florida.



PRESERVING STORED GRAIN

Worldwide, cereal grain production exceeds 3 billion tons annually. Most grain is transported and stored before processing, creating opportunities for insect pests and fungi to damage grain and destroy the crop. Karen Garrett, a professor with the UF/IFAS Department of Plant Pathology, Institute for Sustainable Food Systems, and Emerging Pathogens Institute, led a research team that analyzed grain transportation networks to provide strategies for improving inspections and reducing financial losses. The researchers identified U.S. states that are hubs for grain movement and/or bridges between regions, because these states are key for inspection and management of potential contamination. Garrett's team is also analyzing networks supporting crop breeding, seed distribution, and postharvest transport for other crops.



IMPROVING NUTRIENT MANAGEMENT

Florida's \$675 million sugarcane crop mainly grows on organic soils in the Everglades Agricultural Area (EAA) south of Lake Okeechobee, but more than 20 percent of the acreage is now produced on mineral soils bordering the EAA. Regardless of location, producers benefit from the efforts of soil nutrient researchers including Mabry McCray, an associate scientist with the UF/IFAS Everglades Research and Education Center in Belle Glade. McCray and his colleagues used soil and leaf-tissue samples to develop a superior protocol for assessing soil nutrient availability and plant nutritional status. The team also revised nitrogen fertilizer recommendations for sugarcane on sandy soils that are 20 percent lower than previous grower applications but satisfy crop demands. These findings will help guide future expansion of sugarcane operations on mineral soils.

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