



## Recent and current research, extension and teaching programming

### Elias Bassil\*, Molecular Plant Physiologist (New faculty)

- Understand how cellular and molecular processes that allow plants to acclimate to abiotic stresses such as salinity, drought, flooding, heat and nutrient imbalance
- Study how plant nutrient transporters control nutrient homeostasis within the cell and whole plant
- Root biology and function in plant nutrition and stress adaptation
- Extension program in plant biotechnology and vanilla production

### Haimanote Bayabil\*, Water Resources (New faculty)

- Improving irrigation management in urban and agricultural systems
- Assessing land and water management practices on water quality and quantity using field observations and model simulations
- Integrating field observations with remotely sensed data to better understand and mitigate plant stress
- Extension programs - improve irrigation management of the green industries and for urban landscapes
- Teaching – Irrigation Principles and Management (AOM6735)

### Zachary Brym\*, AgroEcologist (New faculty)

- Data-supported adaptive management practices for resource conservation and profitability
- Sustainable, resilient and biodiverse agroecosystems
- Feasibility of sustainable hemp production
- Distribution and management of invasive plant species
- Extension programs – increase literacy and awareness of agroecology and natural systems; sustainable hemp production

### Daniel Carrillo\*, Entomologist – Tropical Fruits

- Biology and management tactics for ambrosia beetle vectors of laurel wilt on avocado
- Biology and control of invasive plants of concern to the tropical fruit industry
- Biological control of papaya mite pests and fruit flies
- Pitaya and sapodilla insect pests and control
- Extension programs – IPM for tropical fruit crop systems and invasive species preparedness and management

### Alan Chambers\*, Genetics-Plant Breeding-Tropical Fruit Crops (New faculty)

- Trialing of selected tropical fruits and release of cultivars with superior yield and fruit quality

- Cultivar development for selected tropical fruits (mango, papaya, *Vanilla*, and passionfruit)
- Establishing marker-assisted selection and candidate gene discovery for improved plant breeding efficiency
- Extension programs – Distribution of information and planting material for selected crop species

### Jonathan Crane\*, Tropical Fruit Crop Specialist, Associate Director

- Extension programs - cultural practices for tropical fruit crops and BMP's and Food Safety for tropical fruit crops
- Collaborator on papaya plant breeding and selection, lime scion-rootstock evaluations, pest management practices, annona pollination and development of sustainable irrigation and nutrient management practices for tropical fruit crops

### Edward Evans, Director of TREC

- Leadership
- Advocacy
- Mentoring
- Guidance
- Fund raising
- Day-to-day operations
- Strategic planning and vision

### Romina Gazis\*, Plant Pathologist, Plant Diagnostic Clinic (New faculty)

- Understand biology behind various plant diseases (Fungi, Bacteria, Oomycetes, and Viruses) affecting agricultural and natural systems
- Biological control of plant pathogens
- Extension - Dir. of Plant Diagnostic Clinic – identification of biotic and abiotic stresses and recommendations for control and mitigation

### Young Gu Her\*, Hydrologist (New faculty)

- Natural resources – watershed monitoring and modeling of agricultural, natural area and urban boundaries
- Sustainable agricultural water management
- Effect of climate change and sea level rise
- Extension - agriculture, urban and environmental water issues – sea level rise, climate change, and fresh water management systems

Yuncong Li\*, Soil and Water Science

- Natural resources – soils and natural area restoration, environmental nutrient management and monitoring
- Sustainable agriculture, best management practices – soil nutrient and water management and quality
- Fertilizer formulation development for sustainable agriculture
- Extension program in plant nutrition management in agricultural and natural systems

Catharine Mannion\*, Entomologist – Ornamentals

- Biology and control of invasive pests in the nursery (field and container) and urban landscapes
- Biology and management of key hemipteran pests with emphasis on invasive whiteflies and scale insects in the urban landscape
- Extension programs – IPM of ornamental plants in nursery production and urban landscapes

Geoffrey Meru\*, Genetics-Plant Breeding-Vegetable Crops (New faculty)

- Genetic mapping of disease resistance genes for improved plant breeding efficiency
- Genetic improvement of selected vegetable crops (e.g., watermelon, squash/ pumpkin, and snap beans)
- Development, selection and release of improved vegetable crops
- Extension programs - client education on plant breeding and crop cultivars

Bruce Schaffer, Ecophysiology of Tropical and Subtropical Horticultural Crops

- Effects of light, drought, wind and flooding stress on physiology of subtropical and tropical fruit crops
- Effect of laurel wilt on physiology of avocado
- Prevention of iron deficiency in subtropical and tropical fruit crops
- Effect of cover crops on crop physiology

Dak Seal\*, Entomologist – Vegetable Crops

- Biology and management of pepper weevil, *Thrips palmi*, corn silkfly, melon thrips, nematodes, and whiteflies on peppers, tomatoes, sweet corn, eggplant, lettuce, etc.
- Extension program – IPM of commercial vegetable production

Ashley Smyth\*, Biogeochemist/Ecosystem Ecologist (New faculty)

- Aquatic ecology and water quality management
- Nutrient dynamics of lakes, wetlands and estuaries
- Impact of a changing climate and nutrient pollution on coastal resources
- Extension programs – climate change, coastal resilience, living shorelines, water quality and oyster shell recycling

Wagner Vendrame, Ornamental Horticulture – Plant Tissue Culture

- Micropropagation – ornamentals in general including orchids, foliage, flowering trees, palm trees, and other crops, such as banana, sugarcane, among others.
- Cryopreservation – orchids, bananas, jatropha

- Bioreactors – clonal propagation of orchids, bromeliads, sugarcane, banana and other ornamentals
- Micropropagation of coconut palms
- Biofuel crop – jatropha
- Germplasm evaluation, plant selection and breeding
- Effects of microgravity on differential gene expression
- Microgravity studies on diverse plant species

Shouan Zhang\*, Plant Pathologist – Vegetable Crops

- Invasive pathogens in vegetable, tropical fruit and herbal crops
- Biology and integrated management of vegetable diseases - bacterial spot and tospoviruses on tomato, phytophthora blight on squash/pepper, downy and powdery mildews on squash, halo blight on snap bean, and downy mildew on basil
- Extension programs – Disease diagnosis and IPM of vegetable and alternative crops

Teaching programs by TREC faculty members

1. Tropical Fruit Production and Research (HOS5555; at TREC)
2. Orchidology (ORH4280 distance ed) – undergraduate
3. Orchid Biology and Culture (ORH5282 distance ed) – graduate
4. Orchid Short Course (in person on main campus)
5. Special Topics – Micropropagation (ORH4932; live at TREC)
6. Communication in Academia (distance ed)
7. Irrigation Principles and Management (distance ed)

Collaborating institutions include USDA-ARS, Miami; University of Miami; Florida International University; Fairchild Tropical Botanical Garden; Florida Dept. of Agriculture and Consumer Services and numerous other state, national, and international institutions

TREC

- Four major research/extension areas
  - Ornamental and landscape crops
  - Vegetable crops
  - Tropical Fruit crops
  - Natural Resources
- Located in the most populous region of Florida; gateway to Latin America and the Caribbean
- Florida is one of the most vulnerable states to sea level rise
- Located adjacent to major natural areas (e.g., Everglades National Park, Biscayne National Park, Big Cypress, etc.)
- Miami-Dade County is no. 2 of 67 Florida counties in agricultural receipts (annual \$800+ million economic impact)
- With 1,200 miles of coast, 79% of Florida's economy is linked to coastal resources

\*, Research/Extension appointment

(c://trec/adm/misc/2016/TREC faculty current research and extension 3-11-19.doc)

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