Scale-Neutral Harvest-Aid System and Sensor Technologies to Improve Harvest Efficiency and Handling of Fresh-Market Highbush Blueberries

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Ultimate goal is to create long term impact on fresh-market highbush blueberry industry and benefit stakeholders
Principal Investigators

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Collaborators: Jim Olmstead, UF. Breeding and phenotyping; Renee Holland, UGA. Outreach and extension; Maggie Schaber, NCSU. Breeding.
Project Overview

- USDA NIFA competitive grant: Specialty Crop Research Initiative ($2.37 million)
- 14 PIs from 10 institutions; 2014-2018
- Multi-state, comprehensive 4-year research/extension project
Advisory Committee

- John Bennett, CEO, Alma Sunbelt Blueberries.
- Dudley Calfee, President Florida Blueberry Growers Assos.
- John Ed Smith, MBG Marketing, Grant Junction, MI.
- Gerard Krewer, Professor Emeritus, University of Georgia.
- Rod Cook, President, AgView Consulting, USHBC Committee.
- Scott Korthuis, Oxbo mechanical harvester manufacturer.
- Renee Holland, UGA Cooperative Extension.
- Gregg Marrs, Blueline Manufacturing Company LLC.
- Norm Johnson, Littau mechanical harvester manufacturer.
- Tom Giles, Gulf-South Blueberry Growers Association.
- Alto Straughn, Straughn Farms, Waldo, FL. Grower.
Role of Advisory Panel

- Help guide and evaluate the project.
- Members receive formal progress reports
- Informal project updates and requests for input will be given during the year
Objectives

- Five primary objectives in this project

- Sub-objectives within each primary objective
Objective 1

- Develop high-throughput phenotyping technologies to aid the selection of southern and northern highbush blueberry genotypes suitable for semi-mechanical harvest.
Objective 2

• Design a new semi-mechanical harvest-aid system for efficient mechanical fruit harvesting for small- and medium-size blueberry farms.
Sub-objectives

1) Develop the semi-mechanical harvesting system: platform-based harvesting equipment with manually-operated shaking devices and an innovative fruit catching conveyance system.

2) Understand the dynamic interactions between the shaking device and blueberry bushes.

3) Time-motion and ergonomics study to optimize harvest efficiency and improve working conditions.

4) Evaluate quality, microbial safety, and disease incidence in the fruit.
Objective 3

• Develop the next-generation berry impact recording sensor and use it to improve harvest and postharvest operations through a critical understanding of mechanical impacts.
Sub-objectives

1) Develop the next-generation BIRD sensor with smaller size,
2) Measure mechanical impacts created by over-the-row harvesters, semi-mechanical harvesting systems, and hand picking
3) Measure mechanical impacts created by packing lines before and after padding
4) Use the sensor to measure the impact and compression experienced by blueberries during the field transportation and shipping
Objective 4

• Determine microbial contamination and critical control points along the harvest and postharvest chain with the new harvest system.
1. Determine the microbial load of various surfaces along blueberry harvest and processing line
2. Identify the critical control points along blueberry harvest and postharvest chain
3. Evaluate microbe accumulation on, and clean-ability of, different equipment and padding materials
Objective 5

- Conduct economic and ergonomic analyses of the developed technologies and determine the implications to the rural community through outreach and technology transfer.
Sub-objectives

- Ergonomics training
- Economic analysis
- Extension and outreach