REPORT

of

In-Service Training (IST#: 31110), FDACS Program (#20920) and CCA Programs (FL 52402 and FL 52403)

New Technology for Commercial Vegetable Production (IV)

Conference ID: 7834010

Wednesday, February 24, 2016

Polycom from 1306 Fifield Hall to 10 host sites statewide

G. David Liu, Fred Fishel, and Kelly Morgan

Horticultural Sciences, Agronomy, and Soil and Water Science Departments

Tuesday, March 29, 2016

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The carbon footprint calculator, high tunnels, and other new concepts and/or new techniques have been developed to help farmers make informed decisions about crop management. These new techniques can improve profitability for Florida's crop producers and help conserve natural resources. To provide an opportunity for our extension agents and graduate students to learn these new techniques, two out-state and three IFAS extension specialists were invited to present their recent work at the *New Technology for Commercial Crop Production* IST training on February 24, 2016.

The objective of this IST was to introduce new concepts and techniques to our extension agents and graduate students for enhancing the economic and environmental sustainability for commercial crop production in Florida.

Presentation descriptions

The speakers described their presentations as below:

Dr. Dewayne Ingram from the University of Kentucky: Horticultural crop producers and marketers are seeking increasingly sustainable practices. A sustainable system is often described as being environmentally, economically, and socially sustainable. With a maturing nursery industry, economic sustainability is important and the industry has traditionally sought ways to minimize environmental impact of production. Social sustainability is revealed by purchases by the consumer. Understanding the environmental impact of production system protocols could allow managers to make informed decisions to increase efficiency, reduce potentially negative impacts, and reduce the associated variable costs. Understanding the ecosystem services of landscape plants could provide information to help market these products to increasingly environmentally-conscious consumers.

Dr. Annette Wszelaki from the University of Tennessee: Season extension techniques, such as high tunnels and mulches, can enhance the yield and quality of fruits and vegetables, protect crops from climatic extremes, help in transitioning from conventional to organic production, provide a

source of locally grown food year-round, and increase economic sustainability for many fruit and vegetable growers. However, the use of polyethylene plastic raises concern about the environmental sustainability of these highly productive cropping systems. Biodegradable mulches have been available for decades, but have not yet taken hold in the market. We will talk about new developments in biodegradable mulches and making the most of high tunnel space.

Dr. Oscar Liburd: This presentation includes four aspects: (1) A review of the types of damage that mites inflict on strawberry plants; (2) Traditional strategies that are used for monitoring and managing mites in strawberry fields; (3) New technology and tactics that his lab are investigating for managing mites; (4) Benefits of adopting these new tactics for mite management in strawberry production.

Dr. Kelly Morgan: Soil and tissue testing has long been recognized as an Agricultural Best Management Practice for the improvement of nutrient use efficiency. Management of nutrients in Florida's sandy soils is particularly difficult with leaching from excessive irrigation and rainfall. The University of Florida has recently changed its nutrient recommendations from a Mehlich 1 based index to an index based on Mehlich 3 results. The use of these improved index values should lead to greatly improved nutrient management for a wider range of soil conditions. Additionally, use of commercial lab tissue tests for perennial crops and sap testing for short term crops have improved and will be discussed.

Dr. Guodong Liu: As one of 14 states predicted to face "high risk" water shortages by year 2050, Florida needs to use water more efficiently and find more water sources. Central Florida alone has to find an additional 200×10^6 gal/day to meet the needs by 2030. That requires conservation in agriculture because crop production is a major water consumer. Seepage irrigation is the common irrigation approach for potato production in Florida and uses up to 38 inches irrigation water per growing season. Based on research data, there is a great potential to save irrigation water by converting seepage to center-pivot irrigation. Center-pivot irrigation can save more than 50% of irrigation water. During the last three consecutive potato-growing seasons, a sum of one billion gallons of irrigation water was saved on the research trials.

This IST training and CEU roundup were conducted face to face in Gainesville and video conferenced to nine local host sites statewide. The presentations are accessible from Dr. Liu's website at the hyperlinks below.

Dr. Oscar E. Liburd
What We Have Accomplished in Twospotted Spider Mite Management and Where We Are Going with the Technology

Dr. Guodong Liu
How Much Water Can We Save for Potato Production by Using Center Pivot Irrigation?

*Dr. Dewayne Ingram (*from the University of Kentucky*)*
Carbon Footprint and Ecosystem Services During the Life Cycle of Landscape Plants

*Dr. Annette Wszelaki (*from the University of Tennessee*)*
Extending Your Growing Season with High Tunnels and Biodegradable Mulches

Dr. Kelly T. Morgan
Use of Soil and Tissue Testing for Sustainable Crop Nutrient Programs

More information can be found at **http://hos.ufl.edu/faculty/gdliu/service-training**

There were 10 registered host sites statewide and it ended up with 7 host sites for this IST training with 35 participants including 15 women. A survey was completed in the end of this IST training. There were 25 paired tests collected from the survey. Among the surveyees, 13 completed the questionnaires on the economic and environmental impacts. The survey result indicates that 96.2%, 88.5%, 88.5%, 65.4%, 84.6% and 92.3% of the participants are satisfied and very satisfied with the time use, topics, presentations, E-handouts, knowledge gain, and communication in this In-Service Training, respectively. Knowledge gain and estimate of potentially economic and environmental impacts are summarized below.

Knowledge Gain

Pre-and post-tests were matched by names and graded. Tests from either pre- or post-tests that had no match were not graded and discarded. No record of incomplete test pairs was kept. The same name or symbol was recorded, and both pre- and post-test grades were used to obtain means, median, and mode, standard errors, and percentage points of knowledge gain. On average, the trainees got a rise of 23 percentage points from this IST training. A table is generated with the data (Table 1).

Table 1. Statistics summary for the In-service Training event

Count of paired tests	25		Knowledge gain (percentage points)
Number of Questions	10		
Evaluation	Correct answers (%)		
	Pre-test	Post-test	
Mean	46	69	23
Median	42	72	30
Mode	20	68	48
Standard error	0.3	0.2	-

Estimate of economic and environmental impacts

The trainees estimated that the new techniques they learned from this IST training were able to help commercial crop producers reduce production cost of $86 per acre and increase production as much as $151 per acre on average. Thus, the increase in total income is $237 per acre. The trainee serves 49 farms having a size of 550 acres on average. The attendees also estimated that these new techniques can help them reduce water pollution: decrease in nitrogen and phosphorus concentrations in groundwater.

Economic impacts

There were 13 trainees answered the questions on economic and environmental impacts. Based on the survey, each trainee serves 49 farms and 26,950 acres on average. The income increase including production savings was $237/acre (Table 2). Potentially, every trainee can help growers increase their income by $6,387,150 with these new techniques. The total income increase will be $83,032,950.

Environmental impacts

By using these techniques, the trainees can help growers reduce water pollution by decreasing 17 ppb N and 19 ppb P in groundwater. Additionally, the techniques can help growers save 10 inches of irrigation water (Table 2). The water savings will greatly alleviate Florida's water shortage in the near future.

Table 2. Estimate of economic and environmental impacts after the techniques from this IST training are employed for commercial crop production in Florida

# of Farms	Farm Size	Estimate of Impact				
		Cost Reduction	Income Increase	Pollutant Reduction in Groundwater		Water Savings
	(acre/farm)	($/acre)	($/acre)	N (ppb)	P (ppb)	(inch)
49	550	86	151	17	19	10

Needs for potential In-service Training

The attendees are interested in future IST training. Among the 25 topics listed on the survey for the next IST training, the surveyees' top five choices are:

1. Disease control
2. Pest control in organic vegetable production
3. Interaction of nutrients with each other and with soil moisture, pH
4. Cover crops and nematode control
5. Controlled release fertilizers

Photos taken during the In-service Training

Photo 1. Audience at 1306 Fifield Hall, Gainesville.

Photo 2. Audience at 1306 Fifield Hall, Gainesville.

Table 3. New Technology for Commercial Crop Production (IV) (IST#: 31110/FDACS Program ID: 20920 and CCA Programs (FL 52402 and FL 52403) (3 FDACS CEUs and 4 CCA CEUs)

# (female) of participants	Host Site	Phone Number	Building Name	Location	FDACS CEU providers	Email Address
15(5)	UF Campus	352-273-4814	1306 Fifield Hall	2550 Hull Rd., Gainesville, FL 32611	David Liu/F. Fishel/ K. Morgan	guodong@ufl.edu; weeddr@ufl.edu; conserv@ufl.edu
0	Citra PSREU	352-591-2678	Frank Stronach Plant Science Center	2556 West Highway 318, Citra, Florida 32113	Mark Kann/Staci Sanders	mkann@ufl.edu; stacis@ufl.edu
0	Duval Co. Ext.	904-255-7450	1010 N McDuff Ave.	1010 N McDuff Ave., Jacksonville, FL 32254	Erin Harlow	erine@coj.net
0	Indian River Co. Ext,	772-766-5586	Indian River County Annex Building	1028 20th Place, Suite D, Vero Beach, FL. 32960	Christine Kelly-Begazo	ckellybe@ufl.edu
3(1)	Miami-Dade Co. Ext.	305 248 3311	Auditorium, UF/IFAS Miami-Dade County Extension	18710 SW 288th Street, Homestead 33030	Qingren Wang	qrwang@ufl.edu
7(5)	MREC	407-814-6162	Administration #4022	2725 S. Binion Rd. Apopka FL 32703	Katherine S. Houben	kshouben@ufl.edu
3(1)	Palm Beach Co. Ext.	561-233-1718	the Clayton Hutcheson Ag Complex in Exhibit Hall A	559 N Military Trail (Exhibit Hall A) West Palm Beach, FL 33415	Miller, Christian F.	cfmiller@ufl.edu
2(1)	Palmetto, FL	941-722-4524	Aalberg Room	1303 17th St. West Palmetto FL 34221	Crystal Snodgrass, Veronica Henry	Crys21@ufl.edu
5(2)	SWFREC	239-658-3462	SWREC main auditorium	2685 SR 29 North, Immokalee, FL 34142	Gene McAvoy/Julie A. Carson	gmcavoy@ufl.edu; carsonj@ufl.edu
1 (1)	Sumter & Pasco Counties	352-569-6862	Suite 2	7620 State Road 471, Suite 2; Bushnell, FL 33513	Camille E. Esmel McAvoy	cami13@ufl.edu

Total: 36 including 16 women participated in this program.