

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Sustainable Agriculture Production for (non-food) Horticultural Crops

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
111	Conservation and Efficient Use of Water	0%	0%	30%	0%
201	Plant Genome, Genetics, and Genetic Mechanisms	0%	0%	10%	0%
204	Plant Product Quality and Utility (Preharvest)	20%	0%	0%	0%
205	Plant Management Systems	20%	0%	10%	0%
211	Insects, Mites, and Other Arthropods Affecting Plants	15%	0%	20%	0%
212	Diseases and Nematodes Affecting Plants	10%	0%	20%	0%
215	Biological Control of Pests Affecting Plants	15%	0%	0%	0%
216	Integrated Pest Management Systems	20%	0%	0%	0%
601	Economics of Agricultural Production and Farm Management	0%	0%	10%	0%
	Total	100%	0%	100%	0%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	20.0	0.0	5.8	0.0
Actual Paid	16.0	0.0	7.4	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
571305	0	516801	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
571305	0	311310	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	43043	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Within Sustainable Agriculture Production for non-food Horticulture Crops, Clemson University researchers are working to develop research-based Best Management Practices for South Carolina turfgrasses, which would include pest management strategies, evaluating new weed control products and techniques, and developing new turf varieties based on desirable characteristics such as color, texture, pest tolerance, resistance, etc. The quantity and quality of primary water sources currently available in various regions of the United States is also being examined.

Research has begun to discover an effective and environmentally sensitive control for scale insects in ornamentals and to develop an integrated pest management strategy based on the life history of soft scales. Also in the ornamental industry, research is being conducted to investigate diseases of ornamental plants and trees caused by *Phytophthora* spp., to improve our methods for detecting propagules of these pathogens in plants, soil, and water, and to develop and evaluate effective disease management strategies.

During the past six years, researchers at Clemson University have monitored the efficacy of two constructed wetlands to facilitate removal of nutrient and pathogen contaminants from runoff. The wetlands reduced export of total nitrogen by 69%, phosphorus by 39%, and *Phytophthora* spp. (a pathogen) by 80%.

Disease management programs have been refined for bentgrass and bermudagrass putting greens. Results of trials has led to better recommendations for control in a season-long format, so that turfgrass quality is not compromised and businesses remain viable.

Extension horticultural programs were conducted such as Ornamental Plant Schools and shortcourses, landscaping programs, pesticide applicators recertification classes, orchard management programs, turf school, Carolina Yards On-line Shortcourse, and an Environmental Conservation Lecture Series. Master Gardeners were trained and later conducted programs and plant clinics. A School Gardening for SC Educators Online Course for area teachers learning basic gardening skills and techniques for gardening with youth. Agents taught fire ant control, lawn care, shrubbery, and composting. They hosted the Making It Grow live television show to address consumer horticulture questions and hosted the call-in radio program, Your Day, to answer plant problem and landscaping questions. Presentations were made to high school students to expose them to Horticulture careers. The beginning farmers workshop covered organic certification, GAP certification and marketing strategies.

Agents assisted local towns with information about greenhouses. Evaluation reports were provided to growers with comprehensive and updated information on performance so that they can make informed decisions.

There were 3,811,027 visits to the Home and Garden Information Center (HGIC) web site. During 2013-14 thirteen new fact sheets were added for a total of 648 fact sheets on the Clemson Home and Garden Information Center website. In addition, 259 fact sheets, 67 educational documents and 9 user guides were mailed to South Carolina citizens last year.

2. Brief description of the target audience

The audience will include producers, small farmers and Extension personnel, horticulture professionals, residents in counties with Master Gardener programs, Master Gardeners, and consumers.

3. How was eXtension used?

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V(E). Planned Program (Outputs)

1. Standard output measures

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	30562	2391514	0	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2014

Actual: 4

Patents listed

Methods and Compositions for Transgenic Plants with Enhanced Resistance Biotic and Abiotic Stress Overexpression of AsHSP17, a Creeping Ben tgrass (*Agrostis stolonifera*) Small Heat Shock Protein, Increases Abiotic Stress Sensitivity in Transgenic *Arabidopsis thaliana*

Genetic engineering of crop species with a microRNA 528 gene for enhanced abiotic stress tolerance System for Plant Development

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2014	Extension	Research	Total
Actual	2	9	11

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Disclosures

Year	Actual
2014	5

Output #2

Output Measure

- Licenses

Year	Actual
2014	0

Output #3

Output Measure

- Number of people completing horticultural educational workshops

Year	Actual
2014	10875

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of participants gaining knowledge

Outcome #1

1. Outcome Measures

Number of participants gaining knowledge

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	10360

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The Sustainable Agriculture Production for non-food horticultural crops program at Clemson University seeks to inform horticulture professionals and consumers on environmentally sound horticultural practices that will improve communities.

What has been done

Extension provided over 331 educational programs to horticulture professionals and consumers to help them improve their homes and communities through the use of environmentally sound horticultural practices. Approximately 40,000 acres of sod was affected. Assistance was offered to nurseries and floriculture producers.

Results

Some 998 newly validated IPM-based products, services, tactics or practices were used in landscape and ornamental plant efforts. There were 25 joint educational efforts with industry, state or federal agencies and/or trade associations.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
216	Integrated Pest Management Systems
601	Economics of Agricultural Production and Farm Management

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Over 330 programs were conducted reaching 10,875 people. Of those participating in programs 95% reported that they gained knowledge.

Key Items of Evaluation