

Search for Excellence in Consumer or Commercial Horticulture

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Abstract

The College of Knowledge Online courses are pre-recorded, non-credit courses intended for greenhouse growers as professional development. The courses include approximately 4-hours of videos and voice-over PowerPoint presentations, supplemental reading, quizzes, and tests. There are currently two courses in the Series, College of Knowledge Online: “[Greenhouse and Horticultural Lighting](#)” and “[Biological Control for Greenhouse Growers](#).” Students in each of the courses take a pre- and post-test to determine knowledge gain and take a post-course evaluation upon completing the course. Long-term impacts are evaluated using a 6-month post-course online survey using SurveyMonkey. “Greenhouse and Horticultural Lighting” was released in September 2015 and has had three sessions (Fall 2015, Summer 2016, Fall 2016). A total of 140 greenhouse growers who represented 35.5 million square feet of greenhouse production took the course. The students were from 20 countries, 28 U.S. states, and 14 Michigan counties. Ninety-six students finished the course with an average pre-course grade of 73% and an average post-course grade of 92%. According to the long-term impacts survey, 57% of growers made a change in their facility, which encompasses 1.8 million square feet of production space (n=18). In addition, 71% of growers were more confident in their lighting strategy (n=18). “Biological Control for Greenhouse Growers” was released in Fall of 2016 and has been offered for one session (Fall 2016). A total of 133 growers from 9 countries, 24 U.S. states, and 12 Michigan counties, who represented 52.5 million square feet of greenhouse production, enrolled in the course. The average pre-test score was 67% and the average post-test score was 93% (n=114). According to the post-course survey, eighty-one percent of the respondents to the course evaluation reported that they would make a change in their pest management practices as a result of the knowledge gained from the course and 86% reported that it would help protect the crop from pest damage (n=105). Long-term impacts of “Biological Control for Greenhouse Growers” will be evaluated in the summer of 2017.

Educational Objectives

1. To increase the knowledge of greenhouse growers and aligned professionals on the use of lighting and biological control pest management methods in the greenhouse
2. To provide educational materials on important topics for greenhouse growers at a basic or intermediate level

3. To decrease expenses and increase efficiency of methods relating to lighting and pest management used in greenhouses
4. To increase crop quality and manage risks related to pest management and crop scheduling

Program Activities and Results

The two College of Knowledge Online courses are pre-recorded, non-credit courses intended for greenhouse growers as professional development. The courses included approximately 4-hours of videos and voice-over PowerPoint presentations, supplemental reading, quizzes, and tests. There are currently two courses in the series, “Greenhouse and Horticultural Lighting” and “Biological Control for Greenhouse Growers.” “Greenhouse and Horticultural Lighting” was released in September 2015 and has had three three-month sessions (Fall 2015, Summer 2016, Fall 2016). This course was developed by Dr. Erik Runkle (Professor of Horticulture, Michigan State University) and me during 2015. This course covers the fundamental concepts about how plants respond to light quality, quantity, and duration. The course was divided into seven units. A total of 140 greenhouse growers who represented 35.5 million square feet of greenhouse production enrolled in “Greenhouse and Horticultural Lighting”. The students were from 20 countries, 28 U.S. states, and 14 Michigan counties.

“Biological Control for Greenhouse Growers” was released in Fall of 2016 and has been offered for one session (Fall 2016). This course was developed by Dr. Raymond Cloyd (Professor of Entomology, Kansas State University) and me during 2016. This course covers introductory topics of biological control and the challenges and opportunities associated with a biological control pest management program. This course was divided into six educational units. A total of 133 growers from 9 countries, 24 U.S. states, and 12 Michigan counties, who represented 52.5 million square feet, took the “Biological Control for Greenhouse Growers Course”.

Students can enroll for the courses on the Michigan State University Extension Registration website at least 1-month prior to the session. Each of the courses cost \$129 per individual, but group discounts were available for businesses interested in enrolling more than four participants. Four scholarships are available to individuals who demonstrate a financial need for each course session. Upon being chosen based on their applications, the fee for the course is only \$39.99. A total of six scholarships were awarded to students taking “Biological Control for Greenhouse Growers” and two scholarships were awarded to students taking “Greenhouse and Horticultural Lighting.”

The courses are available on a Moodle platform on the [eXtension campus](#) website. Students have three months to complete all of the materials in the course. As the instructor of the courses, I monitored the progress of the students’ throughout the three month period and sent reminders weekly or biweekly to complete sections of the course, exams, and/or evaluations.

Impact Statement

Greenhouse and Horticultural Lighting Course

Ninety-six students finished the non-credit course with an average pre-course grade of 73% and an average post-course grade of 92%. Approximately 75% of growers who took any of the three sessions of the Greenhouse and Horticultural Lighting Course intended to change their practices as a result of the course. All course respondents for all course sessions reported significant progress (4 or 5 on a scale: 1 to 5) on topics such as: photoperiodic lighting, light quality, and light quantity.

A total of 18 students (30%) from the Fall 2015 session responded to the 8-month post-course SurveyMonkey online survey. According to the long-term impacts survey, 57% of growers made a change in their facility which encompasses 1.8 million square feet of production space (n=18). In addition, 71% of growers were more confident in their lighting strategy (n=18). All of the consultants or sales representatives who took the course were more confident that they knew what type of lamps to recommend to greenhouse growers when they were selling their products (n=7). Half of the respondents have changed their night interruption treatments to greenhouse crops, citrus and other tree species (n=12) as a result of the course.

Biological Control for Greenhouse Growers Course

During the Fall 2016 session of this course, the average pre-test score was 67% and the average post-test score was 93% (n=114). Ninety-two percent of growers who finished the course took the post-course evaluation (n=114). According to the post-course survey, 81% percent of the respondents to the course evaluation reported that they would make a change in their pest management practices as a result of the knowledge gained from the course and 72% plan to implement those changes within the next 3 months (n=105). Seventy-six percent of respondents reported that the course was going to help them manage pest resistance to insecticides and 86% reported that it would help protect the crop from pest damage (n=105). Long-term impacts will be evaluated in the summer of 2017.

Evaluation

Each of the course sessions are evaluated using pre- and post-course testing, course evaluations, and course follow-up surveys. Prior to starting the course, students took the pre-test to gauge their knowledge on the subjects to be covered in the course. The students can take quizzes after each of the units of the course on key topics covered in that unit.

Upon viewing all of the videos and reading the supplemental reading, students then take the final exam and the post-course survey. The final exam is similar to the pre-course exam and demonstrates the student's increased knowledge on the topics. Students earning greater than 80% on the final exam can download a print their personalized "Certificate of Merit." The students then took the post-course evaluation in order to provide feedback on the course

module and how they intended to use the information in their greenhouse businesses. After the Fall 2015 offering of the “Greenhouse and Horticultural Lighting Course,” I implemented an incentive for completing the final exam and the post-course evaluation by refunding \$20 of their course fee. By providing this incentive, I have increased the completion rates of the courses from 46% to 83%.

Long-term impacts are evaluated by doing online SurveyMonkey evaluations 6 months after completing the course. Two sample questions from the long term survey include:

1. Based on your knowledge gained from the course, did you implement a change in your business or professional practices?
2. If YES, what did you change (please check all that apply)?
 - a. Install new high-intensity fixtures to improve plant quality
 - b. Install new/different low-intensity lamps for photoperiodic flowering control
 - c. Altered my low-intensity lighting practices (changed day extension or night interruption schedule)
 - d. Altered my high-intensity lighting practices (turned on my lamps etc.)
 - e. Altered the light quality (added blue light, changed the red:far red ratio etc.)
 - f. Started using boom lighting
 - g. Changed crop type as a result of the course
 - h. Used a quantum meter to better estimate light intensity
 - i. Other (please specify)

Supporting Documents

1. Promotional flyers from “Greenhouse and Horticultural Lighting” and “Biological Control for Greenhouse Growers”
2. Action Impact Report from the Fall 2015 session of “Greenhouse and Horticultural Lighting”
3. Course layout of “Biological Control for Greenhouse Growers”