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Biological control and sustainable horticulture principles of Iowa's vocational agriculture curriculum

Abstract
Instructional materials on biological control and sustainable horticulture principles were developed for use by teachers and students in the vocational agriculture programs in Iowa's high schools and community colleges. Students received instruction on various alternative horticultural production practices. Instructors received biological control kits for their classroom use.

Keywords
Horticulture, Entomology, Agricultural Education and Studies, Biocontrol and Integrated Pest Management, Human systems, demographics and beginning farmer programs

Disciplines
Agricultural Education | Agricultural Science | Entomology | Horticulture

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Background

There are many benefits to providing teachers with educational materials about biological controls and sustainable horticulture practices. Students come away from their classes with the skills needed to practice and adopt alternative methods of producing horticultural crops. Focusing on secondary level students from both rural and urban backgrounds, teachers can expose their classes to alternative practices, provide information to help students be better decision makers, prepare them for future careers, and encourage stewardship ethics for the future.

The overall objective of the project was to introduce and enhance the teaching of biological control and sustainable principles and practices for producing high-value horticultural crops in Iowa. Specific secondary objectives were to:

- Develop curriculum-based teaching and technical materials on biological control and sustainable production systems of horticultural crops for secondary agricultural education programs in Iowa, and
- Provide hands-on, in-service training on the curriculum topics of biological control and sustainable horticulture systems for the Iowa vocational agriculture teachers during their annual professional development programs.

Approach and methods

Two assessments conducted in 1996 asked Iowa vocational agriculture students and instructors what subjects they considered to be of high interest and usefulness. “biological control of insects and weed pests” and “alternative production for high-value horticultural crops” were cited as top priority topics suitable for the planned curriculum.

The project investigators met with a focus group of high school and community college instructors in November 1997 at the Reiman Gardens at Iowa State University. Attending the session were 11 voc-ag instructors, three graduate students in agricultural education and studies, one undergraduate student majoring in agricultural education and studies and horticulture, and one representative from the Iowa Department of Public Instruction. The focus group recommended a combination of curriculum format and in-service training as being the most effective method to use. They agreed that active learning, in which students are engaged in activities as compared to passively listening to a lecture, was critical to the success of the curriculum.

The first two curriculum units were distributed to focus group instructors in spring 1998 for use and evaluation by their students. After processing the feedback from this group, materials were distributed to all instructors par-
participating in the 1998-99 Professional Development Program for Agricultural Educators. A session was broadcast over the Iowa Communications Network in April 1998.

In the summer of 1999, three workshop sessions were held to provide in-service training on the Biological Control/Sustainable Horticulture Curriculum. The summer 2000 Iowa Agricultural Education Summer Conference Workshops included two hands-on sessions that covered a new riparian buffer management unit.

**Results and discussion**

Materials developed for this project were the first teaching and technical materials available to Iowa’s vocational agriculture teachers that emphasized biological control and sustainable horticulture practices. Curriculum topics were placed in modules or units so that instructors could include the information in courses other than agriculture or horticulture.

The various instructional units included an introduction, competencies, materials needs, visual materials, activities, class preparation, teaching procedures, additional suggested activities, suggested references, and technical information. The web site included Power Point presentations, photographs, and links to other sites of interest. The materials were developed in a manner similar to other horticultural teaching materials used by the target group of teachers.

Topics (not necessarily focused on horticultural crops) covered in the curriculum materials were:

- An Introduction to Biological Control
- Biological Control of Weeds in Natural Settings
- Biological Control of Insects in Greenhouses
- Biological Control Using Bt Corn
- An Introduction to Sustainable Horticulture
- Alternative Horticultural Practices for Weed Control and Improved Soil Quality
- Understanding Food Systems

The activities and visual aids were printed on white, 8 1/2 x 11” paper for ease in copying for use as handouts, overheads, bulletin board display, games, etc., and also were available on a web site (http://www.hort.iastate.edu/sustain). The printed materials, color note cards, and pertinent ISU Extension bulletins were provided in a three-ring binder.

In addition to the written materials, a biological control kit was given to instructors who attended the June 1999 in-service training session. The materials in the kit supplemented the biological control units and contained predators, parasites, Safer Soap®, sticky traps, and corn gluten meal for hands-on demonstrations. Teachers have the option of purchasing additional supplies as needed for their programs.

**Conclusions**

Thanks to the interdisciplinary cooperation among the authors and the close consultation with agricultural teachers, the project was able to develop and deliver a high-quality set of teaching and technical materials for Iowa’s secondary-level agricultural educators. Teacher response to the in-service training was extremely positive. New and updated information for the curriculum will be provided on the project web site.

**Impact of results**

All 220 vocational agriculture teachers at the high school and community college level received these curriculum materials during the
June 1999 summer conference for agriculture educators. Another 30 copies were delivered to new teachers. The materials also are readily available in electronic form.

Fifty teachers received in-service, hands-on training for sharing the curriculum materials with their students in 1999. Future training materials will include more information on topics such as community supported agriculture, riparian buffer management, and alternative practices.