

**Title of project:**

**A webinar series and interactive grower outreach for pesticide resistance management in greenhouses**

**Project leaders:**

Brian Eshenaur, Elizabeth Lamb,

**Cooperators:**

John Sanderson, Margery Daughtrey, Dan Gilrein, Meg McGrath

**Abstract:**

Through an interactive webinar series and accompanying online materials, this project is reaching growers and extension educators with resistance management IPM techniques. To ensure the relevance and usefulness of the information, we have worked with NY growers to evaluate their understanding of pesticide resistance and to develop IPM based plans for resistance management to train other growers in New York State, EPA Region 2 and beyond in IPM methods for pesticide resistance management. The anticipated outcomes include a reduction in pesticide exposure and the reduction in potential release of pesticides to the environment through a reduction in pesticide use.

**Justification:**

New York State has approximately 23.8 million square feet of greenhouse space for the production of floricultural crops with over 800 producers (USDA Floriculture Crops Summary 2008). Because pests can thrive on crops in the greenhouse environment and consumer demand high quality plants, the total number of insecticide applications to a single crop can be high. The regular use of pesticides in the greenhouse environment can lead to pesticide resistance problems. The difficulty controlling pesticide resistant pests can lead to overuse of pesticides, as well as a reduction in yields and crop quality through poor pest management. While some information on reducing pesticide resistance is available for growers, it can be confusing and difficult to put in practice.

**Procedures:****1. Preliminary work with New York Greenhouse Growers**

New York, like many states, has a diverse array of greenhouse operations that vary in numerous aspects including size and crops grown. In order for the information generated by this project to be relevant and practical, we will be working directly with five growers, who vary in size of operation and other factors, to gather data on current understanding of pesticide resistance management, pest issues, factors favoring development of resistance, and integration of IPM tactics. These participating growers will serve as the basis for content used in the webinars. We will ask the growers to describe their current practices, their pest control challenges.

**2. Webinar series**

Cornell University's greenhouse faculty will combine their expertise with findings from our work with growers to develop and deliver a series of webinars on pesticide resistance management. These webinars will be accessible by individual growers or may be promoted and viewed in Cooperative Extension offices as a greenhouse group activity. In the monitored group setting, participants will have the ability to earn pesticide re-certification credits for their participation. Webinars began in December of 2013 and will continue until

February of 2014.

Webinars have been advertised through the Cooperative Extension system and NYS Flower Industries in New York, through our greenhouse contacts in the northeast region, and through trade journals to reach growers throughout the US.

**Topics for the Webinar Series:**

1. Pesticide Resistance Basics and Examples of Insecticide and Fungicide Resistance in Greenhouse Crops
2. Pesticide Mode of Action Classes and Pesticide Rotation Strategies for Insect and Disease Management
3. Cultural and Sanitation Techniques to Reduce Pest Problems
4. Insect and Disease Monitoring Techniques to Determine Pest Populations
5. Using Biological Control: Biological Control Basics, Transitioning to Biocontrol
6. Using Biological Control: Strategies and Examples for Specific Greenhouse Pests

**3. Website Resources**

This project involved the creation of webpages housed at the NYS IPM program's website. The content will include:

- Notice of Upcoming Webinars
- Archived Webinars

To be added in 2014:

- Resources on pesticide resistance management in greenhouses, including links for known resistance in greenhouse settings
- Resistance management basics, tips and recommendations

**4. Evaluations and Documentation of Change in Practices**

Webinar participants: The numbers of growers participating in the webinars, and their locations, will be documented. An email survey of the growers will be conducted at the conclusion of each webinar to measure immediate knowledge gains and planned changes in pest management practices (registration will include email addresses). Follow-up surveys after the 2013 growing season will measure actual changes in pest management practices implemented by program participants. This will be conducted through email surveys with follow-up phone calls as necessary.

Analytics will be run to record web hits to the on-line resources created by this project and the archived webinars.

**Implications:**

- Six new webinars will be produced and broadcast. The topics will be different aspects of resistance management and how IPM can be used to improve it in a greenhouse situation.
- New web resources available to growers nationally will be maintained on a resistance management webpage associated with the NYS IPM webpage.

**Anticipated Impact**

- Greenhouse growers will demonstrate an increase in understanding of resistance management and its causes and the IPM methods used to manage resistance.
- Growers will implement (new or additional) cultural and biological methods of pest management to manage pesticide resistance based on their participation in this project
- Growers will be exposed to fewer pesticides during application and purchasers of greenhouse products will be exposed to less pesticide residues. This project will produce a reduction in pesticide use of 5% for growers involved in this project.

**Pest:** any insect pest, any disease pest,

**Setting:** greenhouse, high tunnel

**Management Technique:** monitoring, research & education, biological control, resistance.