Development of Best Management Practices and Integrated Pest Management for Poinsettias in Puerto Rico

Dania Rivera[1] and Ada Alvarado[2],

[1]Associate Professor, Ornamental Specialist, [2]Professor, IPM Specialist of Agro-environmental Sciences Department
University of Puerto Rico, Mayagüez Campus
Call Box 9000, Mayagüez, PR 00681-9000
dania.rivera@upr.edu

United States Department of Agriculture
National Institute of Food and Agriculture

SERVICIO DE EXTENSION AGRICOLA
COLEGIO DE CIENCIAS AGRICOLAS

ABSTRACT

Ornamental plants are the third commodity of economic importance in Puerto Rico and in the past 25 years have maintained itself as one of the top five from the total agricultural income across the island. Due to the heterogenic production, the pest management is complex and the use of pesticides can increase the tolerance of existing pests. The objectives of this project is (1) Gather island wide data through a survey to poinsettia plant growers related to current patterns of pesticide use, pesticide use safety, Integrated Pest Management (IPM) and Best Management Practices (BMP) knowledge. (2) Prepare educational materials to train personnel and growers about IPM and BMP. (3) Prepare and publish Pest Alert and fact sheets about IPM and BMP and (4) Measure the increase of knowledge in IPM and BMP. To achieve this, the project will prepare a survey to gather information that will be used to prepare an IPM guide and a BPM manual and presentations. The information will be offered to the personnel and farmers in trainings, field days and shared using a google site. Also, a demonstrative poinsettia production will be developed to educate the audience. Short publications will be distributed containing all the information, pest alerts and fact sheets. During the trainings and field days we will measure the increase of knowledge in IPM and BMP. The first year, a survey was created and used to interview poinsettia growers. To this day, seventeen growers have been interviewed in Aibonito, Barranquitas and Comerío municipalities. According to the obtained data 35% of the growers indicated that they do not know what IPM is. All of them indicated that they control weeds inside and outside of their greenhouse and that they identify the pests by experience. About 12% of the growers do not remove damaged foliage by diseases, do not use preventive applications and do not follow the label instructions. However, 65% of them indicated that have a registry of the pesticide use with the doses, frequency and date of application. The growers reported the use of 32 different products for the poinsettia management in the interview. This data confirms the importance of continuing the education in IPM and BMP to reduce pesticide use and avoid chemical control over use. This data will be use to prepare the educational materials for the poinsettia growers in the next years.

INTRODUCTION

- Ornamental plants are the third commodity of economic importance in Puerto Rico and in the past 25 years have maintained itself as one of the top five from the total agricultural income across the island.
- Nursery production system is a complex and dynamic process
  - Each plant species could be the host to a range of insect pests and pathogens
  - Each specie has its own requirements for maintaining plant health
  - Management is challenging due to the heterogeneity of plant material for nursery personnel
  - Local high temperatures and humidity increase pests' development
  - Ornamentals have an increase use of pesticides and tolerance rise for the existing pests.
- The past 10 years there has been an increase in the introduction of new pests to ornamentals in Puerto Rico like:
  - cycad scale, *Aulacaspis yasumatsui takagi* (Segarra-Carmona and Perez-Padilla, 2008)
  - trips on *Tabebuia spp. Holopothrips tabebuia sp.n.* (Cabrera-Asencio, et al. 2008)
  - exotic trip, *Androthrips ramachandrai* Kanry on *Ficus* (Cabrera-Asencio and Vélez, 2009)
  - soft scale *Toumeyella parvicornis* on pine trees (Segarra-Carmona and Cabrera-Asencio, 2010a),
  - lobate lac scale *Paratachardina pseudolobata* on lemon drop mangosteen, Indian almond and white-mangrove (Segarra-Carmona and Cabrera-Asencio, 2010b),
  - Harrisia cactus mealybug *Hypogeococcus pungens* on columnar cacti (Segarra-Carmona et al. 2010).
- This project will focus only on poinsettias, the major plant that is produced on most of the central part of the Island from June to December. Poinsettia production can be considered a monoculture during half of the year. As poinsettias are delicate plants, timing is essential and plants have to be free of pest and diseases to be marketable.

MATERIALS AND METHODS

- **Survey:** This project will gather island wide information from poinsettia growers. Specific data measured by the surveys will include current patterns of pesticide use, pesticide use safety, cost of pesticide use, alternative control measure used, scouting (if any), current pest (intended target) and their knowledge in IPM. The IPM Specialist and Ornamental Plant Specialist will prepare the survey. The survey will serve as a guide to prepare new educational materials and workshops for IPM and BMP.
- A **google site** will be created and maintained by the Ornamental Plant Specialist, Dr. Dania Rivera, to publish information about the survey and will be also used to publish the educational materials (IPM/BMP for Poinsettias web page).
- **IPM Guide and presentation**. IPM Specialist, Prof. Ada Alvarado, will compile and integrate all available information about IPM in ornamental plants. This information will be used to prepare electronic presentations about IPM. These presentations also will include identification and management of each pest. Each attendee will receive an identification field guide (IFG). The purpose of developing the IFGs is to simplify the information and is intended for field use by county agents and growers. No such document is currently available for poinsettias in Puerto Rico. The IFG will be presented to the intended users in the training sessions that will be conducted as part of the knowledge acquisition process.
- **BMPs**. Plant health is an important aspect of IPM. Ornamental Specialist, Dr. Dania Rivera will compile and integrate all available information about BMPs in poinsettias plants and adapt this information to Puerto Rico's plant industry. This information will be used to prepare electronic presentations about BMPs. These presentations also will include how to avoid abiotic stress information about sanitation in the nursery or field, substrate preparation and fertility (pH, nutrients, EC), propagation, fertilization and irrigation (frequency, amount of water, leachates). A manual with all the information will be also available. Each attendee will receive the BMP manual. The manual will include photos (full color) that illustrate the proper management practices that include a narrative section with the description.
- **Training personnel and farmers**. Five trainings will be held across the island to Agricultural Agents and poinsettia growers per region. IPM Specialist will be in charge to train about IPM identification and management and Ornamental Specialist will train about BMPs. Digital presentations and field guide will be compiling in a USB and given at the trainings. This information will be also on the IPM/BMP for Poinsettias web page.
- **Field days**. All growers will be invited to a field day where a demonstrative poinsettia production will be held at Agricultural Experiment Station at Corozal Puerto Rico where the poinsettia growers will learn and see how their production should be. A second field day will visit one of the poinsettia growers with the best IPM and BMP to educate the other growers.
- **Pest Alert and fact sheets**: In addition to the training we will prepare and distribute pest alerts and fact sheets about BMP and poinsettias crop production. These short publications will be subject specific and easy to understand. The information is intended to the home owner, growers and Agricultural Agents.
- **Measure the increase of knowledge in IPM and BMPs**: To demonstrate what was learned through the IPM and BMPs promotions we will use the same survey in the objective 1 to the same growers as a measurable tool of the increased in knowledge. The survey will be delivered to the same growers 6 months after the trainings.

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OBJECTIVES

(1)Gather island wide information and data through a survey to poinsettia plant growers related to current patterns of pesticide use, pesticide use safety, IPM and BMP knowledge.
(2)Prepare educational materials to train personnel and growers about IPM and BMP
(3)Prepare and publish Pest Alert and fact sheets about IPM and BMP and
(4)Measure the increase of knowledge in IPM and BMP.

EXPECTED OUTCOMES

LOGIC MODEL POINSETTIA INTEGRATED PEST MANAGEMENT (IPM) AND BEST MANAGEMENT PRACTICES (BMP)

SITUATION	INPUTS	OUTPUTS		OUTCOMES/RESULTS		
		PARTICIPANTS	ACTIVITIES/ PRODUCTS	Knowledge SHORT TERM	Actions MEDIUM TERM	Conditions LONG TERM
Poinsettia grower's intensive production has created an industry heavily managed with widespread use of fertilizers and pesticides that create a serious potential threat for runoff water pollution, human health and environment. Growers and Extension agents need to be trained in IPM and BMP in Poinsettias	IPM Coordinator IPM Specialist Extension Ornamental Horticulture Specialist Extension Agents	Poinsettia growers Extension Agents	Survey to poinsettia growers Establish a demonstration project 5 Trainings IPM and BMP Manual Field days IPM/BMP for poinsettias web page Pest alerts and Fact sheets Presentations in SOPCA and CFCS	Increase knowledge of participants in poinsettia IPM and BMP Obtain poinsettia growers involvement in IPM and BMP.	Provide continuous education to the poinsettia growers in IPM and BMP Increase the number of growers that adopt IPM and BMP in their poinsettia production through visits to the demonstration project.	Demonstrate IPM and BMP benefits to poinsettia growers and its impact in quality and profits using the demonstrational project. Increase growers profits by applying IPM and BMP Reduce runoff water pollution; improve human health and environment on poinsettia's farms in Puerto Rico Strengthen the poinsettia local market for quality product.

ASSUMPTIONS
Poinsettia (*Euphorbia pulcherrima*) production occupies the first place in importance among the ornamental plants in Puerto Rico. There is a need to reduce the ornamental growers' reliance on pesticides. The establishment of a demonstrational project will promote the use of IPM and BMP in this plant.

EXTERNAL FACTORS
The high aesthetic value of poinsettia create a heavily reliance on pesticides and fertilizers. Growers are not using IPM to manage pests in their farms. The adoption of IPM and BMP will result in poinsettia quality, profits to the grower and reduction to environment pollution.

SURVEY RESULTS

Percentage of growers that responded to do or omit the IPM and BMP strategies asked in the survey.

100% of the growers
- Report to manage weeds inside and outside greenhouses
- Report to identify the pest and diseases by experience
- Do not use Biological Control in the crop

94% of the growers
- Reported to do scouting daily

88% of the growers
- Inspect the vegetative material before entering the greenhouses
- Remove sick leaves and plants from the crop
- Use Chemical Control as a preventive strategy
- Have a registry of the pesticide used

60% of the growers
- Use sticky traps between the crop
- Are licensed for the application of restricted pesticides

35% of the growers
- Did not know the term Integrated Pest management
- Have a registry of the pest that occur in their crop

18% of the growers
- Reuse the pots
- Report not to follow the label instructions

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