Proc. Fla. State Hort. Soc. 117:307-309. 2004.

INTEGRATED PEST MANAGEMENT IN PINELLAS COUNTY NURSERIES

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Additional index words. outreach programs, Pinellas county extension

Abstract. **In 2000, Pinellas County Extension embarked on using innovative methods to reintroduce Integrated Pest Management (IPM) to Pinellas County Nurseries. A web page showcasing IPM basic definitions, methods and techniques was developed and an informal outreach-teaching program implemented in 2002. In 2003, IPM pilot programs were established in collaborating nurseries. Growers had the assistance of a cooperating entomologist, visiting nurseries on a weekly basis; scouting for pests and proposing treatments following IPM principles. A database was developed to store information and monitor progress of each grower. Data regarding pest population levels and outcome of treatments were stored. In 2004, Pinellas County nursery growers are successfully implementing IPM programs, controlling pests, reducing pesticide output and impacting environmental sustainability.**

Integrated Pest Management or IPM is a combination of multiple control methods to reduce pests, while lowering the number of chemical pesticide applications. IPM has been proven to lower environmental risks and lower crop production costs (Olkoski et al., 1991). Ornamental plant growers of Pinellas County, Fla., have little knowledge of IPM or are skeptical about the outcome of implementing IPM practices in their nurseries. Successful IPM programs for container-grown plants are in place in the neighboring counties of Hillsborough and Manatee (Melton and Shyves, 2004).

Pinellas County Extension is committed to helping growers in the transition from traditional pest control practices to more environmentally friendly pest control. As more pesticides are banned due to environmental concerns, growers need to learn new ways to control insect and mite pests. Pinellas County Extension has devised a strategy that promotes a gradual process to implement IPM in ornamental nurseries in the county. The strategy consists of three steps: generating awareness, pilot programs, and continuous assistance to growers implementing IPM programs.

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IPM Outreach Program Overview

Generating awareness

The first step to start an educational outreach program on IPM in Pinellas County was to create a means to reach a large number of growers. A web page was the ideal method to present information in a descriptive way. The web page describes six simple steps to implement IPM in an ornamental nursery: on site assessment, how to make a scouting map, switching to pesticides compatible with beneficial insects and mites, how to interpret action thresholds, taking action, and follow up treatments. IPM practices, strategies, methods and techniques are also explained.

The web page is simple but informative. Pinellas County Extension hosts the web page and has made every effort to promote its usage with good results among growers. The web page is consulted frequently and has generated interest on IPM of growers and homeowners of Pinellas County, Fla.

Pilot programs

The following challenge after generating the interest of growers was to demonstrate IPM could be implemented successfully in ornamental nurseries. Growers were asked to voluntarily participate in pilot programs that will serve as on site demonstrations of the benefits of using IPM. Two leading nurseries in Pinellas County decided to implement IPM in a small part of their outdoor container production areas. Pilot programs lasted one year and showed that IPM provides efficient, sustainable and economically viable solutions to control crop pests in Pinellas County nursery environment.

IPM pilot programs accommodated economical and environmental factors that influenced plant growth and health. Since monitoring crops provides information to formulate more accurate decisions regarding crop management (Dewayne et al., 1990), emphasis was made on scouting crops for the presence of insect and mite pests. Maria Apgar, an independent IPM consultant, cooperating with Extension, visited growers, provided information on pest population levels and discussed possible treatments. Communication between the consultant and grower was considered a key factor for the progress of pilot programs and was highly promoted by Extension. IPM pilot programs were carefully supervised. A database was specifically developed to track the progress of treatments.

Pilot Program 1: Golden Rain. Golden Rain is one of the leading wholesale nurseries in St. Petersburg, Fla. The IPM program designed for Golden Rain was based on the Nursery location, pesticide spraying history, and labor availability. The pilot program areas consisted of crops frequently used in Pinellas County landscapes. Nursery crops were: Chinese fan, Gardenias, Variegated and Green Pittosporum, King Sagos, Viburnum, Allamanda, Jatropha, Coonties, Ixoras, Shilling ilex, and Indian Hawthorns. The nursery kept the same plants for the duration of the pilot program. Plant health and plant quality parameters were monitored and compared with similar crops maintained in other areas of the nursery using conventional pest control practices.

Golden Rain nursery is surrounded by natural wooded areas and insects that attack pests, or "beneficial" insects spontaneously. The nursery continuously rotates plants, so it has been more economically viable to preserve the beneficials coming from surrounding areas rather than making massive releases of beneficials. To preserve the naturally occurring beneficials, it was necessary to switch from broad-spectrum insecticides to pesticides that were compatible with the beneficials. Golden Rain's spraying program was not routinely scheduled, but operated only when pests were seen while the grower performed regular tasks in the nursery. Not spraying on schedule was a good practice, but usually when pests were seen, numbers were too high and difficult to control without the usage of heavy pesticides. Scouting weekly solved this problem. Through this practice, it was possible to find early stages of infestation and prevent outbreaks. Pesticides used on the trial area were insecticidal soap, ultrafine oil, and miticides compatible with beneficial mites. Beneficial insects started appearing one month after initiation of the program. Releases of non-naturally occurring beneficials were made on a few occasions when natural beneficials for a particular pest were not observed. Some of the crops never required to be treated. In other plants, pests were observed in the summer, and treated during low levels of infestation. There was no need to treat any crop in the pilot area from mid-August to December when the pilot program ended.

Pilot program 2: Carroll's Brothers. Carroll's Brothers is a wholesale nursery dedicated to the production of Gardenias. There were two factors that made this pilot program a big challenge: firstly, the nursery was located in an urban area, which hinders development of naturally occurring beneficials. Secondly, The nursery was dedicated to the production of only one type of plant. In the past, Carroll's Brothers nursery introduced biological control but discontinued due to poor results. The strategy designed for Carroll's Brothers considered all these factors and consisted of three main steps: habitat modification, usage of pesticides compatible with beneficials, and multiple releases of purchased beneficials. At the beginning of the program, plants with extra floral nectaries were brought into the nursery to attract and maintain populations of beneficials. These habitat modifications proved to be effective and, in combination with the usage of compatible pesticides, it was possible to maintain significant numbers of the released beneficials. Beneficials released in the summer of 2003 have been seen reproducing and preying on pests in summer 2004. The following chart shows the management of two spotted spider mites over a six-month period, using only one application of a compatible miticide and one release of *Amblyseius californicus*, a beneficial mite. Two spotted spider mites were kept under a 10% threshold level established for this crop.

Database

A new database was created to store data collected during nursery scouting trips. The scouting trips produced counts of plants inspected and plants found with pests or beneficials. The data from the scouting trips were typed into the database and organized into a tabular format and printed into reports. The database stored infestation percentages per crop, treatments applied, and summary information of data collected over longer periods of time.

Scout reports

These reports contain information on percentage of pest found per each crop inspected and treatment suggestions for each particular case. Treatment Follow up Reports - Show in a graphic way how insect populations decrease or increase after a particular treatment. Treatment Follow-up Reports visu-

ally represent the effectiveness of the treatment. Crop history reports - Comprehensive analyses of insect population fluctuations that can be interpreted as trends. Crop history reports help to implement preventative measures in the future. The scout also recorded the time of day, weather conditions, and any additional comments. The database is written in Microsoft Access and has been improved incrementally with new features and capabilities. The primary platform for accessing the database is a Dell laptop. Further enhancements will include a web-compatible interface, support for touch screen devices, and simplified data entry.

Conclusion

Cooperation between growers, Pinellas County Extension, and an independent IPM consultant has raised the awareness of IPM and resulted in the implementation of successful IPM programs in Pinellas County ornamental nursery environments.

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