

Increasing Adoption of Reduced Risk Practices In the Production of Woody Ornamentals

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Norman C. Leppla¹, Thomas A. Green², Daniel J. Sonke¹ and Barbra C. Larson¹
¹University of Florida, IFAS, *IPM Florida*
²IPM Institute of North America

A. Summary

Our two-year project achieved the goal of significantly increasing the number of woody ornamental plant producers who can use an integrated pest management (IPM) assessment program to encourage reduced risk practices and products. A diverse workgroup comprised of producers, buyers, researchers, extension specialists and agents, and other stakeholders have created a reduced-risk practice assessment. This assessment will be available on the web for any producer to use in evaluating their operations. In addition, an IPM certification program for woody ornamental plant production is being made available to producers by the IPM Institute of North America, with the woody ornamental plant industry, consumers, *IPM Florida*, and University of Florida Extension in advisory roles. This “IPM Star certification” will provide credible recognition in the marketplace for Florida woody ornamentals produced using IPM practices. Individual growers will be able to undergo certification for their woody ornamental products to meet the demands of developing niche markets. Currently, these markets primarily involve environmentally oriented consumers, real estate developments, and public agencies. IPM practices can in some cases be less expensive than non-IPM practices, providing a financial incentive for adoption. IPM certification can provide one or more additional incentives, including price premiums, access to new markets, preservation of existing markets, enhanced neighbor and community relations, and reduced liability from pesticide risks.

B. Impetus for Project

The mission of *IPM Florida* is to provide statewide, interdisciplinary and inter-unit coordination and assistance in IPM to protect agriculture, communities and the environment (Attachment 1). This mission is pursued on a statewide basis potentially for all IPM areas of emphasis, e.g., crops, schools, landscape maintenance and invasive weeds. The overall goal is to increase the adoption of relatively low-risk pest management practices by developing collaborative workgroups, assembling and disseminating technical information, and providing education and training. Delivery of information and technologies is intended for county extension faculty and extension specialists, but other clientele are directly involved. Ultimately, the citizens of Florida are the benefactors. In the event that research is needed to improve IPM methods, *IPM Florida* seeks involvement by appropriate scientists to conduct focused, short-term projects.

In January 2002, Timothee Sallin, Director of Marketing at Cherry Lake Tree Farm, requested information from *IPM Florida* on the availability of IPM certification for woody ornamental plants. There were no specific certification programs, so *IPM Florida* recommended that Cherry Lake consider adapting systems currently in use by Florida Yards and Neighborhoods, Florida Organic Grower's, Audubon International, or the IPM Institute of North America. IPM certification of woody ornamental plant production sites would enable growers to use IPM labels on their products. Additionally, *IPM Florida* contacted Dr. Mike Fitzner, National Program Leader for IPM, USDA, Cooperative State Research, Education and Extension Service, who provided a recent report on IPM labeling (VanKirk and Garling 1997) and recommended that Dr. Tom Green, President, IPM Institute of North America be contacted. The IPM labeling report concluded that Land Grant Universities "have a responsibility to be involved in facilitator, educator, expert roles in developing IPM guidelines but not in any certification role." Consequently, IPM Institute became involved as a possible certifier, assisted in preparing the funding request to the U.S. Environmental Protection Agency (EPA), and provided expert guidance for the project.

C. Project Description

The high aesthetic value of ornamental crops and intensive nature of production systems have created an industry that is heavily dependent on pesticides. Additionally, interstate and international plant protection regulations mandate that plants be shipped free of pests and diseases. Producers of woody ornamentals have reported using an average of 5.5 different insecticides, 3.9 fungicides and 2.4 herbicides with a wide range of risk factors each season. Frequent prophylactic "fumigation" is a common practice within the industry. However, IPM practices are available, including scouting, proper pest identification, economic thresholds, and least risk options, i.e., cultural and biological controls (Larson and Nesheim 2000, Attachment 2). There is a need to reduce the ornamental plant producer's reliance on pesticides and integrate the use of agrichemicals with other pest management options (Hudson *et al.* 1996).

Currently, there is no IPM certification and labeling program available to the producers of ornamental crops, despite growing knowledge of how to effectively use certification to increase and document adoption of IPM (Green 2002a). Practice-based certification programs in other agricultural sectors have demonstrated increases over time in the numbers of participating growers, acres and crops, and in IPM practices implemented by participants (Hollingsworth and Coli 1999, Petzoldt 1999). Documented results include a 37% reduction in the use of 11 high-risk pesticides over three years in Wisconsin potatoes (Lynch *et al.* 2000). Certification programs using IPM implementation as a requirement are now available for more than 40 crops in North America as well as forest products, golf courses and structural pest management (Green 2002b).

The goal of this project was to create a measurable increase in the number of producers of woody ornamentals using reduced risk practices and products, and recognition in the marketplace for those producers through a credible certification program. We envision this project as the first step in a coordinated national certification program for non-food agricultural products, including nursery and ornamental crops. Coordinating a national, multi-use program has potential to

maximize wholesale and retail consumer support, improve efficiency, and reduce administrative costs (Anonymous 1999a, b; Kane *et al.* 2001).

Specific activities that were planned for this project include:

1. Create a multi-stakeholder working group to provide ongoing oversight and direction.
2. Draft general guidelines or standards to govern operation of the program and develop crop and region-specific evaluation criteria.
3. Draft quantitative evaluation criteria specifically for woody ornamentals in Florida to measure compliance with the general guidelines. Include a minimum score to achieve certification with producer flexibility in choice of practices and specific incentives for use of reduced-risk options.
4. Train independent inspectors to evaluate applicants in meeting the criteria.
5. Create educational materials in print and on-line to inform wholesale and retail consumers about IPM and the accomplishments of certified producers.

This project will identify and recruit a volunteer advisory committee to oversee the certification process, including review of applications and inspection reports and certification approvals. Inspections will be conducted by trained, independent inspectors who will report results to the IPM Institute of North America. The UF, IFAS has coordinated the project and will continue to provide educational support, an appropriate role for a Land Grant University (VanKirk and Garling 1997). Timothee and Veronique Sallin of Cherry Lake Tree Farm, Mike Marshall of Marshall Tree Farm and Jeff Bryan of Shadowlawn Nursery represented the producers of woody ornamentals by describing current practices and evaluating advancements. The generic IPM certification structure and process has been developed by the IPM Institute of North America and applied to specific agricultural commodities. IPM Institute applied what they have learned to customize IPM certification for woody ornamental plant production. The final products will be available on-line for public inspection and non-participant use as an educational and self-evaluation tool. This pilot project is a pioneering effort, the first for this industry.

D. Chronology of IPM Certification for Woody Ornamentals

- January 15, 2002- Timothee Sallin (Cherry Lake Tree Farm) contacted Dr. Norm Leppla (*IPM Florida*) about IPM labeling that might apply to woody ornamentals.
- January 17, 2002- Dr. Leppla prepared an options paper for Timothee Sallin (see report at <http://ipm.ifas.ufl.edu>).
- January 18, 2002- Dr. Leppla held discussions with staff at Cherry Lake Tree Farm.
- March 25, 2002- Dr. Leppla met with Dr. Tom Green (President, IPM Institute of North America) (www.ipminstitute.org).
- April 30, 2002- Conference call was conducted to determine direction for an EPA grant proposal, Pesticide Environmental Stewardship Program.
- July 23, 2002- Grant proposal was submitted to EPA, "Increasing Adoption of Reduced Risk Practices in the Production of Woody Ornamentals."

- August 14, 2002- Briefing Book was prepared for the Woody Ornamentals Workgroup (grant proposal, minutes of meetings, presentations, IPM practices, crop profile, registered insecticides, etc.).
- August 29, 2002- The 1st Workgroup meeting was held at Cherry Lake Tree Farm for orientation and direction (Attachments 3 and 4).



- October 7, 2002- Official notification of EPA grant proposal funding (unofficial via telephone in mid-August).
- November 6, 2002- Dr. Leppla attended international “Conference on Eco-labels and the Greening of the Food Market” at Tufts University and held discussions with Dr. Green. (<http://nutrition.tufts.edu/conferences/ecolabels/order.html>).



- November 12, 2002- Project documents updated and posted on the IPM Institute of North America website (<http://ipminstitute.org>) and *IPM Florida* website (<http://ipm.ifas.ufl.edu>).
- November 21, 2002- The 2nd workgroup meeting was held at Cherry Lake Tree Farm to determine pest management practices for woody ornamentals.
- November 25, 2002- Funds received from EPA, \$33,225 to project.
- February 2003- Updated the woody ornamental IPM project in the Entomology and Nematology Newsletter, University of Florida, Institute of Food and Agricultural Sciences (<http://entnews.ifas.ufl.edu/>, Leppla and Green 2003).
- March 25, 2003- The 3rd workgroup meeting was held at Florida Nurserymen and Grower's Association (FNGA) office for guidance, inventorying and ranking IPM practices, and evaluating markets.
- April 11, 2003- Information on the project, including minutes of meetings, was updated on the *IPM Florida* website (<http://ipm.ifas.ufl.edu>).
- May 1, 2003- Timothee Sallin and the project were invited to present "IPM Powerful Potential" at Florida Nursery and Allied Trades Show (FNATS) in Orlando, Florida, as part of FNGA and Walt Disney World presentation on four "New Trends" in the industry (Attachment 5).
- May 14, 2003- The 4th meeting of the workgroup was postponed on advice from Ben Bolusky (Executive Vice President, FNGA) until a meeting could be conducted with key members of the FNGA Woody Ornamental Plant Committee.
- June 25, 2003- Dr. Barbra Larson (*IPM Florida*) and Dr. Eileen Buss (Landscape Entomologist, Department of Entomology and Nematology, UF) met with Merry Mott (FNGA Director of Communications & Landscape Certifications) about adding IPM training to the FNGA "Florida Certified Industry Professional" program.
- July 1, 2003- Dan Sonke (*IPM Florida*) prepared and submitted a report to FNGA for FNATS, "BMPs, Marketing Opportunities and Market Protection," containing marketing opportunities, liability issues, forestalling regulations, and IPM/BMP recommendations for the industry.
- August 6, 2003- FNGA hosted a woody ornamental grower meeting to discuss the IPM certification project. Industry leaders thought that some growers might want to develop niche markets as individual business decisions. The growers appreciated the role of *IPM Florida* in coordinating research, extension and educational support for the industry.
- September 25, 2003- Members of the Workgroup collaborated on a display, "IPM Powerful Potential," that was featured at FNATS. It was described as one of the four most important green-industry trends that will undoubtedly influence the ornamental plant industry. Industry leaders selected these topics (http://www.fnga.org/fnats/spec_events.asp).
- September, 2003- Ornamental Outlook published a special feature on Fresh Ideas: Major Trends, New Plants, New Products." The section, "IPM: Powerful Potential," emphasized that IPM helps growers protect the environment while offering the industry new marketing opportunities (Attachment 5).
- October 20, 2003- A USDA, Rural Business-Cooperative Service grant proposal was submitted, "Developing the Market for Ecologically Produced Woody Ornamentals." The unfunded project was intended to analyze the market for woody ornamentals produced using IPM tactics that could enhance their value to certain consumers. There is

an emerging market for woody ornamentals grown and maintained with minimal impacts on human health and the environment.

- January 19, 2004- Inventory of best management practices for woody ornamentals was distributed to the workgroup for determining current IPM adoption (Attachment 6).
- February 19, 2004- Woody Ornamentals IPM Workgroup produced a list of “IPM and Best Management Practices for Woody Ornamental Plant Production” (Section F).



- April 23, 2004- Esther Dunn (*IPM Florida*) began lectures on IPM in the Cherry Lake Continuing Education Course for Landscape Architects (<http://www.cherrylake.com>).
- May 23, 2004- Dr. Leppla reported on the woody ornamental IPM project at the Nursery and Landscape Research Meeting requested by FNGA at Gainesville, Florida.
- June 11, 2004- Dr. Eileen Buss reported on the woody ornamental IPM project at the Southeast Ornamentals Workshop, Gainesville, Florida.
- June 2004- *IPM Florida* and the IPM Institute of North America will complete the Briefing Book for “Increasing Adoption of Reduced Risk Practices in the Production of Woody Ornamentals.” A limited number of these books will be produced and distributed to members of the Florida Woody Ornamental IPM Certification Workgroup. Additionally, the book will be available on the websites of the two institutions.
- July 2004- Dr. Green will add a program for woody ornamental plant production to his “IPM STAR” certification system.
- July 2004 - Articles summarizing the results of this IPM certification project are in preparation and will be submitted to *Ornamental Outlook* and the UF, IFAS Electronic Data Information Source (EDIS).

E. Project Results

The Woody Ornamental IPM Certification Workgroup outlined the following incentives for IPM adoption: 1. Plants produced using IPM are generally of higher quality and can receive top dollar, 2. Application of IPM guidelines could protect landowners from claims of environmental pollution, 3. An IPM program can prevent the misuse of pesticides by nursery employees and their employers, 4. Voluntary adoption of IPM may provide an alternative to regulation by state

agencies, and 5. Growers who use IPM reduce chemical waste, produce healthier plants and often save money.

The Woody Ornamental IPM Workgroup completed the following project goals:

1. A Woody Ornamentals IPM Workgroup was formed. The Workgroup will continue to further the goal of assisting producers of woody ornamentals to reduce pesticide use by providing technical support and marketing incentives.
2. The Workgroup drafted general guidelines for the production of woody ornamentals under an IPM program. These guidelines were based on a tour of Cherry Lake Tree Farm and a limited survey of woody ornamental plant producers.
3. The Workgroup ranked quantitative evaluation criteria specific to woody ornamentals in Florida for use in measuring compliance with the general guidelines (see section F, IPM and Best Management Practices for Woody Ornamental Plant Production). Woody ornamental producers can use this tool to evaluate their progress in adopting IPM practices and to obtain certification for marketing in the future.
4. Educational materials were created to inform producers and consumers about the production of woody ornamentals using IPM, including this report, PowerPoint presentations, and a display and associated trade magazine article for the FNATS trade show. Additionally, the Workgroup will prepare a summary article for Ornamental Outlook and an EDIS publication for the University of Florida Extension program.
5. The IPM Institute of North America will train independent inspectors and provide IPM certification as requested by the woody ornamental plant producers. This project's principle impact has been to bring together key industry leaders, sensitize the producers to the need for increasing IPM practices, and provide a means to certify and label production facilities that achieve an established industry standard. The number of woody ornamental producers using reduced-risk practices and products can be evaluated after the certification process gains acceptance. This project has provided the basis for a certification program to be managed by the IPM Institute of North America and delivered the supporting educational message to the producers.

F. IPM and Best Management Practices for Woody Ornamental Plant Production

Scoring: Note whether each practice is satisfactory, needs improvement or is not applicable to your operation.¹

<i>I. Reduce pesticide use and risk through IPM</i>	<i>Priority</i>	<i>Score</i>
A. Biological knowledge		
1. Designate a pest manager/IPM coordinator to guide the program, review scouting reports and make management decisions related to pests of all types, including insects, diseases, weeds, nematodes and wildlife.	MUST	

2. Draft an IPM policy to state your commitment to IPM and guide decision-making.	Moderate	
3. Maintain a print and/or on-line IPM resource library including publications, such as the Commercial Ornamental Nursery Scouting Manual, current Extension agrichemical suggestions for ornamentals, current regulations, pesticide resistance chart and color identification photos of key pests, beneficials and protected species.	High	
4. Attend at least one Extension or industry meeting or training event annually.	MUST	
5. On an open-book basis, know key diseases, weeds, nematodes, insects, and wildlife pests for your location and the plant types you grow (e.g., pest names, identifying characteristics, life cycles and conditions that favor problems) and understand how to use this information to improve pest management.	High	
6. Use qualified diagnostic labs, experts and/or other resources to identify unknown pests or beneficial organisms.	High	
7. Staff holds appropriate licensing and certification, e.g., pesticide applicator, state nursery licenses.	MUST	
8. Train field staff to report potential pest problems.	BONUS	
B. Monitoring and Inspection		
1. Systematically scout nursery for pests and beneficials, concentrating time on key plants, known hot spots and greenhouse doorways, vents or other openings.	MUST	
2. Match scouting frequency to need, e.g., scout more frequently during critical times for key pests and plant susceptibility.	Moderate	
3. Create maps of logical and identifiable management unit to be used to note scouting path, results and recommendations.	Moderate	
4. Use traps (e.g., color boards, cards, cups) where appropriate to monitor insects, e.g., double-sided sticky tape or scale traps, pheromone traps for clearwing borers, yellow sticky traps for whiteflies, aphids, thrips, leafminer flies, shore flies and fungus gnats.	Moderate	
5. Mark plants to identify pest/problem detections and hot spots (e.g., with colored flags, GPS).	Low	
6. Maintain optical aids and collection equipment for scouts, e.g., hand lens, scouting report forms.	High	
7. Maintain diagnostic equipment for scout/IPM manager use, e.g., dissecting microscope, pH meter, conductivity meter.	BONUS	
C. Act to Control Pests When Necessary		
1. Follow all label instructions when a pesticide application is necessary, e.g., reentry times, target pests, label rate.	MUST	
2. Establish action thresholds, such as specific weather conditions or numbers of key pests, to guide decisions on whether or not to apply pesticides.	MUST	
3. Time pest control measures to coincide with the pest's most susceptible stage of development.	High	

D. Choose Least-Risk Options		
1. Release appropriate species of beneficials when pest populations are expected (e.g., from historical records) or when first detected, e.g., predator mites for spider mites and fungus gnats.	BONUS	
2. Identify key beneficials and choose least-toxic pesticides and/or application timing to protect those beneficials, e.g., use pesticides specific to the target pest instead of broad-spectrum insecticides.	Medium	
3. Identify infested plants and treat only those areas necessary to achieve control.	High	
4. Calibrate and service application equipment at manufacturer-recommended intervals.	High	
5. Identify pesticide modes of action, and rotate modes to slow pest resistance.	High	
6. Prior to weed seed set, manage weeds under propagation benches and along nursery perimeters, roadsides and ditches to reduce pest hosts and weed seed banks.	Medium	
7. Destroy individual plants with severe pest infestations.	High	
8. Pesticides are ranked for risk to applicators and others, beneficials, and ground and surface water.	High	
E. Long-Term, Preventative Practices		
1. Plant or position beneficial insect host plants throughout the nursery to attract and/or maintain populations of beneficials.	BONUS	
2. Inspect incoming stock for pests and quarantine where necessary.	High	
3. Choose pest-resistant varieties.	High	
4. Maintain healthy plants by using proper culture and management practices, e.g., fertilize according to soil or plant tissue test results, prune properly to preserve bark ridge and speed healing.	High	
5. Exclude pests when possible (fence out deer, screen greenhouse vents).	Moderate	
6. Maintain stored potting media and planted pots in a sanitary condition, e.g., prevent contact with non-sterile soil to reduce disease and nematode problems.	Moderate	
7. Adjust timing, amount and/or method of irrigation to minimize the length of time foliage remains wet and reduce disease pressure.	Moderate	
8. Adjust spacing, elevation of plants/pots to optimize airflow and drying times and reduce disease pressure.	Moderate	
9. Disinfect greenhouse benches and cloth ground covers between crops.	BONUS	
10. Use cloth ground covers, tarps or mulch to suppress weeds.	High	
11. Clean hands, tools and equipment frequently, especially when moving between plantings.	Medium	
12. Identify and correct underlying cause for persistent hot spots (e.g., pest immigration from unmanaged plants, high humidity, poor drainage, etc.).	Medium	
13. Provide information to product purchasers to encourage optimum after-	BONUS	

sale placement and care.		
F. Evaluation and Records		
1. Evaluate results of chemical, cultural, mechanical and biological control measures.	MUST	
2. Maintain scouting records including name of person scouting, locations, date and results.	MUST	
G. Pesticide Management		
1. Store pesticides in a locked and labeled facility.	MUST	
2. Calibrate equipment and locate pesticide mixing and loading sites away from surface water or wells with provisions for collecting spilled material.	MUST	
3. Keep spill kits on hand and clean up any spills immediately.	MUST	
4. Apply any wash or rinse water to the crop.	MUST	
5. Triple-rinse containers and pour rinsate into the tank.	MUST	
6. Use a back-flow preventer on water source.	MUST	
7. Meet WPS requirements for nursery production	MUST	
8. Properly dispose of cancelled, suspended or unusable pesticides, and dispose or recycle used product containers, according to manufacturer's instructions.	MUST	
H. Continual Improvement		
1. Nursery maintains a current list of goals with specific improvements to be made.	MUST	
2. Goals and progress are evaluated on a regular basis.	MUST	
II. Protect Soil and Water²		
A. Nutrient Management		
1. Monitor nutrient levels (substrate, soil testing) to determine when fertilizer applications are needed and amounts.		
2. Follow IFAS extension recommendations for nutrient testing methods and fertilizer application rates, where available.		
3. Choose the best fertilizer application method(s) (e.g., incorporated in substrate, surface applied) and formulation(s) (e.g., slow release, soluble) to minimize leaching and spills.		
4. Protect fertilizer storage from rainwater.		
5. Calibrate equipment and locate fertilizer storage, mixing and loading sites away from surface water or wells with provisions for collecting spilled material.		
6. Clean up any spills immediately.		
7. Apply any wash or rinse water to the crop.		
8. Manage soil/media pH to ensure nutrient availability to plants.		
9. Reduce nutrient leaching by reducing the amount of water leaching from containers (leaching fraction) compared to the amount of water entering the container.		
10. Reduce nutrient leaching by decreasing the amount and increasing the frequency of irrigations.		
11. BONUS: Where possible, manage temperature (e.g., greenhouse venting, container spacing) to maintain proper fertilizer release rates (check fertilizer label for recommendations).		
12. Collect and contain irrigation runoff to prevent nutrient and chemical discharge into natural ground and surface water.		

13. Maintain untreated buffers (“Ring of Responsibility”) between areas where pesticides and fertilizers are applied and surface water.		
<input type="checkbox"/> < 10 ft.		
<input type="checkbox"/> 10-15 ft.		
<input type="checkbox"/> >15 ft.		
14. Limit bare soil by using synthetic or natural mulches or ground covers to reduce erosion.		
15. Compost leaves, trimmings and other plants wastes.		
16. Allow clippings to compost in place.		
17. Avoid directing any ground cover or plant clippings towards surface water or impervious surfaces.		
18. Coordinate fertilization and irrigation to reduce leaching and increase uptake.		
A. Irrigation Management		
1. Check irrigation water delivery rates to ensure efficient operation and reduce waste.		
2. In seasonal growing areas, match irrigation amounts to seasonal plant water use requirements.		
3. Use efficient delivery systems, e.g., micro-irrigation to plants grown in spaced 7-gallon containers or larger rather than overhead irrigation, which can waste 80% of the water applied.		
4. Monitor rainfall and adjust irrigation amounts to account for rainfall contribution, e.g., use a rain shut-off device.		
5. Use backflow protection devices.		
6. Check irrigation system regularly and repair worn or broken parts as needed.		
7. Restrict irrigation to planted, non-pervious areas (e.g., avoid paved areas).		
8. Where appropriate, use efficient container designs and layout, e.g., squat containers retain more water than taller containers; containers that are touching or jammed retain more water than spaced containers. Do not risk disease/fungus gnat management by slowing drying.		

¹ The producers and certifying organization will establish the scoring system and minimum requirements for certification. The priority word “MUST” indicates a practice considered mandatory for certification, while a moderate or high ranking indicates one that should be used in the scoring).

² BMPs are not counted in scoring, although they are recommended practices for IPM. Producers of woody ornamental plants in Florida already practice BMPs to protect soil and water quality.

G. Future Activities to Promote Woody Ornamental IPM Certification

The industry wide adoption of IPM certification and branding of woody ornamentals will depend on future pest management options, environmental concerns in plant production and installation, and related adjustments in the marketplace. Most growers of ornamental plants are already seeking alternatives to chemical pesticides primarily because of the increasing cost of chemicals, potential for phytotoxicity, re-entry limitations, health and safety concerns, and loss of effectiveness. IPM and BMPs reduce the cost of producing ornamental crops by maintaining

pests at acceptable levels with minimal inputs. IPM is based on pest prevention, scouting, accurate pest identification, action thresholds, preservation and augmentation of natural controls, and application of the most effective, low risk pesticides.

This project to develop IPM certification for woody ornamentals is a pioneering effort many years ahead of the industry's advancing marketing structure. Cherry Lake Tree Farm provided vision and leadership for this project based on their very successful allied organic citrus business. About ten years ago, fresh citrus was a highly profitable commodity that required very little value added marketing, much like ornamental plants today. However, as profit margins decreased, growers became very receptive to IPM and organic production, and associated marketing. This was primarily a reaction to market competition but also expanded markets for premium products. The Forest Stewardship Council has an international certification program to "support responsible forestry practices" and the International Society of Arboriculture has indicated an interest in IPM. There are many examples of value-added "branding" for agricultural commodities, including ornamental plants.

Nurseries are typically located at the interface between agricultural and urban land, causing concerns about potential contamination of the air and water. IPM and BMPs can help to protect growers from liability associated with the use of agrichemicals. Recordkeeping and third party audits verify that IPM and BMPs are being practiced. Florida fern growers, having been fined repeatedly for contaminating wells with fungicides, are now using an IPM system to prevent the spread of anthracnose (Leahze *et al.* 1995). A tissue culture laboratory that produces more than 600 kinds of ornamental plants uses cultural practices and biological control exclusively for pest management because chemicals failed to eliminate fungus gnats and other pests. Recently, the Tampa Bay Wholesale Growers Association has offered an IPM scouting service to its members. The scouts are trained by the University of Florida, Institute of Food and Agricultural Sciences.

Environmental communities want landscape plants that are grown and maintained using IPM practices and they will pay a premium. The demand for plants grown using IPM practices already exceeds the supply and this has caused some of these communities to establish nurseries. Neighborhoods, such as Harmony Florida, are marketing the opportunity for people to "live in balance with Nature." Entire landscapes, such as golf courses, schools, and municipalities are becoming IPM certified by independent organizations, including the IPM Institute of North America and Audubon International. Florida Yards and Neighborhoods certifies individual home landscapes and is expanding into entire real estate developments. The marketplace now rewards Silver Vase bromeliads and orchids as "Grown Clean and Green with Integrated Pest Management" (Attachment 7). As an incentive for growers to practice conservation in the production of woody ornamentals and trees, the Florida Department of Agriculture and Consumer Services annually awards the Commissioner's Agricultural-Environmental Leadership Award (Attachment 8).

The woody ornamental IPM certification project led to a partnership among Cherry Lake Tree Farm, the IPM Institute of North America and the University of Florida, Institute of Food and Agricultural Sciences with funding and guidance by the EPA. As a consequence, several associated IPM training and certification projects have been developed: landscape maintenance (Landscape Maintenance IPM Training to Promote Reduced-Risk Pest Management Practices,

funded by EPA-PESP), Florida School IPM “Benchmark Pilot Project” (funded by EPA, http://www.mccsc.edu/~mccscipm/html/reg/ipmodel/ipmodel_steps.htm), Cherry Lake Landscape Architects Course (“Cherry Lake University,” continuing education program for green industry professionals, especially Florida Landscape Architects and FNGA Certified Professionals http://www.cherrylake.com/Resources/Resources_Ceu_Descriptions.htm), turfgrass IPM survey (Evaluation of Integrated Pest Management Practices in Urban Turfgrass, funded by EPA-Strategic Agricultural Initiative), and an unfunded grant proposal to the USDA, Rural Business -Cooperative Service. IPM training could be added to some of the Florida Nurserymen and Growers Association Certification Programs, and discussions have begun for the initiation of that process. These programs include the FNGA Certified Horticulture Professional, FNGA Certified Landscape Contractor, FNGA Certified Landscape Technician, and FNGA Certified Landscape Designer. The woody ornamental IPM certification project supported several UF, IFAS Doctor of Plant Medicine students who have graduated and begun careers in the ornamental plant and allied industries. These DPM graduates are implementing many of the concepts and practices of IPM for woody ornamental plants. The results of this IPM certification project will be documented expeditiously in Ornamental Outlook and UF, IFAS EDIS articles.

H. Acknowledgements

In addition to the Woody Ornamental IPM Workgroup (Attachment 9), very helpful guidance was provided by Ben Bolusky (Florida Nurserymen and Growers Association), Hugh Gramling (FNGA Research Committee), Mike Cheminsky (John’s Nursery), PJ Klinger (Lake Brantley Plant Corp.), Chuck Hudson (Grass Roots Nurseries), Randy Jacobs (Flowerwood Nursery), and Ken Poucher (Skinner Nurseries). Heather Nedley (FNGA) and Jeanne Burgess (Lakeridge Winery and Vineyards) graciously arranged for two of the Workgroup meetings. Rebecca McNair briefly joined the *IPM Florida* staff and provided liaison with Florida Yards and Neighborhoods. Workgroup meetings were attended by Dr. James Sterns and Kevin Athearn of the UF, IFAS Food and Resource Economics Department, Dr. Ed Gilman from the UF, IFAS, Environmental Horticulture Department, Dr. Lance Osborne from the UF, IFAS, Mid-Florida Research and Education Center, and Jim Warneke from Walt Disney World. Ed Burns and Jack Shirley attended a Workgroup meeting as representatives of the Florida Department of Agriculture and Consumer Services, Division of Plant Industry. Jason Evans attended a meeting as a UF student in Environmental Studies. The Workgroup especially thanks Dr. Troy Pierce (EPA) for his attention and encouragement throughout the project.

I. References and Related Websites

References:

Allen, Michael. 2003. IPM: Powerful Potential. *Ornamental Outlook*. 12 (9): 6-7 (*).

Anonymous. 2001. Consumers Union Guide to Environmental Labels. Consumers Union, Yonkers NY. http://www.eco-labels.org/good_ecolabel.cfm

- Anonymous, 2000. Directory of least-toxic pest control products. The IPM Practitioner 21: (11/12) 1-38. Bio-Integral Resource Center, Berkeley CA.
- Anonymous. 1999a. Supporting Green Markets: Environmental Labeling, Certification and Procurement Schemes in Canada, Mexico and the United States. Commission for Environmental Cooperation. Montreal Canada. <http://www.cec.org>
- Anonymous. 1999b. Feasibility of a National Eco-Label: Preliminary Report of the Blue Water Task Force. USDA-NRCS, D. White, Chairperson.
- Anonymous. 1998a. IFP Preference Ratings of Chemicals Used in Apple Production. Hood River District Integrated Fruit Production Program. <http://www.orst.edu/dept/hort/orchardnet/apspray.htm>
- Anonymous. 1998b. The National IPM Protocol for Potatoes: A Pest Management Assessment Tool and Educational Program Developed for America's Potato Growers. National Potato Council, Englewood, CO.
- Buss, E.A. and D.E. Short. 2001. Insect Management on Landscape Plants. EYN-338. Department of Entomology and Nematology, Florida Cooperative Extension Service, IFAS, University of Florida. <http://edis.ifas.ufl.edu/IG013>
- Coli, W.M. and C.S. Hollingsworth. 1996. Defining the ambiguous: Massachusetts' crop-specific IPM guidelines allow growers to understand and benefit from their pest management programs. The Grower, April 1996, pp. 48-49, 58.
- Cross, J.V., and E. Dickler, eds. 1994. Guidelines for Integrated Production of Pome Fruits in Europe: IOBC Technical Guidelines III. International Organization for Biological Control of Noxious Animals and Plants, Bulletin 17(9): 1-8. Montfavet, France. <http://www.admin.ch/sar/scripts/get.pl?faw+portrait/iobc.html+0+60>
- Degner, R.L., T. Stevens, W.D. Mulkey, and A. Hodges. 2000. Economic impact of agriculture and agribusiness in Dade County, Florida. Industry Report 2000-1, Florida Agricultural Market Research Center, Food and Resource Economics Department, Florida Cooperative Extension Service, IFAS, University of Florida. 64 pp.
- Dlott, J. and J. Curtis. 2000. Accountability and Eco-Labels: What Eco-Benefits Did I Buy Today? Presentation, Read the Label Conference, The Food Alliance, Portland OR.
- Flint, Mary Louise, and Patricia Gouveia. 2001. IPM in Practice: principles and methods of integrated pest management. University of California Agriculture and Natural Resources Communication Services. Publication 3418.
- Florida Department of Agriculture and Consumer Services. 1998. Grades and Standards for Nursery Plants, 2nd Edition. PI#97T-05.

- Florida Department of Agriculture and Consumer Services. 2004. Woody Ornamental & Trees Conservation Champions. *Ornamental Outlook*. 12 (9): 21-22.
- Florida Green Industries. 2002. Best Management Practices for Protection of Water Resources in Florida.
<http://www.dep.state.fl.us/water/stormwater/docs/nonpoint/BMP%20Book%20final.pdf>
- Green, T.A. 2002a. Bibliography of IPM Certification, Labeling and Marketing.
http://www.ipminstitute.org/ipm_bibliography.htm
- Green, T.A. 2002b. Links to IPM Product and Service Recognition Programs and Information.
<http://www.ipminstitute.org/links.htm>
- Guillebeau, P. and G. Van De Mark. 1999. Georgia Farm*A*Syst/Cotton*A*Syst Cotton IPM: Farm Assessment System. University of Georgia Cooperative Extension Service, Athens GA.
- Hodges, A. 2000. Outlook 2001- Ornamental plants. Food and Resource Economics Department, Florida Cooperative Extension Service, IFAS, Univ. of Florida. No.146 Nov.-Dec. 2000.
- Hodges, A.W., M.J. Aerts, and C. A. Neal. 1998. Pest management practices and chemical use in Florida's ornamental plant nursery industry. Circular 1203, Food and Resource Economics Department, Florida Cooperative Extension Service, IFAS, University of Florida. 16 pp.
- Hodges, A.W. and J.J. Haydu. 1999. Economic impact of Florida's environmental horticulture industry, 1997. Economic Information Report, EIR 99-1. Univ. of Florida, March 1999. 48 pp.
- Hollingsworth, C.S., and W.M. Coli. 1999. IPM Adoption in the Northeast: An Examination of the IPM Continuum. Unpublished.
- Howard, Dennis and Mike Thomas. 1998. Best Management Practices for Agrichemical Handling and Farm Equipment Maintenance. Florida Department of Agriculture and Consumer Services & Florida Department of Environmental Protection. 43 p.
- Hudson, W.G., M.P. Garber, R. D. Oetting, R. F. Mizell, A. R. Chase, and K. Bondari. 1996. Pest Management in the United States Greenhouse and Nursery Industry: V. Insect and Mite Control. *HortTechnology* 6(3): 216-221.
- Johnson, D.C. 1999. Situation and Outlook for Ornamental Horticulture. FLO-99. USDA, Economic Research Service, Washington, D.C.
- Kane, D., B. Lydon, K. Richards and M. Sligh. 2001. Greener Fields: Signposts for Successful Eco-labels. Rural Advancement Foundation International, Pittsboro NC. 68 pp.

- Larson, B.C. and O.N. Nesheim. 2000. Florida Crop/Pest Management Profiles: Ornamentals. Pesticide Information Office, Department of Food Science and Human Nutrition, Circular No. 1232. University of Florida, Institute of Food and Agricultural Sciences, Gainesville, FL. http://edis.ifas.ufl.edu/BODY_PI038
- Leahze, R., Schubert, T., Strandberg, J., Stamps, B., and Norman, D. 1995. Anthracnose of Leatherleaf Fern. Plant Pathology Circular No. 372, Florida Department of Agriculture and Consumer Services, Division of Plant Industry. <http://mrec.ifas.ufl.edu/cutfol/cutpubs/ppc372.htm>
- Leppla, N. C. and T. Green. February 2003. Entomology and Nematology News. University of Florida, Entomology and Nematology Department. <http://entnews.ifas.ufl.edu/Feb03.htm>
- Lynch, S., D. Sexson, C. Benbrook, M. Carter, J. Wyman, P. Nowak, J. Barzen, S. Diercks and J. Wallendal. 2000. Accelerating Industry-Wide Transition to Reduced-Risk Pest Management Systems: A Case Study of the Wisconsin Potato Industry. <http://ipcm.wisc.edu/bioipm/reports/choicesfinal.pdf>
- Mizell, Russell F., III. 2001. Pesticides registered for the nursery and landscape and their impact on beneficial and non-target organisms. Monticello-NFREC Research Report BB98-7. http://ipm.ifas.ufl.edu/applying/tactics/pesticides/mizell_ornamental_pesticide_side_effects.htm
- Mizell, R.F., and D.E. Short. 1998. Integrated Management in the Commercial Ornamental Nursery. ENY-336. Entomology and Nematology Department, Florida Cooperative Extension Service, IFAS, University of Florida. http://edis.ifas.ufl.edu/BODY_IG144
- Omhart, C.P. and S.K. Matthiasson. 2000. Lodi Winegrower's Workbook: A Self-Assessment of Integrated Farming Practices. Lodi-Woodbridge Winegrape Commission, Lodi CA.
- Osborne, L.S., N.C. Leppla and R.S. Osborne. 1999. "Biological Control of Foliage Pests" Chapt. 15c. In K.M. Heinz, R.G. Van Driesche and M.P. Parrella (Eds.), Biological Control of Arthropod Pests in Protected Culture. Ball Publishing, Batavia, Illinois.
- Osborne, L.A., E.A. Buss, C.M. Mannion and J.F. Price. 2001. Commercial Foliage and Woody Ornamental Arthropod Pest Management. EYN-311. Department of Entomology and Nematology, Florida Cooperative Extension Service, IFAS, University of Florida. <http://edis.ifas.ufl.edu/IG012>
- Petzoldt, C.P. 1999. Challenges for land grant university personnel resulting from participation in eco-labeling efforts. In Proceedings: Adding Value through Environmental Marketing: Opportunities for Food Producers, Processors and Retailers. Institute for Agriculture and Trade Policy, Minneapolis MN.

Short, D.E., G.W. Simone and R.A. Dunn, eds. 2001. Commercial Ornamental Nursery Scouting Manual. SP 235. Department of Entomology and Nematology, IFAS, University of Florida. <http://mrec.ifas.ufl.edu/Iso/SCOUT/INTRO.htm>

University of California. 2000. The UC Guide to Solving Garden and Landscape Problems: An Interactive CD-ROM. Publication 3400. ANR Communication Services, 6701 San Pablo Ave., Oakland, CA 94608. 800 994-8849. <http://anrcatalog.ucdavis.edu/index.html>

VanKirk, J. and L. Garling. 1997. IPM Labeling: A Discussion of Benefits and Challenges to Land Grant Involvement in IPM Labeling and Related Initiatives. A Report on the National Meeting at Indianapolis, Indiana, April 23-24, 1997. <http://northeastipm.org/reports/Indylabel97/indyintro.html>

Yeager, T.H. 2001. Irrigation and Nutrient Management Considerations for Container Nurseries. ENH-156. Environmental Horticulture Department, Florida Cooperative Extension Service, IFAS, University of Florida. <http://edis.ifas.ufl.edu/EP077>

Yeager, T., D. Fare, C. Gilliam, A. Niemiera, T. Bilderback and K. Tilt. 1997. Best Management Practices, Guide for Producing Container-Grown Plants. Southern Nurserymen's Association, Marietta, GA. <http://www.sna.org>

Related Websites:

Audubon International, Audubon Cooperative Sanctuary System:
<http://www.audubonintl.org/programs/acss/index.htm>

Cherry Lake Continuing Education Course for Landscape Architects:
(<http://www.cherrylake.com>).

Consumers Union: www.eco-labels.org

Florida Cooperative Extension's Electronic Data Information Source (EDIS):
<http://edis.ifas.ufl.edu>

Florida Department Of Agriculture & Consumer Services, Division Of Plant Industry Publications (Grades and Standards, circulars on Florida pests):
<http://www.doacs.state.fl.us/pi/pubs.html>

Florida Organic Grower's Association: <http://www.foginfo.org/>

Florida Yards and Neighborhoods: <http://hort.ufl.edu/fyn>

Florida Yards and Neighborhoods. 2002. Yard Certification Checklist.
<http://hort.ufl.edu/fyn/certification.pdf>

FNGA - Florida Nurserymen & Growers Association: <http://www.fnga.org>

Forest Stewardship Council: <http://www.sustainablebusiness.com>

Harmony Florida: <http://www.harmonyfl.com>

International Society of Arboriculture: <http://www.tourdestrees.org/isa.htm>

IPM Florida, University of Florida/IFAS: <http://ipm.ifas.ufl.edu>

IPM Institute of North America: <http://www.ipminstitute.org>

Southern Nursery Association: <http://www.sna.org>

Tree Introductions, Inc. <http://www.treeintroductions.com>

J. Attachments

- 1.) IPM Florida Mission and Goals
- 2.) Larson and Nesheim Crop Profile
- 3.) IPM Institute of North America PowerPoint presentation
- 4.) Leppla *et al.* PowerPoint presentation
- 5.) FNATS (cover, p. 3, 6, 7) plus IPM photos
- 6.) Participants Survey
- 7.) Silver Vase
- 8.) FDACS Woody Ornamental & Trees Conservation Program
- 9.) Florida Woody Ornamentals Workgroup