RESEARCH & EDUCATION GARDEN: DISSEMINATING POLLUTION PREVENTION INFORMATION FOR URBAN LANDSCAPES

Susan M. Varlamoff[1] and Joyce G. Latimer[2]

AUTHORS: [1]Program Coordinator, [2]Faculty Leader, Georgia Station Research & Education Garden, The University of Georgia - Griffin Campus, Department Horticulture, Griffin, GA 30223

REFERENCE: *Proceedings of the 1999 Georgia Water Resources Conference*, held March 29-31, 1999, at The University of Georgia. Kathryn J. Hatcher, editor, Institute of Ecology, The University of Georgia, Athens, Georgia.

Abstract. The Georgia Station Research & Education Garden serves as a vehicle to transfer research results to the general public through hands-on programs. Research focuses primarily on improving the economic viability of the ornamental horticulture industry while reducing the environmental effects of fertilizers and pesticides in the landscape through the use of pollution prevention strategies. The Georgia Station Research & Education Garden connects scientists with industry professionals and the general public, allowing for the rapid transfer of research information to improve the quality of Georgia urban landscapes while preventing the pollution of groundwater and surface water.

INTRODUCTION

According to a recent study on water quality in the Flint, Apalachicola, and Ocmulgee River basins during July 1994, "More pesticides were detected and at generally higher concentrations in water from urban watershed than the agricultural watershed (Hippe et al., 1994). Environmental concerns have led to public demands for critical reassessment of pesticide use in urban residential and commercial landscapes.

The Georgia Station Research & Education Garden (Garden) is a 65-acre tract located adjacent to the University of Georgia - Griffin Campus in Spalding County and within Metro Atlanta. Half the population of Georgia lies within 60 miles of the facility which is a component of the Center for Urban Agriculture. The Garden contains research plots and a Demonstration Area. Several pollution prevention research projects conducted at the Georgia Station Research & Education Garden address the problem of non-point source pollution resulting from run-off containing fertilizers and pesticides. These are described below.

ONGOING RESEARCH PROJECTS

Landscape Management Project is a long-term research and extension project to improve pest management options available to the landscape maintenance industry and homeowners with an overall goal of reducing risks from pesticides used in urban landscapes. The project, initiated in Spring 1995, is a collaborative effort of horticulturists Joyce Latimer and Carol Robacker, entomologists Kris Braman and Ron Oetting, and agricultural economist Wojciech Florkowski. The objectives include identifying and quantifying inputs required to maintain a mixed landscape using different pest management regimes and various cultural practices. Pest management strategies include: no pest control, professional management, targeted management, or pest-resistant plant materials. The professional management plot is maintained by researchers from TruGreen-ChemLawn. Data has been collected on insect pest problems, natural enemy occurrence and abundance, plant growth and performance.

In 1998, the project was renovated with new plant materials to evaluate the pest regimes with an irrigation variable. Optimizing water use in the landscape will reduce the potential for run-off containing pesticides and fertilizers from urban landscapes while maximizing plant health and performance. Since 80% of plant problems result from the inability of a plant to tolerate the environment, the *Landscape Management Project* demonstrates how plant placement can profoundly affect plant susceptibility to pests. It also emphasizes the value of using pest resistant plant materials developed by cooperators. Results from this project will be used to develop best management practices for urban landscapes.

Breeding Insect Resistant Azaleas is an important research focus because azaleas are the number one landscape plant in Georgia and are susceptible to a number of pests and diseases. Frequent use of pesticides is often required to control azalea lace bugs (ALB), the number one insect pest of azaleas. Plant breeder Carol Robacker and entomologist Kris Braman have been building an azalea germplasm collection in the Garden, and evaluating selections for resistance to ALB. The genetic and physiological basis of resistance to azalea lace bug is being investigated. Having identified ALB resistance in some deciduous azaleas, they are trying to transfer that resistance into the more susceptible, but more commonly desirable, evergreen varieties. They are also working to identify the mechanism of ALB resistance in azaleas and to develop tissue culture screening procedures to maximize the number of selections that can economically be tested. Combining desirable horticultural

traits with pest resistant traits to produce improved cultivars is the goal of *Breeding Insect Resistant Azaleas.*

Recycled Tires as Mulches for Perennial Crops is a project funded by the Georgia Department of Natural Resources to consider the possibility of using chipped scrap tires for mulch. Horticulturists Scott NeSmith, Orville Lindstrom and Gerard Krewer are testing chipped tires for mulch on blueberry plants and Leyland cypress Christmas trees. Over a three-year period, it was compared to pine bark, bare ground, and a grass cover. All mulches were evaluated for their ability to conserve soil moisture, moderate soil temperature, and suppress weed growth. The project has yielded mixed results. The chipped tires have successfully improved soil moisture conditions and reduced weed pressure on both the blueberry and Leyland cypress plants. Chipped tires may be economical for use on perennials crops such as the Leyland cypress that are not typically irrigated during production for Christmas trees. However, after three years of testing the chipped tire mulch, elevated levels of zinc were detected in the soil which may prove be toxic to some plants.

Reducing Greenhouse Wastewater through Recycling is a project being conducted at the new production greenhouse in the Research and Education Garden by horticulturist Marc van Iersel. An 'ebb and flow' system is being evaluated as a means to reduce surface water run-off from greenhouses. In most commercial greenhouses, water is applied by hand with a hose or with overhead sprinklers. Excess water mixed with fertilizers may run out of the greenhouse. This mixture can contaminate groundwater and nearby surface water causing eutrophication. By contrast the 'ebb and flow' system pumps water and fertilizer onto watertight tables holding young plants. Growers leave the water on the table for a time, then collect the excess water in tanks. Later, the water is pumped back out for the next watering. With this system every plant receives the same amount of water and fertilizer. Ebb and flow grows healthier, more evenly sized plants. This method of providing water and nutrients to greenhouse plants maximizes plant quality and production while reducing water and fertilizer use. Initial studies have focused on cultural conditions, including fertilizer concentrations, timing of watering and different growing media. Greenhouse runoff can be virtually eliminated if recirculating watering systems are used. Economical means of incorporating these systems into existing commercial greenhouse operations must be determined.

SUMMARY

These projects, along with others, provide the information needed to develop and update educational program materials designed to teach industry professionals and homeowners strategies to reduce the impact of fertilizers and pesticides in the landscape. An integrated pest management manual has been produced for professionals and is currently undergoing revision. From this information, a homeowner version is being developed. Prior to implementation of this program, a survey, funded by the Pollution Prevention Assistance Division of the Georgia Department of Natural Resources, will be conducted to determine the habits of homeowners with regard to their use of fertilizers, pesticides and alternative methods of pest control such as horticultural oils, insecticidal soaps, and biological control. The survey will also determine the profile of homeowners who do their own landscape management, and how they receive information regarding landscape management. Training programs will be established based on this information.

The Georgia Station Research & Education Garden provides hands-on training and educational programs to teach pollution prevention strategies based on research results which include use of pest resistant plant materials, cultural practices, and integrated pest management. Practicing pollution prevention in landscape management by both homeowners and professionals safeguards the quality of the landscape while protecting groundwater and surface water quality of the state. As both the research plots and Demonstration Area develop, more and more programs will become available. Accessibility to research results provides for the rapid transfer of information from scientists to industry professionals and homeowners thereby quickly benefitting both the quality of urban landscapes and the surface waters of Georgia.

ACKNOWLEDGMENTS

These projects were funded by the Pollution Prevention Assistance Division of the Georgia Department of Natural Resources; the Horticultural Research Institute; SARE/ACE Biopesticides Program; Southern Region IPM Program ((USDA/CSREES).

LITERATURE CITED

Hippe, D.J., Wangsness, D.J., Frick, E.A. and Garrett, J.W., 1994. Water Quality of the Apalachicola-Chattahoochee Flint and Ocumulgee River Basins Related from Tropical Storm Alberto; Pesticides in Urban Agriculture Watersheds; and Nitrate and Pesticides in Groundwater, Georgia, Alabama, and Florida. U.S. Geological Survey, Water Resources InvestigationReport 94-4183. Altanta, GA.

Wang, Y., Robacker, C. D., Braman, S. K., 1998. Identification of Resistance to Azalea Lace Bug among Deciduous Azalea Taxa, J. Amer. Soc. Hort. Sci 123(4): 592-597.