REDUCING THE POLLUTION POTENTIAL OF PESTICIDES AND FERTILIZERS IN THE ENVIRONMENTAL HORTICULTURE INDUSTRY

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Abstract. Optimizing growing conditions and thereby, plant growth, through the development and implementation of best management practices (BMPs) reduces the susceptibility of plants to many disease and insect problems. Educating growers, consumers, and landscape professionals about BMPs, the potential environmental hazards of improperly applied pesticides and fertilizers, and the potential alternatives to their use would reduce the pollution potential of these products in environmental horticulture.

INTRODUCTION

The environmental horticulture industry is composed of related commodities including greenhouse, nursery, and turfgrass crops, as well as the services associated with their use. Many of these operations are located in or near urban areas to reduce transportation costs. Pesticides have been the primary method of pest control for years, and growers and landscape managers depend upon them to control insect and disease-causing pests effectively and economically.

However, pesticides and fertilizers are important pollutants of surface waters in urban areas. Eighteen percent of the pesticides in the United States are sold to industrial, commercial, and government entities (including commercial ornamental crop producers and professional pest control operators) and 7% are sold to home and garden consumers. Although only about 25% of the total amount of pesticides sold in the United States are used for non-agricultural purposes, the use of many of these in urban areas increases their perceived, and in some cases, real, impact. In Georgia, the U.S. Geological Survey reported that median concentrations of two insecticides, chlorpyrifos and diazinon, from urban watersheds exceeded the EPA guidelines for protection of aquatic life, and were much higher than in agricultural watersheds (Hippe et al., 1994).

The agriculturally-accepted concept of a risk : benefit ratio is considered by many to be unacceptable for pesticide use in urban areas. Since the benefits of high quality ornamental plantings are difficult to quantify, any risks associated with pesticides in landscapes or lawns may be deemed unacceptable (Adamczyk, 1993). Although environmental and public health concerns have led to public demand for critical reassessment of pest management tactics in urban areas, they have not reduced the high aesthetic standards for ornamental plants, urban landscapes, or recreational turf. However, opportunities for reducing the potential pollution arising from the use of pesticides and fertilizers in environmental horticulture are excellent.

GREENHOUSE, NURSERY, AND SOD PRODUCTION

There are more than 1000 firms engaged in greenhouse, nursery or sod production in Georgia with a farm-gate value of almost $207 million in 1995 (GASS, 1996). Over 40% of the gross sales of their products comes from the urban district including metro-Atlanta.

Optimizing conditions for plant growth, reduces the susceptibility of plants to many disease and insect pest problems. Research in Integrated Pest Management (IPM) offers alternatives to conventional chemical treatments. Growers are very receptive to IPM, and many already use alternatives such as, applying more environmentally benign chemicals like insecticidal soaps and oils, monitoring and routine scouting for pests, rouging of infected plant material and other sanitation practices, improving cultural practices, and incorporating biological control organisms. Greenhouse, nursery, and sod producers are using many of these alternatives to reduce the outbreak potential and severity of disease and insect problems (Oetting and Allison, 1994). Future research should focus on increasing the effectiveness and availability of alternatives to conventional treatments.

LAWN CARE AND LANDSCAPE MANAGEMENT

Environmental horticulture interacts with almost every homeowner and consumer in the United States. More than 80% of the households in the United States participate in gardening activities (Behe and Beckett, 1993). Furthermore, the interest and participation in home gardening is increasing which results in more pesticide use. A survey in Albuquerque, N.M., revealed that 90% of households had someone in the home who applied the pesticides to their own landscapes, spending an average of $36.10 per year on pesticides (Ward et al., 1993). In addition, about 16% of households purchase professional lawn care or landscape maintenance services.

The landscape industry remains one of the largest, most diverse and most rapidly growing industries in the state. Pesticides combined with the use of N and P fertilizers on lawns and landscapes contribute to water pollution problems in urban areas, increasing the need for the proper management of the amount, timing and placement of chemicals and fertilizers. Evidence suggests that homeowner knowledge about the effects of pesticides and fertilizers is limited and that warning labels are not read or are ignored (Whitmore et al., 1993). Many of the

professional maintenance firms also suffer from lack of training in proper chemical use.

IMPEDIMENTS TO POLLUTION PREVENTION

Current impediments to reducing the pollution potential of pesticides and fertilizers used in the environmental horticulture industry include the limited number of easily implemented, reliable, and cost-effective alternative pest control methods and the underfunding of research in developing new alternative pest control measures. Commercial operators, chemical and nursery sales representatives, landscape architects, and the general public have very limited knowledge about the availability of these alternatives and need additional education on sanitation, monitoring, and other low-cost methods of reducing the frequency or severity of pest outbreaks. Lack of funding for research to identify effective biological control organisms and to develop methods of effectively and economically applying the organisms hinders their incorporation into commercial and consumer pest control strategies.

The nursery industry is reluctant to produce, and landscape architects are reluctant to recommend, pest resistant plant materials. However, new emphasis on pest resistance in breeding and selection programs is leading to the development of pest resistance plants with impressive ornamental appeal. Educating the landscape architects who determine the plants used in many of our urban landscapes will encourage the use of this simple means of reducing pesticide use.

There are currently few economic or regulatory incentives for professionals to implement alternatives to standard pesticides. And, there is inadequate funding for education on the benefits of decreased chemical use and the necessity of changing consumer perception of plant aesthetic damage.

Improved pest detection methods and the use of pest-resistant plants in landscapes (and therefore, nurseries) offer simple, and in many cases readily available, approaches to reducing the dependence on chemical use. Increased emphasis on BMPs in all production and landscape systems would enhance plant health and thereby reduce pest problems. Research on additional effective, low-cost IPM methods is essential if the use of chemicals in the environmental horticulture industry is to decrease.

EDUCATIONAL OPPORTUNITIES

Educating professional lawn or landscape maintenance operators and homeowners about plant health management would reduce the need for chemical intervention and thereby the potential for pollution from pesticides and fertilizers. Pesticide use has been reduced by up to 70% with the implementation of current IPM technology (Smith and Raupp, 1986). We must teach the value of soil testing and implementing fertilizer recommendations properly. We need to educate homeowners and professionals on irrigation management, with respect to optimizing plant growth, reducing disease and insect problems, and minimizing pollution from fertilizers and pesticides. In order for educational efforts to reach consumers applying chemicals in residential gardens, we must educate the sales representatives and others who interact most closely with consumers.

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