
Ornamental Pest Management

Introduction to Ornamental Pest Management

What Is IPM?

Integrated pest management (IPM) is based on the philosophy of using various strategies to optimize the environmental, economic and sociological consequences of a management system. IPM is a systematic approach to plant protection that emphasizes increased information for improved decision-making. By understanding the ecological aspects of the system, pest populations can be minimized with less effort using various control measures. The concept of IPM is not new and is widely implemented on field crops throughout the United States and the world. Implementation in the urban environment has special challenges because of aesthetic considerations, lack of ornamental damage acceptance data, lack of demand by the public and the difficulty in dealing with a multitude of different plants with different management requirements in a small area.

These constraints have changed dramatically with an increase in the interest of people living in urban areas and those working in educational environments.

IPM, Ecology and Management

IPM incorporates ecological principles into a management program. Management strategies are integrated into an ecologically based system that includes:

- **Host plant resistance.** Host plant resistance is a critical part of any management system. Host plant resistance is the ability of the plant to prevent pest buildup or tolerate pests without damage to the plant itself. This is a critical component and the basis of an effective IPM program. For example, selecting a Chinese elm (*Ulmus parvifolia*) will help avoid problems with the elm leaf beetle.
- **Cultural practices.** Cultural practices, or care of plants and the surrounding environment, can determine whether pests or abiotic problems, such as sunscald or drought, develop and how long plants can survive. Cultural management includes proper fertility, proper plant selection, watering, soil structure and reduced competition from adjacent plants.
- **Physical/mechanical practices.** Many times, physically reducing pests by mowing, hoeing or trimming can provide an easy, economical alternative to using pesticides. By reducing direct competition through careful tillage or mulching around the base of plants, the life and appearance of the plants can be enhanced. Also, avoiding physical or mechanical damage to plants can greatly improve a plant's survival and reduce potential pest problems. Wounds in trees caused by weed eaters or other tillage equipment can shorten the life of plants by making them susceptible to either insect or disease infestation.
- **Pesticides.** Pesticides should be viewed as a salvage treatment to prevent significant damage to plant materials. While pesticides are an important tool, they should be used only when necessary and must be used in conjunction with other management tools. In the urban environment, the tendency is to use pesticides on a preventative basis to ensure a perfect landscape. For example, the overapplication of weed-and-feed materials on lawns can have serious effects on adjacent ornamental plants. This practice must change. The development of a pest population is a sign of improper ecological management.
- **Proper selection and placement of plant materials.** Plants that thrive in their growing environment are better able to resist insect and disease problems. This is where many management programs fail. If the wrong plant materials are selected, it will be difficult to overcome the poor initial choice – no matter how hard one tries to compensate. An example is planting cedar trees adjacent to apple trees susceptible to rust. This situation stimulates cedar-apple rust that can cause serious damage to the apple trees.

- **Regulatory.** The easiest way to prevent development of a pest within a landscape is simply to not allow the pest to become established. This is particularly important for some exotic pests or weeds in a landscape. It is much more difficult to eliminate exotic pest populations after they become well established. Federal and state agencies can and often do place quarantines on certain exotic pests to prevent their spread into other areas of the United States. Examples are the red imported fire ant, citrus rust and the gypsy moth.
- **Biological control.** The importance of using biological agents to control insect and disease pests is often overlooked. Biological agents include predators, parasites, nematodes and microbiological organisms, such as bacteria, viruses and fungi. Many of the aphids are controlled naturally by fungi, predators and parasites that keep the aphid numbers below damaging levels.

Why Implement IPM?

Over the past three decades, most U.S. regions have experienced rapid urbanization, with much of the population living in major urban areas. The same situation holds true for Arkansas. Like commercial agriculture, the urban environment faces many significant management obstacles. Often, ornamental trees and shrubs in a landscape have significant weed, insect, disease, fertility and cultural management problems that must be addressed for each plant's survival. Likewise, urban personnel often don't know enough about effective pest management and routinely use calendar-based applications of pesticides. With intense use of pesticides and fertilizers, there may be a significant impact on the environment and the people themselves. Without effective, economical and safe management systems, the plants may not survive. A better question may be: Why not implement ornamental IPM systems?

Ornamental IPM Programs

Ornamental IPM programs have several unique characteristics that set them apart from traditional agronomic IPM programs, including:

- Economic decision levels, called economic thresholds, often are not established or don't apply to ornamentals. The appearance of the

ornamental plant is the key factor. However, most universities have developed action thresholds to give an idea of when treatments are needed to prevent extensive damage. These action thresholds are the basis for monitoring programs; however, they need to be verified and refined to improve the IPM system in ornamentals.

- In urban areas, the traditional thought has been that management strategies, such as biological control, resistant varieties, genetic manipulation and other non-pesticide control methods, are not effective or applicable because of the aesthetic concerns. These non-pesticide management tools, including sanitation, improved cultivars, habitat removal and proper plant selection, may be more readily available than in traditional agricultural situations. In an urban setting, selected replanting or pruning is economically feasible. Likewise, plant selection can be altered without significant economic hardship.
- A significant driving force in an urban setting is the public's concern about pesticide use. This concern must be addressed in any ornamental IPM program, but it is also a driving force behind these management programs. Respect for the desires of others and using caution when applying pesticides and fertilizers will prevent most problems with pesticide/fertilizer usage in urban settings.
- Agricultural crops are often in monocultures where monitoring can be simple and straightforward. This is not the case in urban settings where the landscape has been designed using a variety of plant species. Monitoring is equally important in the urban setting, but it is more difficult due to the variety of plants, pests and management requirements. This means pesticide applicators must look to sources such as the Cooperative Extension Service, nursery and landscape associations and others for assistance and employee training.

How IPM Programs Are Implemented

Developing and implementing IPM programs requires careful planning and a basic understanding of the landscape itself, management alternatives available and cost-benefit trade-offs

with each alternative. Keys to an effective IPM program include:

- A long-term plan for the landscape that is being managed. This includes the careful selection of plants, fertilizer management and cultural practices.
 - The development of reference materials and contacts.
 - An on-going employee IPM training program.
 - Periodic monitoring of the landscape to ensure plants are cared for properly.
 - Monitoring and diagnosis of problems: Diagnosis of management problems often requires significant study of plants and the surrounding environment. Managers must understand the ecology of these systems to implement an effective management plan. Managers need to include:
 - A history of the landscape.
 - An examination of plants and the surrounding environment.
- Diagnosis of problems.
 - Possible management options.
 - Long-term corrective treatments.
 - Maintenance and implementation of cultural practices that will minimize future management problems.
- A consistent schedule for maintenance, including soil testing, tillage, pruning and weed management.
 - An understanding of management options to ensure efficacy with limited environmental or personal safety impact.
 - The calibration of pesticide and fertilizer equipment several times per year to ensure correct applications.

The management strategy must include planning before and after implementation. IPM systems must continually be improved to maximize efficiency, minimize environmental impact and maintain a beautiful landscape.