JOURNAL OF
ARBORICULTURE

January 1984
Vol. 10, No. 1

IPM — IS IT FOR THE ARBORIST?

by Winand K. Hock

What do the following pest management procedures have in common?

- Use of insect and disease resistant plants
- Sanitation, i.e. pruning out dead and dying limbs
- Total tree removal
- Fertilization
- Use of mechanical barriers such as screens and plastic guards around the trunk of young trees
- Use of parasitic and predator insects
- Use of microorganisms such as fungi, viruses, and bacteria to control destructive insects and weeds
- Use of pheromones or other attractants
- Use of repellents
- Use of pest-free planting material
- Use of chemical pesticides

All of these tools or techniques of pest management are used to one degree or another by the professional arborist and landscaper to control pests of ornamentals and shade trees. The tree care professional uses Integrated Pest Management (IPM) techniques every time he/she is on the job.

In the overall scheme of IPM programming, ornamentals and trees have taken a back seat to food and fiber crops. Maybe this is understandable, but there isn't any reason that IPM tactics cannot be used to control pests on ornamentals and trees. Pest management programs need not be developed exclusively by entomologists, plant pathologists, weed scientists, and horticulturists to be successful. They can be developed by arborists and landscaping professionals utilizing techniques already in existence for other crops.

Let's define integrated pest management. Although you will find as many definitions as there are people doing pest control work, a suitable definition of IPM is as follows: Integrated pest management is a pest population management system that utilizes all suitable techniques and information to reduce or so manipulate pest populations that they are maintained at tolerable levels, while providing protection against hazards to humans, domestic animals, and the environment. In other words, we are trying to *suppress* pest populations using all available pest control techniques so these pests do not cause intolerable damage to a crop or an individual plant. Chemical pesticides are but one group or class of control measures that fit into a pest management scheme. All of the other techniques or tactics mentioned previously can be used alone or integrated with chemical controls if appropriate.

Basic Principles of IPM

Exclusion. This practice attempts to prevent pests from being introduced into an area or from even being present on an individual tree, shrub, or other plant. For example, when you put in a new tree for a customer, don't you first make sure the plant is free of insects and diseases? You certain-

1. Presented at the annual conference of the Penn-Del Chapter of ISA in February 1983.

ly wouldn't use a tree loaded with branch cankers or egg masses of the gypsy moth. Another example is the removal of dead elm wood or the removal of an entire dead or dying elm tree. You are doing this to exclude the elm bark beetle by eliminating potential breeding sites.

Suppression. This method attempts to suppress pests below the level at which they are economically damaging. In this case you're using tactics or techniques to reduce a pest population. This often involves pesticides, but may involve many other pest management techniques as well. Several examples are:

1. The release of parasitic insects to aid in the control of destructive insects (i.e. gypsy moth parasites).
2. The use of microorganisms such as *Bacillus thuringensis* (Bt) for control of gypsy moth and other Lepidopterous insects, and *Bacillus popillae* to control Japanese beetle grubs in turf.
3. The use of mulches to keep weeds suppressed in planting beds is an example of cultural suppression of nuisance plants.

Eradication. This practice attempts to eliminate an entire pest population by any combination of available pest management techniques. Unfortunately, it rarely works as demonstrated by the gypsy moth, Japanese beetle and Dutch elm disease, all foreign pests which were introduced accidentally into North America. The best example of where eradication appears to hold some ray of hope is with the Mediterranean fruit fly in California. It appears that the combined efforts of the USDA and the State of California may have eradicated the Med. fly, but not without enormous costs and a monumental effort by all involved agencies.

As far as tree and ornamental pests are concerned, eradication of such pests will be nearly impossible to achieve except possibly in a very localized geographic area.

Plant resistance. This principle stresses that healthy, vigorous plants will be resistant, or at least more tolerant, to certain pests. When we think of plant resistance, we usually associate this with genetic resistance to certain pests. For example, certain varieties of crabapples are resistant to apple scab, powdery mildew, and cedar-apple rust. This resistance is undoubtedly determined by the genetic makeup of the host plant. However, there is another type of plant resistance with no genetic basis at all. This is cultural resistance or increased pest tolerance through cultural manipulation. A plant that is properly cared for — fertilized, watered as needed, planted correctly — will be more tolerant to pest pressures than will a plant already under cultural stress. Maintaining the vigor of the host plant is essential in any pest management scheme.

Arborists were practicing IPM long before the term was coined. In reality, the arborist/landscaper is a pioneer in this area.

The identification of key pests and beneficial organisms is an absolutely essential first step. No one can plan an intelligent and proper pest management program without first identifying the pest problem. In addition to recognizing the pest, you must know something about the biology of the pest such as its life cycle, generations per year, reproductive rate and similar things. You also have to identify the physical and environmental factors that affect a pest organism if you hope to manage a pest successfully. In other words, how does temperature, humidity, light, and rainfall affect a pest? What is the host range of the pest? How many susceptible host plants are there in the immediate area? What is the source of the pest?

A pest identification service which is provided by some tree care and landscaping companies is a very important aspect of any total pest management program. Some companies may be reluctant to charge for such services, but no one questions a fee associated with a soil or foliar analysis to determine nutrient levels; so why not a basic fee to cover pest analysis.

Pest populations should be monitored by trained persons to determine the need for control procedures. Pest monitoring or scouting is a very important, if not the most important aspect of any pest management program. Trained persons or, as they are usually called, pest management scouts, should monitor the presence of pest populations. Scouts can identify the pests, determine at what population density the pest is harmful, and determine the host range for a specific pest. And well-trained, competent scouts also function as educators in the eyes of the customer.

A PM scout could be one of your best public relations assets. The ultimate objective of using PM scouts is to reduce the dependency on a general pesticide cover spray based strictly on the time of year or the phase of the moon. In other words, use controls only when needed, and a scout can tell you when a treatment is actually necessary.

There are times when you can't wait for a pest to appear before spraying with a protective pesticide. The best examples are the plant diseases. In such cases a protective fungicide may have to be applied prior to the occurrence of the disease if the problem is to be controlled. On the other hand, monitoring or scouting insect and mite populations may be a more practical approach to IPM programs, at least at our current stage of knowledge and expertise.

Management tools to determine the presence of some insects are already available to you in the form of insect traps. These traps are generally used as monitoring devices and rarely should be used to control pest populations.

Some of these insect monitoring devises are called pheromone traps. Pheromones are highly active chemicals produced by insects. When the female releases a chemical to attract male insects for the purpose of mating, we refer to these as sex pheromones. Many insect monitoring devices utilize these sex pheromones to attract and trap male insects of the same species. Some use both a sex pheromone and a food lure to attract the pest. The traps are usually lined or coated with a sticky substance to hold the insects attracted to the trap. This makes for fairly easy counting and identification.

The question comes up, can you interest your customers in using these traps to monitor insect populations? I think you can definitely sell this service if you work cooperatively with your customers. Why not teach them to use these traps? Get them involved, have them cooperate with the scout.

With the fears and negative attitudes many people have about pesticide spraying, the use of pheromone traps could be an excellent educational tool to demonstrate to your customers that not everything revolves around the use of chemicals. And, most importantly, you can then more readily justify using pesticides if the traps indicate the presence of a destructive pest. The bottom line in any pest management program is monitoring pest populations, be it by PM scouts, monitoring devices, or both.

Try to predict the potential risk of a pest to a crop or individual plant. Pests should be controlled only when the pest population threatens acceptable levels of quality and yield of a crop. With ornamentals and shade trees we are not usually so concerned with yield, at least not as arborists. But we are concerned with the quality or aesthetic value of the plant or the crop. In other words, how does it look. Try to evaluate the potential impact of a pest on a tree or shrub before attempting to control the pest. Consider current and past weather conditions, the size and condition of the trees or shrubs, the risks and costs of attempting to control the pests, and of course, the kinds of controls available. A good IPM program considers all pest management options, not just the use of chemicals.

Once you have decided what pest management strategy or strategies to use and you have accomplished that task, **conduct a follow-up visit** to evaluate your pest control program. Program evaluation is very important to IPM. It allows you to assess the current level of success and to project future possibilities for improvement. IPM programs are not static, they are constantly changing to include new technology. And you have to change with the times to be successful and competitive. Evaluate your program!

Is the IPM approach for you? Only you can assess that. Can you sell the IPM approach to your customers? Maybe. Some of your customers will welcome this approach and, more importantly, be willing to pay for this service. Others will just want to get the job over with and "be done with it." Persons who have genuine concerns over spraying will endorse the IPM approach, even if in the end, spraying is the only way to control a pest.

Let me now review briefly an actual, on-going ornamentals IPM program to illustrate what I have just said about customer acceptance.

Dr. John Davidson, Entomologist at the University of Maryland, has been conducting an "Urban IPM Program for Ornamentals" in the Maryland suburbs of Washington, D.C. for several years. So far the program seems to be a big success. The

emphasis is on pest scouting — in other words a scout monitors pest populations. And, customers pay for this scouting service as well as for any treatment that may be required. According to the arborist company that cooperated in the 1982 program, the total cost was somewhat higher (mostly because of added labor costs) than the total cost of 3 general cover sprays on the same properties, but with only about 1% of the amount of pesticide used in the PM program.

Despite the slightly higher costs, customer responses about the PM program were very favorable and most encouraging. The responses were as follows:

1. 78% of the customers said they would prefer the PM scouting service rather than preventative cover sprays next year.
2. 78% were very satisfied with the PM scouting service.
3. 77% of the customers said their ornamentals looked as good or better than in the past.

Realistically, most pest problems will still have to be controlled by chemicals. Remember, however, IPM doesn't exclude the use of chemicals. In fact, in some cases spraying is actually increased as a result of an IPM approach. The main thing is, don't fail to consider other pest management strategies before deciding to spray, be sure to identify the pest or pests correctly before deciding on a control procedure, be sure to monitor pest populations where possible, and be sure to evaluate your program.

I believe that an IPM approach to pest management in trees and ornamentals is not only possible, but represents a tree care service that is highly marketable by professional arborists and landscapers. Consider giving it a try.

Department of Plant Pathology
Pennsylvania State University
University Park, Pennsylvania

CONTRIBUTED ABSTRACT

TEN-YEAR SURVIVAL AND GROWTH OF *PLATANUS* PROGENIES

by Frank S. Santamour, Jr.[1]

Western American planes (*P. racemosa* Nutt. and *P. wrightii* Wats.) suffered annual dieback in replicated Maryland test plantings. Many Turkish planes (*P. orientalis* L.) were killed back during the severe winters of 1977-78 and 1978-79 with overall survival of only 18%. Hybrids between *P. orientalis* and *P. racemosa* were completely killed during these winters. On the other hand, hybrids between *P. occidentalis* L. and the other 3 species had high survival (81 to 100%).

Growth rate of hybrids between *P. occidentalis* and *P. orientalis* (the "London" plane cross) was slightly but not significantly superior to that of *P. occidentalis,* even though the hybrids were far more resistant to sycamore anthracnose disease. Likewise, the high disease susceptibility of the hybrids involving Western species was not reflected in significantly slower growth. All the hybrid progenies averaged between 19 and 22 feet in height after 10 years. Four of the best anthracnose-resistant hybrids were selected for more extensive testing and 2 of these will be introduced as cultivars.

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[1]Research Geneticist, USDA Agricultural Research Service, U.S. National Arboretum, Washington, D.C. 20002.