

Getting Started with an Effective Integrated Pest Management Program

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What is Integrated Pest Management?

Integrated Pest Management (IPM) is a pest management system that uses all available methods including biological and cultural controls, as well as pesticides, to anticipate and prevent pests from reaching economically damaging levels (7 U.S.C. §5881[c]—federal law published in the United States Code). Pests are considered any organisms, including weeds, insects, and diseases, that interfere with the planting, growth, harvesting, or marketing of a crop. IPM is a good crop management option because it can potentially improve yields, reduce costs, and contribute to the sustainability of agriculture and the environment.

Implementing an Effective IPM Program

Four basic steps are involved in implementing an IPM program.

The first step is to identify the pests correctly. The pest management system cannot be implemented effectively if a grower does not know the type of pests that are present (or likely to be present) or whether the pest populations pose a significant detriment to the crop. A misidentification of a pest can lead to erroneous and costly recommendations.

The second step involves regular monitoring and mapping of fields, orchards, greenhouses, etc. for pest problems. Monitoring is very important and should be conducted by a field scout or someone who is familiar with the pests associated with the crop being monitored. Ideally, the farm manager and employees should be trained to monitor pests correctly. Scouting should be conducted on a regular basis, as appropriate for the crop and pest conditions. Field scouts who are conscientious and well trained to recognize pest problems provide the basis for a successful monitoring program.

The third step is to determine the level of pest that will incur an economic loss. An economic or action threshold is reached when the cost of potential damage exceeds the cost of control. There is no need to treat for pests that do not cause economic losses in the agricultural setting.

Once the type and severity of the pest problem has been determined through good scouting practices, the final step is to develop an appropriate pest management program. The program should incorporate a variety of pest management techniques. Preventive measures can greatly reduce the level of potential pest problems, as well as the cost of treating them. These measures include options such as crop rotation, use of resistant crop varieties, and soil and nutrient management. Good scouting also provides valuable information that enables the grower to use pesticides more efficiently and effectively.

IPM Options

Several pest management options are available, depending upon the nature of the pest, the crop, and the size and needs of the farm involved. A combination of pest control methods can be used including: biological control, pesticides, crop rotations, planting crop varieties that have natural resistance to pests, and soil and nutrient management.

Biological Control. Biological control refers to the release and/or establishment of predators or parasites that can effectively reduce pest populations. Although this management technique can be done on a large scale, it is most effective for small crop units, such as greenhouses or orchards, where one particular pest can be targeted. Introducing predators and parasites with multiple host or prey preferences may reduce the effectiveness of the biological control agent.

Pesticides. IPM does not exclude the use of chemical control methods. If properly used, pesticides are very effective in reducing pest populations and the potential



harm they represent. The demand for materials which are safer and that have a limited lifespan has helped to create new pesticides that are generally safer for handlers and consumers and require small amounts of active ingredient per acre which are less damaging to the environment. In addition, botanicals and biological insecticides composed of bacteria, viruses, nematodes, or plant derivatives (such as pyrethrum, rotenone, neem oil, etc.) are used whenever possible.

Pesticide usage may not necessarily be reduced by an IPM program, although it often is. Instead, IPM allows for more efficient and effective use of pesticides. For example, by monitoring pest development, pesticides can be used during the most susceptible stage of a pest's life cycle. The grower should use the safest, most effective pesticide available for the particular pest. Spot treating, rather than blanketing the entire crop, is usually both more environmentally sound and economically efficient. The type and quantity of the material to be used is critical, because an inappropriate choice of pesticide may kill beneficial biological control agents, harm the crop, or reduce market yield.

Crop Rotation. This management technique works very well in annual crop production for field crops, forages, and vegetables. For perennial crops, crop rotation can still be practiced, but the rotations may be considerably longer than one year. Crop rotation can break pest cycles and also preserve healthy soil. Crop rotation can also enhance the ability to control certain weeds. Although crop rotation is generally encouraged, it may be difficult to practice because of space limitations, soil types of particular fields, or the level of development surrounding the farm. These factors should be taken into consideration before a crop rotation system is implemented.

Resistant Crops. Pest-resistant or pest-tolerant plant varieties are bred or genetically engineered to resist certain types of pest damage. The use of these varieties for managing certain pests can keep crop injury below a threshold of economic loss. Adaptation in a pest's biology, however, may eventually overcome the plant's resistance factor—especially in the case of soilborne organisms such as fungi.

Soil and Nutrient Management. Good soil and nutrient management produces strong plant vigor that will help to ward off disease, insects, and competition with weeds. The soil should be tested, at a minimum, once every two to three years. These tests provide soil pH and plant nutrient levels on which recommendations for fertilizer and organic material for producing a healthy and vigorous crop are based.

Purchasing IPM Services

Selecting an IPM Service. Before choosing an integrated pest management service, it is important to have a clear idea of farming goals and the type of information desired. This will help to ensure that the appropriate IPM service is selected. When meeting with the consultants, determine what services will be provided and at what cost. Know the frequency of farm visits and who to contact with questions or emergencies. It is important to feel comfortable with the consulting firm and to be willing to accept and act on their recommendations. Many IPM programs fail to achieve maximum success because the advice of the consultant is not carried out completely.

It is a good idea to confer with the Better Business Bureau on the reliability of the company. Once a company is chosen and the contract is drawn up, a careful reading of the contract will ensure that both the farmer and the company clearly understand what is expected.

Many private consultants and other agri-business firms offer integrated pest management services. Contact your local Rutgers Cooperative Extension office for information on private consultants and availability of Rutgers field scouting services, or visit the Rutgers Cooperative Extension website at: www.rce.rutgers.edu.

A useful new resource is the 1998 IPM Almanac, available from Gempler's,* a company that supplies IPM information and accessory products. The almanac provides, among other things, a national consultant's directory with the firm's name, address, phone number, and services available. Copies of the almanac can be obtained by contacting Gempler's at 1-800-382-8473 or by visiting their website at: www.gemplers.com.

What to Look for in an Integrated Pest Management Service. An effective integrated pest management service should improve your profitability. This may come from either improved yields and/or crop quality, decreased crop production costs, or both. Service options available in a pest management program include soil sampling, nematode sampling, pest scouting (crop monitoring and various forms of sampling pests including pheromone, sticky board, light, and bait traps), plant tissue analysis, forage analysis, and disease prediction capabilities using weather sensors. Related services may include nutrient management planning, manure sampling, GPS/GIS mapping, computer support, and marketing and financial information.

Certain indicators reveal how well a service is performing. Perhaps the most important aspect of an integrated pest management service is a strong scouting practice. Is the service spending enough time on the farm researching crops for specific problems? At the very least, scouting should include the study of the temperature, weather conditions, and soil. In addition, regular plant and pest surveys should be taken by any effective management service.

Record keeping is also important. Make sure that the pest management service is keeping accurate records of farm conditions for future reference. Cultural modifications and results of pesticide treatments should be evaluated by monitoring the site environment and pest populations. Keep written records of site pest management objectives, monitoring methods, data collected, actions taken, and results obtained.

An effective integrated pest management system should focus on the long-term success of a farm rather than improvements in short-term yields. One indicator is whether the service is diversifying its treatments. A problem may occur if the service is relying exclusively on one pest management technique.

Reliability, usefulness of recommendations, and fulfillment of the contract by the consultant are critical. If the consultant is providing a field scouting service, watch to see that the field scout is spending adequate time in the fields and is examining the fields appropriately. It is important that the consultant address the specific needs of the farm. Once a comfortable working relationship has been established with the consulting firm, the consultant can become an invaluable asset to the farm business.

Sources

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Related Rutgers Publications

For subscription and/or ordering information for the following publications, contact your local Rutgers Cooperative Extension office:

FS609 Ultrasonic and Subsonic Devices for Pest Control
FS719 Soil Fertility Test Interpretation
FS748 What is IPM?
FS828 Biological Control of Insect Pests of the Greenhouse

FS897 Consumer Response Toward IPM-Grown Produce
IS005 Vegetable Integrated Pest Management Program
IS006 1998 Tree Fruit Integrated Pest Management Program

In addition, Plant and Pest Advisory Newsletters are published throughout the year for vegetable crops, fruits, field crops, livestock, landscape, nursery and turf, and cranberries. These are available by subscription or free on the internet at: www.rce.rutgers.edu/rcepubs.htm#ag.

The authors gratefully acknowledge the assistance of Christiana Brennan in compiling the information for this fact sheet.

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Desktop publishing by Rutgers-Cook College Resource Center

Published: March 1999

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N.J. AGRICULTURAL EXPERIMENT STATION
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