



This is the fourth fact sheet in a series of ten designed to provide an overview of key concepts in plant pathology. Plant pathology is the study of plant disease including the reasons why plants get sick and how to control or manage healthy plants.

Keeping Plants Healthy

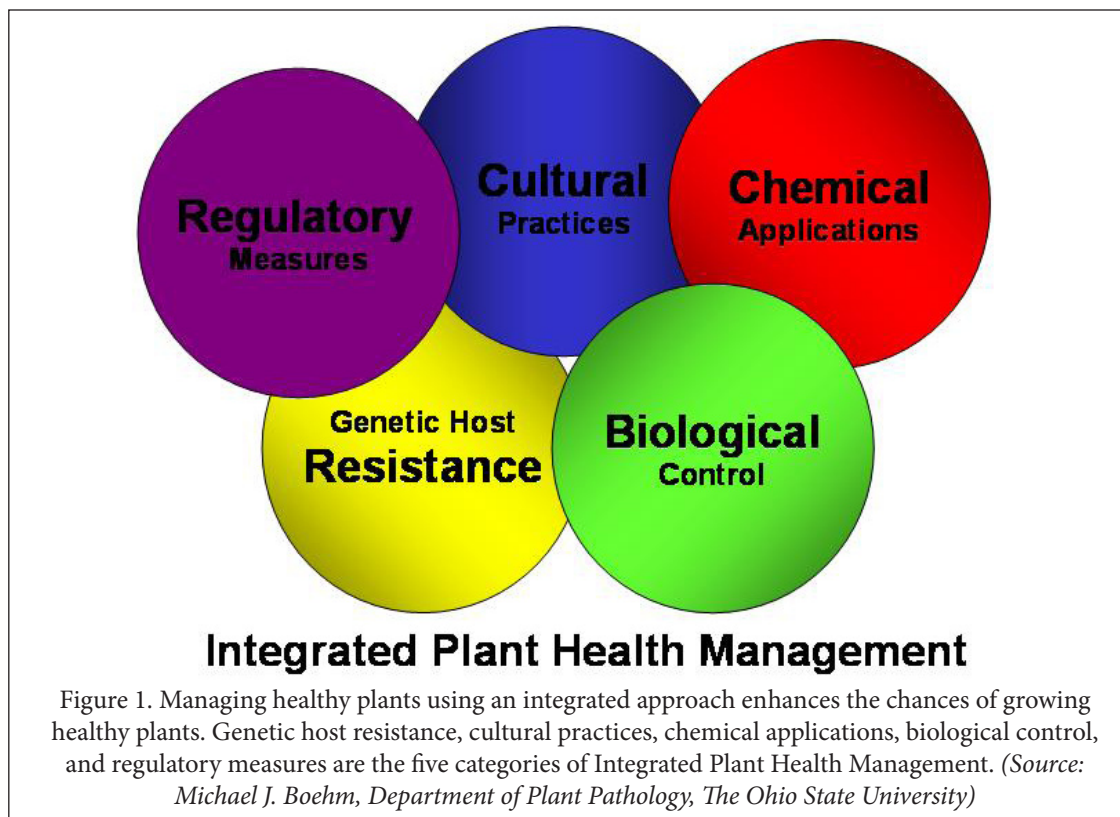
An Overview of Integrated Plant Health Management

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Integrated Plant Health Management (IPHM)

Regardless if managing a weed, insect pest, or disease-causing organism, most specialists interested in plant health recommend the use of a multi-pronged approach or strategy commonly referred to as an Integrated Pest Management or an Integrated Plant Health Management approach. Integrated Plant Health Management programs rely on the use of several methods rather than on a single means for avoiding or otherwise minimizing the impact of plant pests and pathogens. Although sometimes called different names by weed scientists, entomologists, and plant pathologists, the methods for managing or eliminating plant pests fall into five categories.

1. **Genetic Host Resistance**—the use of genetically resistant plants to minimize or avoid losses caused by insect pests and/or pathogens. The use of genetically resistant plants is often recommended by entomologists and plant pathologists as the first line of defense for avoiding or minimizing plant damage caused by insects and pathogens. In some cropping systems, such as large acreage field or row crop agriculture (corn, soybeans, wheat, rice, cotton, etc.), the use of genetically resistant plants may be the only cost-effective means for managing a particular pest or disease. In some cases, the use of resistant cultivars or varieties might be the only means of effectively managing a disease or pest such as in the case of managing plant diseases caused by viruses. The development of resistant plant types may also reduce the need for using pesticides. Although genetic resistance should be considered when dealing
- with all insect pests and diseases, it is especially useful when dealing with annual cropping systems where new seed is sown each season thereby providing an opportunity to introduce new cultivars or varieties with insect or pathogen resistance. Although important in perennial cropping systems such as orchards, forests, golf courses, or home lawns, once the initial crop is planted, the introduction of resistant lines is limited due to the long-term nature of these crops.
2. **Cultural Practices**—the use of agronomic or horticultural practices which favor plant development and minimize pest or pathogen activity. There are a number of cultural practices that can be used to change the environment in which plants are grown that can severely influence pest and pathogen activity. These practices include tillage practices, water management, fertility, crop rotation, and sanitation (cleaning or removal) of equipment and diseased or infested plant material. Cultural practices designed to achieve or maintain disease play a key role in reducing plant losses by minimizing or eliminating sources of insect pests, weed seed, or pathogen inoculum. Practices such as the removal and destruction of infected plants or infested soil or potting mix, and the use of “certified” pathogen-free or weed-free seed as well as the use of “clean” tools and equipment are critical to maintaining healthy plants and reducing spread of weeds, insects, and pathogens.
3. **Chemical Applications**—the use of pesticides such as herbicides (weeds), insecticides (insect pests), fungicides (fungi), and nematicides (nematodes) to suppress

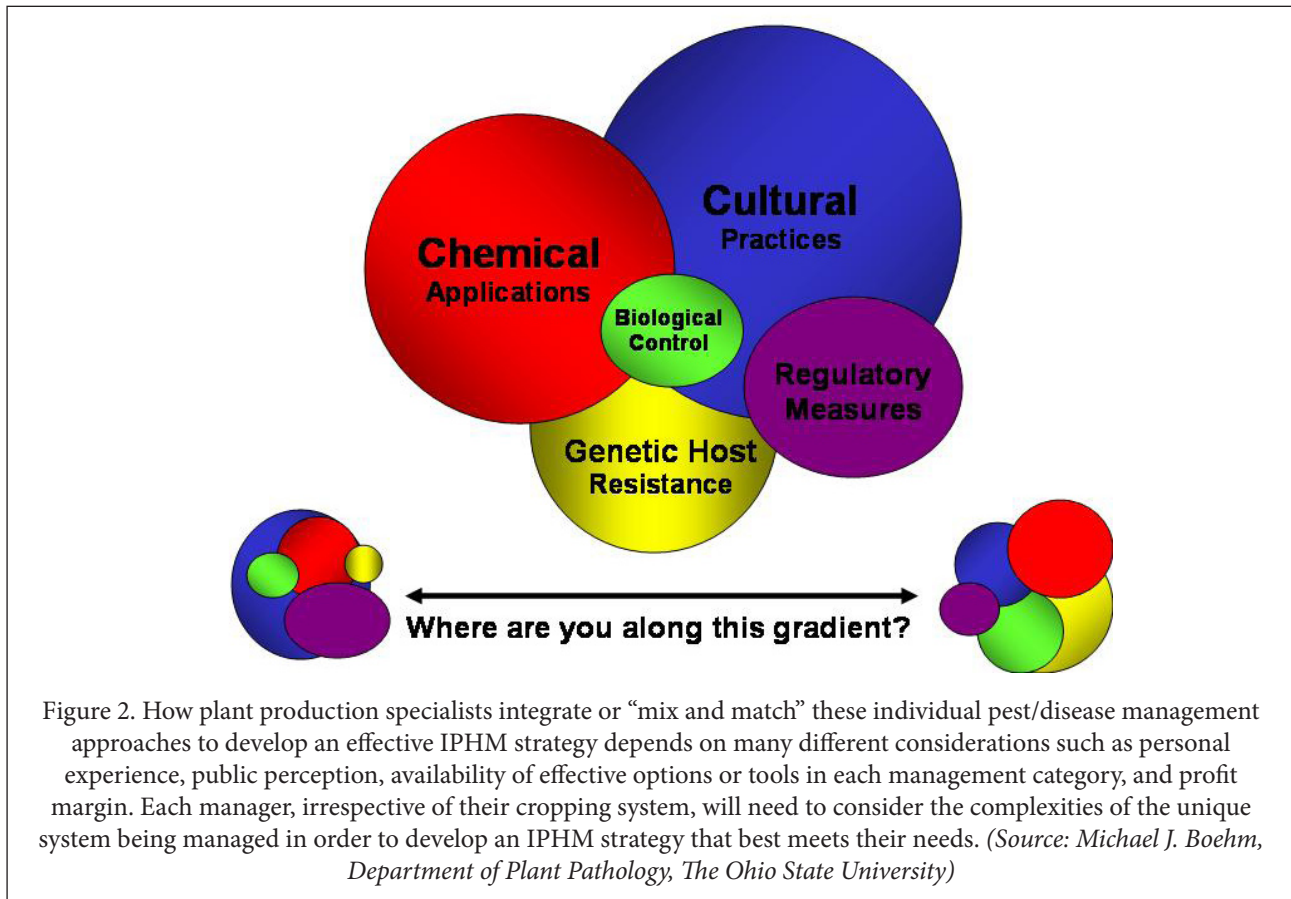


or inhibit pest/pathogen activity. The third line of defense available to those interested in managing plant pests is the use of pesticides to either kill or suppress plant pests and pathogens. Because of the concerns over potential dangers of pesticides to humans, the environment, food products, animals, and the atmosphere, they are often considered the least desirable method of managing insect pests and plant diseases. For detailed information, see the fact sheet “Using Fungicide Sprays Effectively” at <http://ohioline.osu.edu/hyg-fact/3000/3038.html>.

4. **Biological Control**—the use of beneficial or antagonistic organisms that when introduced kill or otherwise suppress plant pests or pathogens. Biological control is the use of one organism or a group of organisms to suppress, kill, or restrict the activity of a pest or pathogen. The use of biological control is considered advantageous and environmentally sound as it provides an eco-friendly alternative to the use of pesticides. Unfortunately, however, few biocontrol products are available that provide consistent and commercially acceptable levels of pest or disease control. Biocontrol organisms kill or suppress pathogens and pests by either (a) parasitizing the pest or pathogen, (b) out-competing the pest or pathogen for space or nutrients, (c) producing toxins that kill or make the pest or pathogen sick, and/or (d) inducing a physiological or biochemical change in the host plant making it less sus-

ceptible to (more tolerant of) pest or pathogen attack. For more information, see the fact sheet “Microbial Biopesticides for the Control of Plant Diseases in Organic Farming” at http://ohioline.osu.edu/hyg-fact/3000/pdf/HYG_3310_08.pdf

5. **Regulatory Measures**—the use of quarantines and pest eradication programs to limit the introduction or spread of deleterious plant pests and/or pathogens. Strict government inspections and quarantines of imported plants, plant products, and soil can be an effective way to keep a pest or pathogen out of a region or area. However, given the global nature of modern society, the possibility of moving and introducing pests dangerous to people, plants, and animals is real. Government eradication programs are conducted when a serious insect or disease pest breaks out. Often the trouble is eliminated before it has a chance to spread. Such programs require highly trained personnel who know the potential insect and disease problems and are able to recognize the pathogens and the symptoms of their activities. On the grower level, many greenhouses and nurseries also use quarantine measures. They often keep the new material separated from the old. If a disease were to come in on the new material it would not impact the rest of the greenhouse or nursery. A great web site to visit on regulatory measures is the U.S. Environmental Protection Agency at www.epa.gov.



Introduction to Plant Disease Series

PP401.01: Plants Get Sick Too! An Introduction to Plant Diseases

PP401.02: Diagnosing Sick Plants

PP401.03: 20 Questions on Plant Diagnosis

PP401.04: Keeping Plants Healthy: An Overview of Integrated Plant Health Management

PP401.05: Viral Diseases of Plants

PP401.06: Bacterial Diseases of Plants

PP401.07: Fungal and Fungal-like Diseases of Plants

PP401.08: Nematode Diseases of Plants

PP401.09: Parasitic Higher Plants

PP401.10: Sanitation and Phytosanitation (SPS): The Importance of SPS in Global Movement of Plant Materials

These fact sheets can be found at OSU Extension’s “Ohioline” web site: <http://ohioline.osu.edu>. Search for “Plant Disease Series” to find these and other plant pathology fact sheets.

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