Plant Health Care for Landscapes and Gardens at Home and in the Community

Plant Health Care—A Basis for IPM
Preventing and Managing Environmental Stresses and Pests

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All gardeners want healthy, vibrant gardens and landscapes. Healthy gardens and landscapes start with healthy plants. **Plant Health Care** is a concept that was developed as a natural evolution from Integrated Pest Management (IPM). The IPM philosophy developed as an alternative to chemical treatments based on calendar dates, which has been a common practice for pest control for a very long time.

When carried on to the Organically Managed Landscape -- or, as it is frequently called "Organic Land Care," of course, there are no synthetic chemical treatments. Plant Health Care is using ecologically sound principles to grow a wide range of plants in a home garden, landscape or in a community garden. It can be practiced in caring for the lawn, vegetable garden, flower garden, in the landscape, or in growing fruit or herbs. It is comprehensive and requires time to make observations and plan ahead for changes in years to come. Gardeners need to keep in mind the end result of having healthy plants in their gardens. Hopefully that should motivate and guide them into making important decisions.

Plant Health Care does not replace Integrated Pest Management (IPM) or Organic Land Care, but puts a strong emphasis on the ***preventive measures*** and incorporates them into a comprehensive program with a focus on the plants. It also takes into consideration the many perceptions and expectations of the gardener. It is only after we have attended to all the elements of maintaining healthy plants and a healthy ecosystem that is our landscape, that we begin to consider the options of other stages of organic landscape care.

Preventing the problem is the key
The simple fact is that preventing a problem pays off in the long run.

We have to know our sites, and plan for preventive measures that will minimize pest problems, such as:

- Replacing plants that are prone to diseases, insect and vertebrate pests
- Mulching or planting ground covers to reduce weed invasions.
- Spacing plants for better air circulation, reducing disease potential on some species

To do this...observe, plan and prepare.

- Observing the site and soil conditions -- and making an assessment about how they might affect plant growth and development -- means looking at various factors: climate, light, wind, water, soil texture and composition, slope, compaction [1], drainage and physical characteristics are all factors that must be considered. Help the gardeners know that it is helpful to map out the site assessment and use it as a reference as the process continues.
- Planning the garden or landscape design means choosing plants that match site conditions, anticipating the future maintenance needs of the garden and arranging for practical site alterations. Which plants need pruning to maintain their shape, appearance or fruit/flower

production? How fast will the selected plants grow in relation to one another? Are any of them aggressive in the garden or invasive to the ecosystem?

- Gardeners should recognize and work with those factors that cannot be changed easily or cost-effectively, such as incorporating extensive hardscape features and amending the soil on a large scale.

Once gardeners know more about preventing pests in their gardens, they can then make practical decisions about what can be done to alter the site.

- Amending the soil with organic matter may be practical, while removing a rock ledge may not.
- Pruning or removing a tree to increase sunlight may be possible, but removing a building may not.
- Building a raised bed where the drainage is poor may be practical, but replacing all the soil in a large vegetable garden may not.

Once they know about any future plans for the site, they can answer important questions:

- What development, if any, will take place on the site and how will this change conditions?
- What impact will it have on soil and water conditions?
- Is there a proper plan to protect existing trees?
- Is the soil going to be compacted by construction equipment?

The more gardeners know about the site, the better they can plan the landscape and garden, such as:

- Selecting the right varieties of plants: trees, shrubs, flowers,vegetables, fruits, or turfgrass, for each location.
- Determining what fertilizer nutrients will be needed and absorbed by the plants, based on the surrounding soil and water conditions. Nutrients not used by the plants may run off and affect other parts of the environment.

Starting with and Keeping Healthy Plants

A healthy plant, planted correctly in the right location, is more likely to remain healthy and less susceptible to attack by disease or insects. Good management of the landscape is essential. Maintenance -- feeding, trimming, pruning and making other adjustment as conditions change -- is also essential.

Selecting a plant is much more than choosing one that fits a specific hardiness zone. It means matching the plants to the site and soil conditions. It means selecting plants that you can maintain well. And it means selecting plants, when possible, with inherent disease resistance, insect resistance, and ability to withstand other stresses that may be present.

The Gardeners' Attitudes and their Values are Key

The gardener is the key to any situation. The results the gardener desires and expects are those that he or she values most. The gardener's initial perception and expectations of the situation ultimately decides the outcome of any Plant Health Care-motivated action.

Most gardeners would agree that appearance is important in our gardens and landscapes, but they

may differ on how they distinguish good from bad appearance. In other words, gardeners' expectations differ. Color and leaf texture preference, presence of thorns or fruit, taste and quality of edible parts, tolerance for the volume of leaves that drop in the fall, tolerance for pest damage -- all vary from gardener to gardener. What they value will also change over time. Change comes from heightened awareness or understanding. Education triggers some of these changes, while social pressures may also trigger changes.

In addition, it would help gardeners to distinguish between damage that is harmful to plants and damage that is aesthetically imperfect, but may not harm the plant. Just because a plant has a blemish does not mean that it has to be treated or corrected. Make a thoughtful decision, based on the extent of the problem, the severity of the problem, and what the consequences are to the environment, the health of the plant or, in some cases, your own health or well-being.

There have been several attempts to measure "aesthetic thresholds" and "aesthetic injury levels." In the real world, however, individual gardeners have differing expectations for their gardens or landscapes as a whole and for individual plants within them. Aesthetics tend to be based on personal preference or trendy ideas. With the profusion of plants and stress problems associated with those plants in the landscape, it is unlikely that comprehensive lists of aesthetic thresholds and aesthetic injury levels will be available or of practical use in the near future.

Whether gardeners do their own work or hire others to do landscape work, they still make the final decision. If a homeowner hires a professional to remedy a perceived problem, their confidence in the professional will also influence the outcome. It is an opportunity to discuss perceptions, learn more about alternatives, and ultimately to come to a mutual agreement. Communication is extremely important.

Considering Options or Trying to Fix a Problem

In many instances, in times of crisis, gardeners seek help or try to remedy a problem. Often the problem was created by poor or uninformed design before anyone seriously thought about total plant health care. Perhaps the garden or landscape was planted strictly for aesthetics. Or maybe the fruit trees, herbs or vegetables were planted without regard for disease resistance, insect susceptibility, or invertebrate pest attraction. Sometimes the garden simply needs to be renovated to prevent future problems. External conditions that influence the garden might change the way a garden functions, how efficient it is.

In such times, the "warning" is that a change is needed to prevent future infections, infestations or rampant destruction.

What to do? Deciding on an appropriate response is not a "recipe." A sign, symptom, or event will trigger the gardener to think that something is "wrong." But does it need to be remedied? As we have seen, the decision to take appropriate action when the situation is critical is based on what the gardener expects and what the gardener knows. He or she sometimes considers printed or professional advice as well. Some of the steps in assessing plant damage are:

- Determining the damage
- Identifying the plant

- Looking into the history of the plant or the site
- Looking for patterns in the plant damage It may not be easy to determine causes, but it is usually easy to recognize that the plant is damaged.

Keep in mind, as we explored under "values" above, that gardeners are often concerned about more than the health of the plants in their gardens and landscapes. They may be concerned about the appearance or aesthetic quality of the plants.

It is important to identify environmental stresses in the garden to make good decisions. Stresses can be ***biotic*** (living) such as those caused by diseases, or ***abiotic***, or non-living, such as those caused by weather or mechanical injury. There can be mechanical, physiological, biological, or a combination of factors in a stress complex. Both the type of stresses and their potential to damage the health or appearance of the plant can cause it to look unhealthy. Diagnosing involves asking questions and relying on your knowledge and resources to figure out what the problem is and what it is doing the plant.

Identifying the plant correctly is more than nice information to have. Knowing the plant will also clue you to its:
- Growth habit (normal or abnormal)
- Susceptibility to stresses (abiotic and biotic)

Living organisms -- disease-causing pathogens or insects -- tend to spread throughout a single plant and to adjacent plants, whereas non-living damage tends not to spread to new growth. Noting the cultural and environmental conditions of affected plants before and after injury is important to determine what is wrong. Many times, the symptoms begin before we try to figure out what the problem is. Think back over time to determine the conditions that may have contributed to the damage. Think about the site history, pesticide history, weather conditions, cultural practices, and other factors in coming up with probable causes of the problem. The landscape often includes constructed features such as paths and walls. They need to be considered over time and how they affect the growth and health of plants.

Patterns are clues. They might alert you to whether the problem is caused by a living organism or by abiotic factors. Random patterns, for the most part, suggest a biotic cause, whereas uniform, or nonrandom, symptoms tend to be abiotic.

Is it possible to over-react to a problem to make it normal again? You bet it is. As with most processes, treatments applied without considering any alternative, without any other justification, or as an insurance against unknown or possible stresses, is not a part of the Plant Health Care concept. First be sure you have monitored the problem long enough to be sure it is a problem. When it is necessary to treat or take other action to remedy a problem, be sure it is done at an appropriate time and with the proper material.
Living plants grow and change with time. They have a natural lifecycle. Removing them when necessary is part of plant health care. A plant weakened by age is likely to become diseased and insect-infested, potentially introducing these problems to healthy plants.

To manage a problem, the gardener can modify the environment to prevent future recurrence, mechanically disrupt the stress to alleviate the current problem, use other organisms to eat, parasitize, or out-compete the stressing organisms, or prevent the spread of stresses through remediation.

Getting to the "Roots" of Plant Health Care

The concept of plant health care was developed in the 1980s as a way to enhance maintenance and management practices for landscape professionals. For home gardeners, it goes far beyond the concerns for woody trees and shrubs. Plant Health Care evolved from the concept of "integrated pest management" (IPM), which has its roots in production agriculture. The predominant goal of IPM is to use a combination of management tactics (mechanical, cultural, biological, chemical, and regulatory) to reduce pest populations or maintain them at non-damaging levels.

When the plants lose yield or vigor, when it becomes more costly to grow them, we begin to look more closely at the extent of their damage. We call damage past a certain level an economic loss. Professionals can predict when this economic loss might occur and call that their economic threshold. For the gardener, damage reaches a point where it is no longer acceptable. That point is loosely referred to as the threshold damage level.

Gardeners have a much more difficult time determining a threshold than professionals do, because their plants have such personal value and there are so many more garden plants to monitor. Gardeners must replace lost plants, or spend money to control the damage to their plants. The IPM philosophy was carried into the landscape arena in the 1970s. At that point, many pest control programs were and are still based on calendar date chemical treatments. The first goal of the early days of integrated pest management was to get people to look before they treat.

There have been reductions in pesticide use in the United States, based on a simple program of scouting and monitoring (Olkowski and Olkowski 1978; Raupp 1985; Ball 1987). Scouts observe, recognize, identify, estimate and record problems in the landscape. The overall program of several episodes of scouting is referred to as "monitoring." But, as we began to realize, scouting and monitoring were not the only practices that lead to healthy landscape and garden plants. More recently, Organic Land Care is a trend that has been gaining momentum. It grew out of the IPM tradition, but is focused more on organic principles, including the practice of excluding synthetic chemicals from the landscape.

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