PEST MANAGEMENT:
Client Expectations
and
Employee Education

Photo 1. Bleeding canker is a fatal disease of European beech unless symptoms are detected early and the disease treated appropriately. Clients should expect that arborists on the property should be aware of the disease and be able to identify its symptoms.

Information Desired by Tree Care Consumers

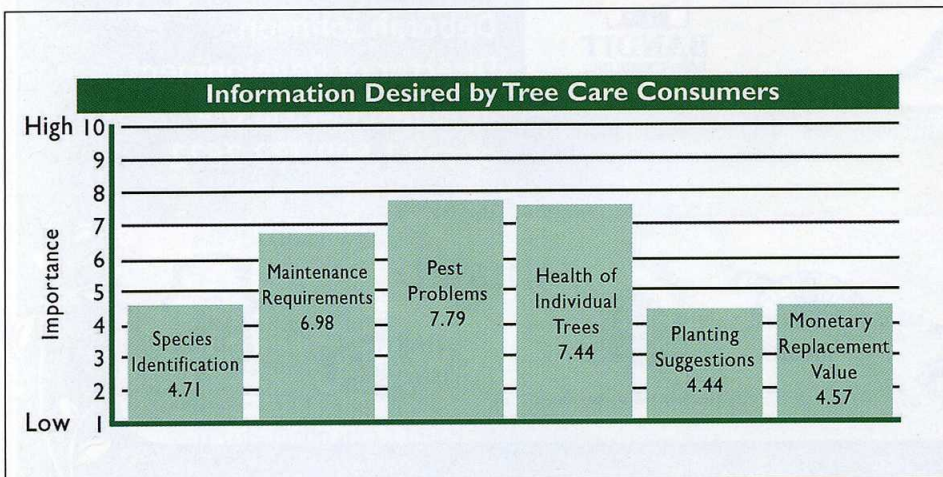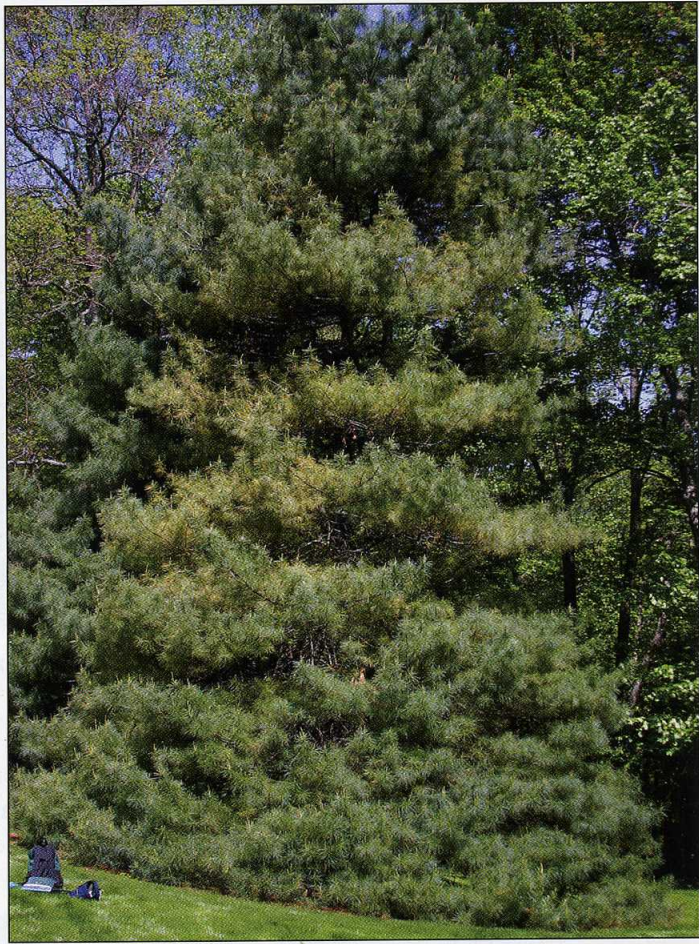| Category	Value
Species Identification	4.71
Maintenance Requirements	6.98
Pest Problems	7.79
Health of Individual Trees	7.44
Planting Suggestions	4.44
Monetary Replacement Value	4.57

Figure 1. Results of a 2002 survey by the International Society of Arboriculture that identifies the importance to clients of knowing pests and plant health in the landscape. Source: International Society of Arboriculture.

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It is clear as documented by a number of studies (Figure 1) that what clients primarily want from their tree and landscape service providers is an assessment of the health and pest issues of their trees and landscape plants. Provision of services that maintain health and vigor is an obvious extension of this desire. Providing post mortems because the initial symptoms of a key pest were overlooked is not a good way to support customer satisfaction (Photo 1). This article focuses on helping employees and companies meet client expectations in the landscape.

Pest diagnostics and management is often one of the core service competencies that even experienced arborists struggle with because of its technical nature. What is more challenging is to train employees to have sufficient diagnostic skills so they can identify pest issues in the landscape and answer client inquiries.

Often, employees delivering landscape services are the primary person clients have contact with and to whom they direct questions to about their plants. Despite its importance to clients, training employees so they can approach diagnostics confidently usually takes a back seat to other pressing training issues.

To make this task even more challenging, most green industry professionals have little, if any, formal training in pest management. And even if they did have training, it was likely in the form of one or two insect or disease courses blurred in with their formative college years. Typically, most obtain their pest management information through updates presented at meetings or in-house training sessions, university extension information sources, trade magazines or outside reading. Given this, what can we expect employees to know as essential information to satisfy client expectations, and how can they obtain this information?

What to expect

Plant identification comes before anything else, pest management or otherwise. The first essential step in diagnostics beyond plant identification is knowing normal growth patterns and rates, and how these change over the season. Most pests

first appear as subtle changes in normal growth or appearance. Being aware that these changes may represent the start of a more serious infestation is a very important job responsibility of any employee. A simple example is presented in Photo 2, where a subtle change in the color of the foliage on white pine has been induced by eriophyid mites.

Capturing a deviation from normal is not necessarily easy for someone who is just learning or expanding their knowledge of plants in the landscape. The basic concept of symptoms – or what one sees as a change from the normal health or condition of plants – and signs is useful. Signs are evidence of the causal agent, such as cast skins (from molting), or excuvae of insects, or conks of wood decay fungi on trunks of trees. A 10X power hand lens should be in the pocket of anyone serious about making observations about pests in

Photo 2. This subtle change in needle color on this white pine is from eriophyid mites. Although an employee may not know the pest identification, they should be able to recognize the change from normal needle color as a potential symptom of a pest problem.

Photo 3. Being able to recognize signs, or evidence of the causal agent, greatly improves the reliability of pest diagnostics in the field. This conk is the sign of internal wood decay in this silver maple.

the landscape. Being able to recognize signs of specific pests offers a significant improvement in the reliability of diagnostics in the field because the actual causal agent is now being identified (Photo 3).

Initial diagnostic steps

How can employees with little experience with diagnostics be expected to know all the symptoms and signs of pest problems? Obviously they cannot, but they can be knowledgeable in the diagnostic process. They should be able to identify what is not normal and approach pest problem identification in a somewhat systematic manner. That, coupled with basic information on pests and their development in landscapes, is a reasonable starting point for most people.

To determine what is normal for any particular plant, the easiest step is to look at a number of the same species in the immediate or general location. This is a simple step that will help determine if similar symptoms are present on other plants of the same species, and the potential extent of the problem. It is also critical to look at different plant species to determine if sim-

ilar symptoms are present on them as well. In fact, this observational method is where all landscape diagnostics should start, for the experienced and novice alike. The mark of an inexperienced diagnostician is to ignore other plants in the landscape before considering their diagnosis.

Employees should also be capable of collecting the basic information needed to identify pests so a more experienced person can make a reasonable attempt at identification without important gaps in information. Most of the critical information is summarized on diagnostic forms required by university extension labs.

Plant samples, or – even better – digital photographs, are also usually essential to make an initial diagnosis. From a diagnostic standpoint, it is frustrating to obtain a request for a diagnosis when this basic information is lacking. Many people do not want to take the time to work through the diagnostic process to collect this information. However, the process of making these critical observations and collecting essential information is part of the learning process that trains employees on pest identification in the field.

Photo 4. Deep planting resulted in the death of these Austrian pine. Poorly delivered cultural practices are at the root of many tree health problems in the landscape.

Causes of pest problems

There are three major groups of agents that cause pest problems in landscapes: the biotic or living agents; abiotic or non-living agents; and declines, which are unique to woody plants and are usually caused by combinations of abiotic and biotic agents. Of these, the many pest problems in the landscape are caused directly or indirectly by abiotic agents. These include environmental factors such as soil and site conditions, weather abnormalities and cultural practices (Photo 4).

This single piece of information is helpful in identifying pest problems: one must consider the environment and culture of the plant as a prime suspect and make observations accordingly. This also suggests that knowledge about the site and plant's adaptability to existing conditions, past maintenance practices and changes that have occurred are needed in determining what is wrong. Obtaining this information implies a certain level of investigation has taken place, to interview the site manager or tree owner about the development of the
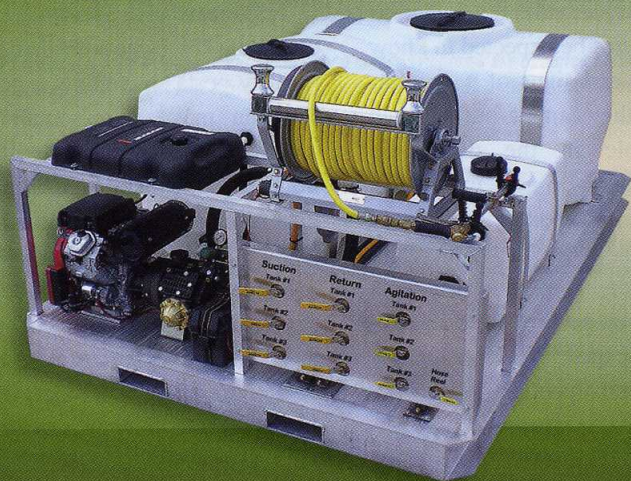
Basic knowledge

There are several basic elements of knowledge that can substantially help employees become better versed in pest management diagnostics. Our contention is that many green industry professionals lack this basic information because broader concepts in pest management are seldom presented in technical identification manuals.
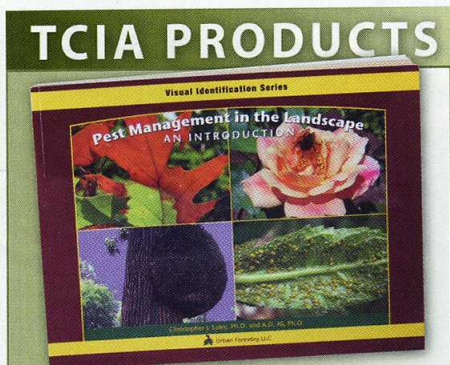
Photo 5. Many pest problems in the landscape are abiotic in nature, such as this scorch on Norway maple. Because symptoms can result from multiple causes, further investigation into their cause is a task for anyone attempting basic diagnostics.

problem and past management practices (Photo 5).

Biotic agents are the insects, pathogens and animals that damage plants in the landscape. Clients often believe that pest problems are due to an overt attack by an insect or disease, and therefore some pesticide can be used to "treat" the problem.

Unfortunately, most problems in the landscape are the result of more complex issues, and insects and diseases are often secondary in nature, meaning that they are attacking the plant because of its weakened condition. It is often easier to blame and treat a secondary pest than to determine the root cause of a plant's problem and deal with the long-term prognosis and actual cause of the problem.

Most biotic agents are relatively host specific. The majority attack only a specific plant species or closely related plants, with a few exceptions. However, clients often become alarmed that similar symptoms on a range of plants indicates a pest is present that is capable of killing all the plants present. A key point for employees is that biotic agents cause specific symptoms on a host. Similar symptoms on a range of unrelated plants are either due to a series of different biotic agents, or an abiotic problem is present that is non-host specific.

Knowledge of the symptoms caused by different insects and diseases quickly becomes a technical topic with seemingly endless details depending on the host/pest combination. But, a few basic concepts and facts suggest that initial diagnostics are within the reach of most employees.

First, the number of common pests in the landscape is relatively small (Raupp et al 2001). Therefore, one can know the major-

Photo 6. Stippling (left) is a common symptom of arthropods with piercing sucking types of mouthparts. Knowledge of this type of symptom, and its potential causes and consequences, covers a large number of different host-pest combinations.

ity of insect pest problems likely to be encountered in the landscape by becoming familiar with these pests.

Second, grouping damage categories and the types of symptoms insects and pathogens cause allows reasonable conclusions to be drawn about their potential cause and importance (Photo 6). For example, stippling is a common symptom of insects and mites with piercing sucking mouthparts. This damage at low or moderate levels is usually not important to plant health unless it is severe or occurs on evergreens. Knowledge of this type of symptom, and its potential causes and consequences, covers a large number of different host-pest combinations. Similar relationships can be drawn for other symp-

Photo 7. Declines are usually initiated by a sequence of biotic and abiotic agents. The presence of any particular pest on a tree does not necessarily implicate it as a cause. Care to avoid simple cause effect relationships is an important consideration when diagnosing and treating decline type problems.

toms, categories and types; although other categories may require more immediate concern and attention, such as wilting or branch dieback.

Third, the vast majority of diseases in the landscape are caused by fungi. Diseases caused by bacteria, nematodes, viruses, phytoplasmas and other pathogens are relatively rare. Therefore, knowing the important fungal disease of common trees in an area is a significant help in narrowing the cause of pathogen-induced problems.

Declines and the long-term

Trees and shrubs are long-lived in the landscape. This single fact greatly influences the development of pest problems and diagnosis of their cause. Most tree and shrub problems have multiple causes as part of their genesis, even though the immediate symptoms may be attributed to a single cause or agent (Photo 7). Declines are diseases that have multiple biotic and abiotic causes that together result in the deterioration in plant health. Typically, one of these biotic or abiotic agents alone cannot cause the observed decline in health.

It is not unusual for urban and landscape trees to have decline types of symptoms that are due to combinations and sequences of agents unique to that plant. It is only with careful forensics that the actual contributing factors can be pieced together, at least partially. Knowledge that decline-type problems are common on mature trees in urban areas is useful. It suggests that simple explanations or cause/effect relationships should usually be avoided, at least initially. It also suggests that employees need to understand that diagnostics are developed by considering multiple causes and events that can only be deciphered by careful observation along with consideration of the history of the tree. The presence of any particular pest on a tree does not necessarily implicate it as the cause of a problem.

Plant heath care

The real essence of plant health care is that virtually any management done in the landscape is part of pest and health management. Many common management practices, when performed poorly, are at the root of a significant number of tree and shrub health problems. Deep planting, over-mulching, poor pruning cuts and poor plant selection top the list. Many of these issues can be found in every landscape. The health and pest problems that develop from these poor cultural practices can be misidentified as pest problems. However, the real treatment is good employee training so that quality management practices are delivered in the landscape.

Plant heath care also includes an employee base that is able to recognize that changes in health are a good reason to look closer. Providing them with the basic knowledge so they can approach diagnostics in a confident manner and make basic observations to start the diagnostic process seems like a reasonable goal. After all, it is these on-site employees who our clients often look to for the answer to a simple question, such as, "How is my tree doing."

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