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Diagnosing Plant Problems

Diagnosing plant problems is both an art and a science. Problem solving techniques have their foundation in biology and scientific methodology, however they must also consider the intricate relationships between plant species, plants and soil, plants and their environment, pests and plants and plant cultural practices in order to uncover the underlying factors and identify solutions.

In one situation, the causal factor may be identified based on a single agent or event. In another, it may be a combination of biological and environmental factors uncovered through the artful integration of plant science, environmental awareness and experience. Luckily, plant problem diagnostics can be organized into a series of steps. An orderly progression through these steps will either expose the cause or aid to eliminate what its not. If the causal agent or factors can't be pinpointed, the last step in the process is to solicit the assistance of experts, whether through the Cooperative Extension Service at the state's land-grant university, the State Department of Agriculture, or a private consultant. Diagnostic laboratories associated with these agencies or consultants may have the equipment and expertise to investigate the problem at a more basic level. Remember, keen observation of the physical environment, background information on weather conditions, knowledge of plant growth and development and experience will be the keys to solving many of your plant problems. Here are a few steps to follow when investigating plant problems regardless of whether they are biotic or abiotic in origin.

Step 1:

Know your plant. Knowing the plant species and / or cultivar can reduce the possible problems. Plants may be susceptible to problems due to genetic disposition. Identifying plant disorders starts with identifying the plant and performing a background check of the species.

Step 2:

Differences from normal appearance will be the first indication of a problem. Signs and symptoms can be useful in categorizing the problem as biotic or abiotic in origin. Signs are associated with biological agents and are the actual visual presence of the agent. Symptoms are changes in the plant appearance initiated by the causal agents or factors. Symptoms can be initiated by either biotic agents or abiotic factors or conditions. For example: leaf spots are an example of disease, honeydew is a sign of insects, witling of foliage is a symptom of water stress, and blackened shoot tips are a symptom of temperature injury. Remember, one of the critical factors in evaluating plant appearance is being able to reference the sample to a healthy specimen of the same species.

Leaves are usually the first indicate a problem. Discoloration or chlorosis might be a symptom of a nutrient deficiency or related to a pest. Premature fall color is usually a symptom of environmental stresses.

Leaf disfiguration or leaves with holes, or shredded margins might be from an insect or environmental factor such as wind / hail. If a biological pest is suspect, look for direct signs of a pest, such as cankers, fungal fruiting bodies, insect feeding damage or excrement. Twisted or malformed leaves may be associated with chemical injury. Sudden blackening or browning of leaves usually indicates a

change in temperature. Extreme temperature changes can kill shoot tips and cause a rapid decline in foliage appearance.

Trunk and braches are next in the inspection. Look for obvious damage to the bark. Bark damage may be in the form of holes from insect or bird injury, crack or fissures from environmental fluctuation, mechanical damage from lawn mowers or weed whips, and girdling from rabbits or other rodents. Bark bleeding or slime flux is a symptom of internal wood injury.

Roots are the most difficult and the most overlooked part of the plant in diagnostics. Root injury interferes with water and mineral uptake. This injury is expressed in the plant parts furthest from the roots. Leaf scorch or dieback is the typical symptoms of root related problems. Symptoms are usually a result of poor uptake. Flooding, drought, or mechanical root damage will all reduce root uptake. If root injury is suspected, “dig deeper” into the investigation.

Step 3:

Survey the surrounding landscape. It is important to determine the extent of the problem. Is it isolated on a single plant, on a single species, in a single area, or does it exist on several species throughout the surrounding area? Isolated problems are usually related to a specific event and could occur from mechanical or chemical origins. Insets or diseases will usually be on plants of the same type in the area. Environmental problems related to temperature, water or wind will usually influence broader community areas. It is also important to note when the problem started and whether it intensified with time.

Step 4:

Review the plant history. The first basic question to answer is how long the plant has been in its present location. The objective is to consider or rule out any problems related to newly established plant materials. Transplant shock or site limitations during establishment may influence plant performance for several years following installation. Plant history should also include information on recent or routine cultural practice. Some pant problems may develop over time and the visual change in appearance may not occur until the following growing season. Asking detailed questions will aid in the confirmation of a cause and the eventual corrective recommendation.

Step 5:

Review the site characteristics and site history. Site characteristic assessment involves a comprehensive inventory of the site. Begin with documenting the characteristics of the plants immediate location. Problems may surface due to its relationship to use area, exposure to light, wind and orientation. Soil characteristic, both chemical and physical, are important considerations especially when we are dealing with either extremely light or heavy soils. Soil pH can influence plant performance. Site history examines the impact of construction or disturbance on the site soils and their subsequent impact on a plant’s overall appearance. Weather patterns and / or specific events can trigger plant problems. Long-term weather patterns that result in marginal conditions such as prolonged drought or unseasonably high or low temperatures can predispose plants to other biotic or abiotic stresses. Unseasonable weather events such as hail, late frost or ice storms can have a direct impact on plant health and appearance.

Step 6:

Document routine or periodic cultural practices. Improper landscape management techniques can lead to plant health problems. Timing and rates of chemical inputs such as fertilization, pesticide or herbicide applications can influence plant performance.

Planting records can provide a wealth of information about a plant's history and potential predisposition to problems. Information including the original stock type (bare root, container, balled and burlaped or mechanically spaded), when the plants were planted, maintenance during the warranty period, and any subsequent care can be useful in determining the extent of transplant shock on the establishment of newly planted landscape plants. Each of these may contribute to abiotic problems or increase a plant's susceptibility to biotic agents.

Irrigation timing, frequency, and rate can influence plant health. Water is essential for plant growth and development; however, too much can lead to plant decline.

Keen observation of the physical environment, background information on the plant, site and cultural practices, knowledge of plant growth and development, and experience will be the keys to solving many of your plant problems.