The Plant Doctor's LANDSCAPE TIPS

By David L. Roberts, Ph.D, *Michigan State University*

Photo 1. Identifying the plant is important; rosaceous plants, such as pear and crab apple, are susceptible to the bacterial disease, fire blight, while elms and all conifers are not.

Photo 2. The decline of many rhododendrons in this landscape is due to excessive irrigation, initiating a Phytophthora root rot disease.

Photo 3. These normal white flecks of resin secretions on bristlecone pine are sometimes misdiagnosed as scale insect infestations.

Photo 4. Insects and their damage are often easy to see. However, spider mites (Arthropods) are essentially microscopic and their feeding injury exhibits a "dusty" appearance on this foliage.

DIAGNOSING PLANT PROBLEMS

INTRODUCTION:

Diagnosis is the first and most important procedure in managing plant problems, whether the plants are located in gardens, landscapes or nurseries. Plant problems may be grouped into four major categories: diseases (fungi, bacteria, etc.), animals/insects, cultural problems (those incited by humans) and environmental (those typically beyond human control). Following is a 12-step program outlining a logical approach for diagnosing plant problems. Once an accurate diagnosis is performed, selection of an appropriate management practice for the specific situation is fairly straightforward.

STEP #1 - IDENTIFY PLANT:

Certain plants are susceptible to certain problems. For example, native elms are susceptible to Dutch Elm Disease while flowering crabapple is not. Crabapple is susceptible to a bacterial disease known as fire blight while elm is not (Photo 1). Species or even varieties of various plants may be more or less susceptible to specific problems.

STEP #2 - COLLECT INFORMATION:

Accuracy of diagnosis increases significantly as more information about the problem is gathered, taking the guesswork out of diagnosis. It may be difficult to obtain some important information; hence, detective work may be required. Some important information includes watering practices (Photo 2), fertilization practices, herbicides applied in the area and how long has the plant been at the site, etc.

STEP #3 - COMPARE WITH HEALTHY SPECIMEN:

In some instances, we may not know how a healthy specimen should appear. Is the purple coloration in a purple leaf plum normal? Generally, yes. Many have confused the normal resin secretions on a bristlecone pine with scale insect infestations (Photo 3).

STEP #4 - EXAMINE FOR INSECTS:

Compared to many problems, insects and damage from insects and animals are generally more easily observed. However, small insects/arthropods, such as mites (Photo 4), leafhoppers and other small critters, may be difficult to see without the aid of a magnifying device.

STEP #5 - EXAMINE FOR SYMPTOMS AND SIGNS:

Symptoms are probably the most important diagnostic features. Symptoms includes spots, rots, holes/tunneling, cankers, wilt, dieback, decline, chlorosis (yellowing), necrosis (death), mosaic/mottling (uneven coloration), etc. It is important to realize that symptoms from various causes may mimic one another. Signs are the actual presence of the cause agent, such as an insect or "mildew" caused by a Powdery Mildew fungus.

STEP #6 - EXAMINE FOLIAGE:

The leaves of a plant generally exhibit symptoms regardless of where the problem exists on the plant. Problems associated with the stems or roots usually show symptoms of nutritional deficiencies, wilt, general decline or poor growth. Some symptoms may be so obvious that the diagnostic procedure may be stopped at this point; however, this may not be wise. Leaf margin or interveinal necrosis (scorch) or chlorosis may indicate water imbalances or nutritional deficiencies. Spots caused by infectious disease agents, such as bacteria and fungi, tend to be randomly distributed over the leaf (Photo 5) while cultural and environmental problems tend to be consistent, either interveinal or at the leaf margins (Photo 6).

STEP #7 - EXAMINE STEMS:

Stems include trunks of trees, branches, twigs or actual stems of herbaceous plants. Look for abnormalities. A pocket knife may be used to section into stem tissue to determine if it is healthy or abnormal (Photo 7). Look for abnormalities in structure and coloration.

Photo 5. Diseases often exhibit a pattern of randomness, such as this fungal leaf spot on maple.

Photo 6. Cultural and environmental problems tend to exhibit more consistent symptoms such as these necrotic spots between this oak leaf's veins initiated by high soil pH.

Photo 7. Use of a pocket knife on these twigs reveals healthy green succulent cambial tissues on the right and dead tissue on the left.

STEP #8 - EXAMINE ROOTS:

The healthy roots of herbaceous plants should be white and flexible; diseased roots tend to be darkened. Roots of woody plants may reveal new white rootlets but in general are dark and woody. When pulling on a woody root between two fingers, the sloughing of the root cortex (bark) leaving a white "string" (stele) probably indicates a root rot. Root problems, whether on herbaceous or woody plants, may be caused by disease pathogens (Photo 8), insects or excesses in water and fertilizers, etc.

STEP #9 - PERFORM SOIL pH AND SS:

If possible, as part of an overall diagnostic procedure, soil pH and soluble salts (SS) tests should be performed (Photo 9). These two tests, while not exhaustive compared to a full soil test, may nonetheless be extremely valuable for "rooting out" some problems. High SS may indicate too much fertilizer, deicing salts, or animal urine. An improper pH may lead to various nutritional problems and increased susceptibility to diseases and stresses.

STEP #10 - COLLECT SAMPLES:

If the problem cannot be diagnosed on site, samples may need to be collected for more careful examination or lab analysis. Samples may include various plant tissues and should be representative of the problem. A variety of samples and large samples are advised. Soil samples submitted for a more thorough soil analysis may also be helpful.

STEP #11 - USE ALL TOOLS AND REFERENCES:

Some tools that are helpful for on-site diagnosis include a saw, pruner, pocket knife, magnifying device (hand lens), camera, pH meter, soil probe (Photo 10), and so forth. References such as books or extension publications may be extremely helpful. The World Wide Web contains a wealth of information on various plants and their specific problems.

STEP #12 - OBTAIN ASSISTANCE:

If the diagnosis is still uncertain or if confirmation is desired, further assistance may be obtained from a wealth or resources, including universities, diagnostic clinics, plant healthcare businesses, suppliers, consultants, and professional societies. Several resources may be consulted to arrive at the best diagnosis.

For more information, please feel free to email me at robertsd@msu.edu or contact a professional plant health-care provider. The author, MSU or MGIA do not endorse any particular products. If using pesticides, be sure to read and follow label directions.

Photo 8. Examination of the lower stem (trunk) and roots reveals an infection by Armillaria root rot and readily explains the decline and death of this tree.

Photo 9. A pH meter and Solubridge are two useful instruments for preliminary soil tests in landscapes and nurseries.

Photo 10. A soil probe helped to determine that several inches of fill soil has caused the decline and untimely death of white pines in this landscape.

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