



Know ornamental disease symptoms

Three factors make diagnosing ornamental disease problems difficult: the wide host range, the influence of urban environments and varying management practices.

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A systematic approach is a big help in diagnosing disease problems with ornamental plants.

It also guides those intimidated by the sheer number of possible problems.

Knowing whether the problem is cultural or environmental (abiotic) as opposed to a problem caused by an insect, mite or disease (biotic) is essential. The systematic approach to plant problem assessment provides an outline to follow to improve your chances of a correct diagnosis. And, a correct diagnosis starts you on the way to better management.

Define the problem

Does a plant problem exist? Identify and inspect the affected plant and surrounding plants. Is the plant growing normally for this species/cultivar at this time of year and age of plant? Know how the plant looks when it's healthy, because we sometimes mistake normal characteristics as problems. Examples of these include unusually large leaf glands or twig lenticels, variegation or seasonal foliage coloration or synchronous leaf drop from conifers and other evergreen broadleaf plants.

Compare an affected plant with a healthy plant. Describe the symptoms associated with the problem. How is the plant's growth affected? Remember, while symptoms signal something is wrong, they don't necessarily indicate the nature or location of the cause, especially with root damage or improper soil conditions.

Check for patterns, time

Two important clues for distinguishing between biotic factors and abiotic factors include:

◀ Reproductive spore capsules on the underside of a fern, a normal characteristic.

- ▶ recognition of symptom patterns
- ▶ symptom development over time

Start with the individual plant, then the whole planting and finally the surrounding plant community. Get a history of the plant, including what has been done to it and when, and where the plant is. Consider weather data as well as soil and water conditions.

With biotic causes, symptoms usually develop gradually over time on an individual plant, spreading to other similar plants. Most of the biotic agents are host-specific and won't attack multiple kinds of plants or all plant parts, simultaneously.

With abiotic causes, symptoms can appear all at once and usually the injury doesn't continue to spread either on individual plants or onto neighboring plants. Depending on the abiotic factor, damage can be widespread, affecting different types of plants simultaneously.

Refine the diagnosis

Distinguishing between the various biotic and abiotic agents requires careful observation of the affected plant or plants. Symptoms are a plant's response to the problem, not necessarily the problem itself. Symptoms may include galls, yellowing, dead tissue and distorted growth. Signs are evidence of, or the actual presence of an organism. Signs may include insect frass, fungal mycelium or spores, bacterial ooze or the actual insects, mites, rodents.

Abiotic factors can include mechanical, environmental and chemical agents. To identify mechanical problems, look for signs such as broken stems, crushed plants or girdling from plant ties. Check for recent changes in environmental conditions or for extreme environmental events such as lightning, hail or freezes.

Analyze patterns of damage on individual plants and across benches, greenhouses or yards. What do the patterns show you about the source and delivery methods of chemical agents? These may include nutritional problems or phytotoxicity from pesticides, pollutants or poor water quality. Because many of these factors may overlap, you must often rely on a careful review of management practices.

Reference materials

Sometimes you may need help to identify the specific factor. Become familiar with useful refer-



▲ *Entomosporium* leaf spot with lesions and discoloration on *Photina*.

ence books and know the experts to contact. Learn how to collect a good sample. You may need a laboratory analysis to confirm a diagnosis. Be sure you get a high quality sample. It will directly impact the quality of the diagnostic report.

Once you know the problem, you can develop a management strategy. Get more information on disease management from your county Cooperative Extension Service, university worldwide web sites, reference materials and local experts. **LM**

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▼ Take- all patch on Bermudagrass

