

Sometimes Diagnosis Is Simple

While it's always preferable to have diseases professionally identified in a lab, there are some basic guidelines to help growers diagnose their plants' issues.

| | | | |
|--|---|--|---|
| | <p>Gray mold (<i>Botrytis cinerea</i>) Gray, brown dusty spores any part of the plant</p> | | <p>White mold (<i>Sclerotinia sp.</i>) Black mouse droppings, white fans of mycelia, edge of damage. Check around the edge dead spots and in the center of crowns.</p> |
| | <p>Anthraco nose (such as <i>Colletotrichum</i> and <i>Phyllosticta</i>) Pincushion pepper grains in rings (upper surface)</p> | | <p>Fusarium Pink to orange spore clusters (any side) on leaves and stems.</p> |

By A.R. Chase

Throughout my more than 30 years as a plant pathologist, I have been asked many times to talk or write about diagnosing diseases. This is always challenging and often rather frustrating. The most recent request was made for the February 2009 SAF Pest Management Conference in San Jose, Calif. I decided to try to discuss only things that a grower could expect to diagnose, including several diseases and definitions of important symptoms characteristics. Because diagnosis is so visual, we decided to use pictures more than writing.

Table 1. Characteristics of the most common and easily diagnosed diseases.

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Myrothecium
Black spore clusters with a white fringe in rings (undersides)



Powdery mildew
(such as Oidium and Erysiphe)
White colonies (upper surface) and any plant part, purplish mottling



Downy mildew
(such as Peronospora)
White or purple down on undersides, yellow blotches between veins, burning



Rust
(such as Puccinia)
Brown, orange and yellow pustules (undersides) scattered or in rings

pests & diseases

Diagnose by Sight

There are several common and important diseases that can be diagnosed by the naked eye or with a magnifier of some type, including gray mold (*Botrytis*), white mold (*Sclerotinia*), anthracnose (*Colletotrichum* and *Phylosticta*, to name just a couple), *Fusarium*, *Myrothecium*, powdery mildew (*Erysiphe*, *Oidium* and *Sphaerotheca*), downy mildew (*Bremia*, *Peronospora* and *Plasmopara*) and rust (*Phragmidium*, *Puccinia* and *Uromyces*). Table 1 summarizes the specific characteristics of each disease. The diseases that can be easily identified are those that make fungal structures like spores that form in mass under normal growing conditions. The types of disease are only those caused by certain foliar fungi. Neither root nor bacterial diseases can be identified by sight alone; while you may get an idea about the cause of a structure like a gall, you cannot be sure of the cause without isolating the pathogen in a lab. Root diseases all look very similar, and the prevalence of mixed infections is common and will only be obvious with a lab identification or failure to achieve control.

It is also critical to be able to determine whether the foliar damage you are seeing might be due to a phytotoxic response or a pathogen like a fungus or bacterium. Table 2 summarizes the "typical" characteristics of each problem. ♦

Table 1 (continued). Characteristics of the most common and easily diagnosed diseases.

| Characteristic | Phytotoxicity | Fungi | Bacteria |
|----------------------|---------------|--------------------------|-----------------------------|
| Water-soaked (A) | No | Rare | Yes |
| Color (B) | Tan/white | Tan/brown/black | Brown/black |
| Colorful margins (C) | No | Yes | No |
| Disintegration (D) | No | Rare | Yes |
| Between veins (E) | No | No (except downy mildew) | Yes |
| Edges (F) | Sometimes | No | Yes |
| One size (G) | Yes | No | No |
| Concentric rings (H) | No | Yes | No (except <i>Erwinia</i>) |
| Sharp margins (I) | Yes | Sometimes | Sometimes |

Table 2. Characteristics of phytotoxicity, fungal and bacterial spots. (Photos on page 49.)

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Table 2. Characteristics of phytotoxicity, fungal and bacterial spots. (Letters correspond to table 2 on page 48.)

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If you can narrow down the possibilities, you can avoid prolonging the damage or choosing an inappropriate control strategy. To do this, you must understand the descriptions of symptom types.

Be Careful!

Remember: There are exceptions to these generalizations. If you can narrow down the possibilities, you can avoid prolonging the damage or choosing an inappropriate control strategy. To do this, you must understand the descriptions of symptom types. The specific characteristics I look for include whether the spots are water-soaked (more common for bacteria), the color of the spot itself and whether it has a colorful margin (unlikely for phytotoxicity) and if the spot shows disintegration (common with *Erwinia*). I also check for the shape of the spot (between veins) if the spots start on the leaf edges. Both are more common for bacterial pathogens than fungal pathogens. The formation of various-size spots in the centers of leaves indicates a fungal disease is more likely than bacterial or phytotoxicity. If the spots have sharp or discrete margins or concentric rings (target or bull's-eye), that also tells me something about their possible causes. Phytotoxicity spots often have sharp edges while fungal diseases may have diffuse margins. It is also far more likely for a spot that has concentric rings to be caused by a fungus than a bacterium or phytotoxicity since only the fungi respond to light and dark cycles with growth rings.


Be cautious with your diagnoses and remember that mistakes cost quite a bit in lost time, use of expensive — and perhaps inappropriate — fungicides and the potential for phytotoxicity. It is always better to obtain a diagnosis from a professional lab than to guess. GPN

A.R. Chase is president and pathologist of Chase Horticultural Research, Inc., floriculture's premier chemical screening and disease diagnostic company. She can be reached at archase@chaseresearch.net.

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