

How to Spot Trouble Indoors

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One of the hardest things to learn is how to spot trouble before it gets out of hand. Any successful technician has mastered the technique of walking through an interiorscape and pinpointing a diseased or insect infested plant in a seemingly uniform group of plants. What do these technicians see that tells them one plant is different than all the rest in the interiorscape? Here are some tips on how to spot a diseased plant vs. a healthy plant.

Recognize Healthy Plants

The most important thing for anyone to learn is what a healthy plant looks like. Each plant cultivar has special growth habits, colors and growth rates. If you don't know what to expect of a plant, you cannot tell when something is wrong. So, the first step is to recognize healthy plants.

With all the new colors and patterns available today for foliage plants, determining whether a cultivar has naturally yellow leaves or if it is under-fertilized is difficult. Some ways to learn are to check out catalogs and visit industry trade shows like Tropical Plant Industry Exhibition (held each January in Fort Lauderdale, Florida) and the Ohio Florists' Association Short Course (every July in Columbus, Ohio). In addition, read production guidelines and magazines and look for photos of ideally grown plants.

If your plant doesn't match the "ideal" then check some general plant characteristics. For example, fertilizer deficiency is a possibility if plant leaves get smaller toward the tips of the shoots or if the leaves are different intensities of green from the base of the plant to the tips. In addition, the root system can give you clues about nutrient levels. If the roots are more developed than you would have guessed for the amount of top growth, then the available nutrients are probably low. Excessive root growth on an under-fertilized plant is the plant's way of trying to reach more potting medium or soil to absorb more nutrients.

Signs of Root Problems

The most obvious sign of root problems is wilting. Also, if a plant's color is dull instead of bright and clear, this may indicate water stress. Many things can cause water stress, including lack of water, root rot, and exposure to bright light and hot, dry air. The entire root system may be stunted and underdeveloped because of a root fungus or a nematode. If roots appear gray or brown and fall apart when you gently pull at them, a fungus is probably the cause. Be sure to examine roots carefully **before** installation- once plants are installed, checking root health may be nearly impossible because of logistics or plant size.

Problems on Stems and Roots

Symptoms	Possible Cause(s)
Rot at soil line	Slow-release fertilizer placed against stems, over-watering, poor drainage, stem disease (especially <i>Fusarium</i> and <i>Erwinia</i>)
Stem lesions or cankers	Sunburn, mechanical injury, stem disease (especially <i>Fusarium</i> and <i>Erwinia</i>)
Stem cracks	Mechanical injury, stem disease (especially <i>Fusarium</i> , <i>Erwinia</i> and <i>Phomopsis</i> on <i>Ficus</i>)
Thin and weak stems	Fertilizer extremes, low light
Poor root development	High soil salinity (fertilizer or poor water quality, soil temperature extremes, plant potted too deep)
Root rot (mushy or disintegrated)	Root disease caused by pathogens (especially <i>Pythium</i>), high soil salinity (fertilizer or poor water quality), poor drainage
Stunted plant	Root disease (especially <i>Pythium</i>), fertilizer extremes, low light, temperature extremes, poor drainage, pot-bound plants
Wilting	High leaf temperature and cold soils, drought, low humidity, poor root system
General chlorosis	High light, high soil salinity (fertilizer or poor water quality)

Stunting

Teaching someone to spot a small plant in the midst of normal-sized one is relatively simple. But recognizing stunting when all the plants are uniformly small is more difficult. Try examining roots and leaves, looking for any distortions in color or wet, mushy spots. These are all signs of diseased plants. Most stunting occurs because of a cultural problem, such as lack of fertilizer, and is not a common sign of disease. Stunting caused by plant pathogens is spotty because all plants are rarely infected by pathogens to the same degree.

What to Look for Up Close

Once you spot wilting, off color or stunting, examine plants closely for additional signs and symptoms of disease. We talked about examining roots, but what about the leaves? Look for distortion, mosaic, yellow or dead spots, and wet or mushy areas. Each of these symptoms is characteristic of at least one disease type. Distortions and mosaics are typical of virus infection, while bacteria most often cause wet and mushy spots. Bacteria, some viruses, fungi and even chemical burn can cause yellow or dead spots.

With some diseases, the fungus produces a characteristic fruiting body that can indicate the cause. The best example of this is powdery mildew fungi, which produce a

powdery coating on leaves that can be in patches or covering the entire leaf surface. Here are some other examples of common fungal diseases.

Spots caused by the fungus *Myrothecium roridum* have black, irregularly shaped bodies surrounded by white fringe. They are usually found on leaf undersides. Spots caused by anthracnose fungi are often found on the upper leaf surface and appear in rings in the leaf spot. Black, pepper-grain sized spots signal the fungus *Colletotrichum*. Magnification of these fruiting bodies with a microscope reveals a pin cushion or sea urchin shape. You can usually see this with the aid of a magnifying glass or hand lens.

Problems on Leaves

Symptoms	Possible cause(s)
Powdery coating	Powdery mildew fungus (<i>Oidium</i> on grape ivy and African violet), dust, paint
Speckling	Mite (especially spider mites) or insect feeding, paint
Young leaves, yellow or pale	Iron too low, poor soil drainage
Old leaves, yellow or pale	Low nitrogen or potassium, high salinity (fertilizer or poor water quality), over-watering, poor soil drainage, root disease (especially <i>Pythium</i>)
Distortion	Virus disease (Dasheen mosaic or Impatiens necrotic spot), high nitrogen (bird's nest fern)
Mosaic pattern (ring spots)	Virus disease (Dasheen mosaic or Impatiens necrotic spot on many plants)
Yellow spots	Cold water injury (especially on African violet, gloxinia, and begonia), potassium deficiency (palms)
Water-soaked spots	Temperature extremes, bacterial infections (on Aroids)
Dead or brown margins or tips	Boron or fluoride toxicity (palms, Dracaenas, <i>Cordyline</i> and <i>Calathea</i>), high soil salinity (fertilizer or poor water quality), drying, temperature extremes
Dead or brown spots	Cold water or air, fertilizer toxicity, sunburn, bacterial infections
Leaves too large	Fertilizer excess, low light
Leaves too small	Fertilizer deficiency, copper deficiency, high soil salinity (fertilizer or poor water quality), root-bound plants
Leaves long and narrow	Low light
Leaves very thin	Excess nitrogen, low light
Holes in leaves	Mechanical injury, insect feeding (worms, snails or slugs)
Defoliation (leaf drop)	High soil salinity (fertilizer or poor water quality), abrupt light reduction, chilling, drying, poor soil drainage, drought

Diagnosis and Control

If you find discoloration, wilting or stunting, consult with an expert before deciding on a course of action. Most experts prefer to confirm the cause of a disease by culturing before making a diagnosis and recommendation for control. Also, be prepared to send in a sample to a diagnostic laboratory. It may seem that you cannot afford either the cost of this service or the time to receive the diagnosis. However, the costs in terms of money and time of applying inappropriate treatments because of an inaccurate or incomplete diagnosis are usually even higher.

The best way to give yourself the time needed to control a problem is to catch it early. Don't assume that if only a few plants are damaged, the problem won't get worse. The best way to treat disease is to get that diagnosis as soon as you notice symptoms. We wouldn't consider ignoring an infected cut until it was necessary to amputate the arm. So, scout plants regularly and don't wait until problems reach epidemic proportions. To coin a phrase "An ounce of prevention is worth a pound of cure."