Identifying Plant Diseases

Purdue University Cooperative Extension Service
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No farm or home garden is exempt from the threat of plant disease. Farmers know all too well what disease can do to crop yield and stand, if left unchecked. And even the most avid gardener has, at some time, experienced plant damage because of disease.

The key to preventing loss to plant disease is prompt and correct diagnosis of the problem. Only at this point can proper control measures be recommended.

This publication deals with plant disease identification -- what symptoms to look for, how to determine if disease is actually involved and when, where and how to get a diagnosis. Although no attempt is made here to spell out detailed disease descriptions, the glossary of terms used in describing symptoms found at the end of this publication can provide a clue as to the nature of the disease.

WHEN TO SUSPECT DISEASE

Here are four common symptoms of plant disease. You can suspect disease is involved --

1. If part or all of the plant starts to die.

2. If roots, stems, leaves, blossoms, fruits or other plant parts are abnormal, misshapen or underdeveloped.

3. If the plant fails to respond to fertilizing, watering, insect control or other recommended practices.

4. If the plant or seed starts yielding less or "runs out" after performing well for several years.

HOW TO BE SURE DISEASE IS INVOLVED

Other conditions besides disease can cause the symptoms just mentioned. Before getting damaged plants diagnosed, check to see if the trouble might have been caused by something else.

1. Were the affected plants suited to the area? Exotic plants, such as citrus trees, banana plants, palm trees, etc., selected at random from nursery catalogs may get sick because they are not suited to Indiana conditions.

2. Could the damage have been caused by insects, pets, children?

3. Were the plants growing in poorly drained soil; gravel; over construction debris like boards, cement blocks, bricks, old driveways; or in other unfavorable environments?

4. Could the damage have been caused by high winds, hail, driving rain, blowing sand; or mechanically by garden tools and power equipment; or by fumes from trash burners or industrial plants?
5. Did the unhealthy plants receive different treatment than the healthy ones, such as watering, pruning, fertilizing, chemical pest control?

6. Do different types of plants nearby have the same symptoms? If so, chances are that plant disease is not involved.

HOW AND WHERE TO GET A DIAGNOSIS

If you're satisfied that other conditions are not responsible for the trouble, here are the steps to take to get your diseased plant diagnosed.

1. Examine all parts of the plant, especially the roots. Look for abnormal root growth by comparing them with healthy plant roots.

2. Check to see if nearby plants are affected.

3. Then contact your county Extension agent's office for publications on plant disease. Chances are the agent himself will be able to help you identify the problem. (Check the phone book for your local Extension office.)

4. Read the available publications to see if the descriptions mentioned compare with yours.

Selecting Specimens to Have Diagnosed

5. If you still can't identify the trouble, select a specimen to send to the Extension plant pathologists at Purdue University.
6. Don't be afraid to send in large specimens. Small ones often fail to show a sufficient range of symptoms to make accurate identification possible. If you plan to send in a complete plant, select one that is partly alive.

7. Dig the plant -- don't pull it.

8. Wash the soil from the roots, and allow a few minutes for drying. In some cases, it's not necessary or possible to send complete plants for diagnosis. For instance --

If leaf, stem or fruit spots appear on above-ground plant parts, send only the parts showing the spots or lesions and a sample of similar but unaffected parts. Rots on fleshy fruits and vegetables need special attention. Select fresh specimens with young symptoms, not old ones in advanced stages of decay. These are useless for disease identification. (They smell badly too.)

If cankers appear on shrubs or trees, select canker or twig specimens from recent infections. Send entire cankered portion containing some healthy wood beyond the canker. If cankers occur on large limbs or trunks, send just the cankered section. Branches and twigs that have been dead for several months are useless for identification.

If yellowing or wilting is found on the foliage, root trouble is often the reason. Include the crown of the plant as well as part of the root system. Do not send soil samples.

How to Send Specimens

9. Entire plants or roots should be placed in polyethylene bags (freezer bags) and tied securely. Or wrap them in paper with moist towels or cotton around the roots, then cover with heavy wrapping paper.

Fruit specimens should also be placed individually in freezer bags or can be wrapped separately in wax paper. Don't pack in
wet towels or cotton. Moisture only hastens decay.

Green leaves should be pressed flat and put between two filing cards or pieces of cardboard secured with rubber bands.

10. Then fill out the attached "Plant Disease Specimen Identification Form", BP 9-7. Be sure to name the plant. It's difficult to diagnose disease on "a leaf from my flower bed" or "a twig from a shrub in my back yard". Also check the "Terms Used in Plant Disease Identification" (below) when describing the disease symptoms.

11. Finally, place the specimen and identification form in a sturdy container—carton, box, mailing tube. Pack the container lightly to prevent the specimen from becoming further damaged in shipping.

Where and When to Send Specimens

Mail specimens to:

Extension Plant Pathologist
Department of Botany and Plant Pathology
Lilly Hall of Life Sciences
Purdue University
Lafayette, Indiana 47907

Mail specimens so they arrive early in the week. Those that lie in the mail over the weekend often spoil.

The pathologist's diagnosis and control recommendations will be spelled out on the back of the "Plant Disease Specimen Identification Form", BP 9-7. The form will also be given a reference number for record purposes. Please use this number when referring to previous correspondence.

TERMS USED IN PLANT DISEASE IDENTIFICATION

The symptoms of plant disease are the clues to accurate diagnosis. Therefore, it's important that the terms used to describe the symptoms mean the same thing to you as they do to pathologist. The following are common terms in describing disease symptoms:

Blight: Rapid discoloration and death of tissues over certain parts of the plant. Used as a general way to describe a disease condition which may include spotting, sudden wilting or death of leaves, stems, flowers or entire plants. Usually coupled with the name of the plant part affected, like twig blight, blossom blight, tip blight, cane blight, leaf blight, etc.

Burn: A condition in which the cells of the plant become reddish or dark-brown and collapse.

Canker: A definite dead area, usually on woody stems, surrounded by live tissue.
Chlorosis: Yellowing of normally green tissues. Many diseases cause chlorosis, and often the pattern of the chlorotic area helps to diagnose the disease.

Curl: A puff-like distortion of a leaf resulting from the unequal development of its top and lower surfaces.

Damping-off: A disease of young seedlings caused by soil-borne fungi. Infected seedlings topple over and die just after they emerge from the soil. In some cases, seedlings may "damp-off" before they emerge from the soil.

Dwarfing: The underdevelopment of any organ of the plant or the entire plant.

Etiolated: Yellowed because of shading or disturbed nutrition.

Exudate: Any substance formed inside a plant and discharged through a natural opening or wound.

Flagging: Loss of rigidity and drooping of plant parts, usually because of water deficiency.

Gall: A pronounced localized swelling or outgrowth, often more or less spherical and composed of disorganized cells.

Hairy Root: Development of an abnormally large number of small roots in a small area of the root.

Host: The plant which is invaded or parasitized by a disease producing agency. The "host range" refers to the various kinds of plants that are affected by a specific parasite.

Knot: A knob-like growth on roots or stems.

Lesion: A localized spot of diseased tissue. Spots, cankers, blisters, scabs, etc. are lesions.

Mold: Any fungus that produces a superficial, often woolly growth, on various types of organic matter or on plant parts.

Mosaic: Disarrangement of the chlorophyll content of plant tissue, especially leaves, resulting in dark green and light green, or yellow areas forming a variegated pattern. Typical symptom of some virus diseases.

Mummy: A dried, shrivelled fruit, the result of some fungus diseases, such as brown rot of stone fruits.

Necrosis: The death or disintegration of cells and tissues.

Pathogen: An organism capable of causing a plant disease.

Proliferation: Abnormal bush-like outgrowths.

Pustule: A pimple-like or blister-like growth on a plant surface caused by infection with a pathogen.

Rhizomorphs: String-like strand of fungus hyphae.

Rot: A state of putrefaction or decomposition.

Scab: The abnormal thickening of the outer layer or layers of tissue resulting from local irritation.

Scorch: Burning of tissues.

Shotholing: A disease symptom in which small roundish fragments drop out of leaves giving them the appearance of having been riddled by shot.
Spore: Pertaining to fungi, it is a propagative unit that may be considered analogous to the seed of green plants.

Vector: An agent that may carry or transmit the cause of a plant disease.

Viruliferous: Capable of transmitting a virus.

Wilt: Loss of rigidity and drooping of plant parts. Similar to flagging except a wilt usually involves a greater portion of the plant.

Witches Broom: A broom-like growth produced by the dense clustering of branches.

Yellowing: Loss of green color due to degeneration or disorganization of chlorophyll or chloroplasts. Comparable to chlorosis.

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