

Common Signs and Symptoms of Unhealthy Plants

Amy D. Timmerman, Associate Extension Educator
James A. Kalisch, Entomology Extension Associate
Kevin A. Korus, Assistant Extension Educator
Stephen M. Vantassel, Wildlife Program Coordinator
Ivy Orellana, Extension Assistant



Common Signs and Symptoms of Unhealthy Plants

Amy D. Timmerman, Associate Extension Educator
James A. Kalisch, Entomology Extension Associate
Kevin A. Korus, Assistant Extension Educator
Stephen M. Vantassel, Wildlife Program Coordinator
Ivy Orellana, Extension Assistant

Plant symptoms may be caused by biotic (living organisms) or abiotic (nonliving) agents. Many abiotic factors can cause symptoms in a landscape or garden. These factors include nutrient imbalances, drought or excess soil moisture, limited light, reduced oxygen availability, air pollution, soil pH extremes, pesticide toxicity, compaction, cultural practices, mechanical damage, and low or high temperatures.

Insects, mites, fungi, bacteria, nematodes, viruses, parasitic higher plants, protozoa, and grazing or browsing animals are all examples of biotic agents that damage plants.

Symptoms of an unhealthy plant are expressed as visible changes in its appearance. When whole-plant symptoms such as wilting are observed, 100 percent of the plant has visible symptoms. Plant part symptoms can affect any portion of the plant, including flowers, fruits, leaves, stems, or roots.

Along with the type of symptoms being expressed by the plant, it can be important to observe the colors that are associated with those symptoms. When making a diagnosis, description of color can be a useful tool, such as the yellowing of leaves associated with chlorosis. Being able to correctly define or describe the abnormal appearance of an affected plant strengthens the ability of a gardener or landscape manager to correctly identify the cause.

In addition to the symptoms observed on the plant, there also may be signs of the problem. Signs are visible, direct evidence of the causal agent on the affected plant part. Signs may include tracks, bite marks, chemical residue, honeydew, egg masses, frass (insect fecal excrement), fungal mycelium and spores, or bacterial ooze.

Signs can be very useful when making a diagnosis but must be interpreted with care. For example, fungal growth on the surface of

a plant part may be a sign of a saprophyte (a nonparasitic fungus growing on nutrients and organic matter on the plant surface) and thus might not be related to the actual cause of disease.

When working on diagnosing a plant problem, remember to examine the surrounding area to observe the presence of any patterns. Biotic problems typically have an uneven margin between the affected tissue and healthy tissue, are randomly distributed, affect one plant species or related plant species, and progress to related plants nearby. An example of a biotic problem pattern is the movement of black spot from one rose to another. Abiotic problems typically have distinct margins between healthy and affected plant tissue, have a uniform pattern to the distribution, affect multiple species, and do not spread to related plants. An example of an abiotic problem pattern is the uniform browning of turf resulting from a plugged or leaking sprinkler head.

Whole Plant Symptoms

Damping-off: Seedling damage near or below the soil line that causes emergence failure or death shortly after emergence.



Damping-off of a corn plant infected with a root pathogen.

Groove: The linear depression in the soil or turf caused by animals repeatedly walking or foraging on the same strip of land.



Groove 1 to 2 inches wide caused by voles foraging.

Stunting: Hindering of normal growth or overall development of a plant.



Chrysanthemum stunted due to chrysanthemum stunt viroid infection. (Photo courtesy of J. Dunez, Bugwood.org)

Wilt: Loss of rigidity and drooping of plant parts.



Whole zucchini plant wilting due to squash vine borer.

Plant Part Symptoms

Bleaching: White coloration on leaves.

Leaf



Bleaching of lilac leaves.

Blight: General and rapid death of a plant part.

Leaf, Flower,
Stem



Blighted tomato stem and leaves caused by late blight infection.

Symptom	Plant Part(s)	Photo
<p>Blotch: Lesions with irregular margins, tunneling by leafminers.</p>	<p>Leaf, Stem, Fruit</p>	 <p>Apple leaf with blotches.</p>
<p>Bottle-brushing: Major roots of a plant with numerous short, stubby secondary roots.</p>	<p>Roots</p>	 <p>Bottle-brush symptom on corn roots.</p>
<p>Bronzing: Bronze discoloration of leaves.</p>	<p>Leaf</p>	 <p>Overall browning and/or yellowing of bean leaves, caused by twospotted spider mite feeding.</p>
<p>Canker (stem, root): A necrotic, often sunken, lesion on the stem of a plant.</p>	<p>Stem, Root</p>	 <p>Canker on dogwood.</p>

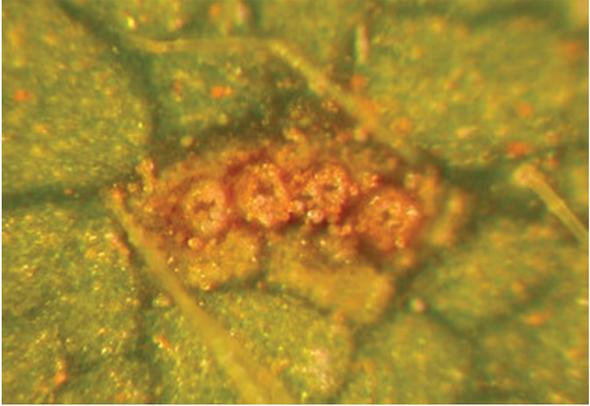
Symptom	Plant Part(s)	Photo
<p>Catfacing: A deformity of fruit induced by initial scars caused by insect punctures or plant disease lesions, followed by continued fruit growth.</p>	Fruit	 <p>Catfacing on apple, caused by apple maggot.</p>
<p>Chlorosis: Spotty, striped, or mottled yellowing of normally green tissue due to chlorophyll destruction or reduced chlorophyll production.</p>	Leaf, Stem	 <p>Mulberry leaf with chlorosis.</p>
<p>Clipping: Animals nibbling or biting the end of a stem or branch into short sections.</p>	Stem, Branch	 <p>Clipping by rabbit.</p>
<p>Crooking: Growing stems curl or bend over to form a hook.</p>	Stem, Branch, Shoot	 <p>Curling of candles (new growth) caused by European pine shoot moth larvae. (Photo courtesy of David McComb, USDA Forest Service)</p>

Symptom	Plant Part(s)	Photo
<p>Dieback: Progressive death of shoots, branches, and/or roots, generally starting at the tip and gradually moving down the plant.</p>	<p>Leaf, Stem, Root</p>	 <p>Dieback on tips of pine branches caused by pine tip moth larvae.</p>
<p>Erineum: Shallow, dense, granular growth on leaf blades. Can be green, pink, or red.</p>	<p>Leaf</p>	 <p>Erineum on underside of viburnum leaves, caused by eriophyid mites.</p>
<p>Flagging: Limited, non-progressive death of leaves or branch tips caused by rather sudden injury.</p>	<p>Leaf</p>	 <p>Dieback on tips of red oak caused by a flatheaded borer, the oak twig girdler.</p>
<p>Flecking: Small, pale, irregular leaf speckles that can coalesce to form necrotic spots.</p>	<p>Leaf</p>	 <p>Ash plant bug feeding damage on green ash.</p>

Symptom	Plant Part(s)	Photo
<p>Gall: An abnormal growth or swelling of plant tissue.</p>	<p>Leaf, Stem, Flower, Fruit, Root</p>	 <p>Oak bullet gall, caused by a gall wasp.</p>
<p>Gnawing: Animal biting or chewing.</p>	<p>Stem, Fruit, Root</p>	 <p>Gnawing caused by rabbit on branch.</p>
<p>Hole: Removal of plant tissue caused by biotic agents such as insect feeding, or openings caused by abiotic agents such as hail.</p>	<p>Leaf, Stem</p>	 <p>Holes chewed in pea leaf by a cabbage looper.</p>

Symptom	Plant Part(s)	Photo
<p>Lace-like injury: Numerous small holes between leaf veins caused by chewing insects, thus creating an intricate lace-like appearance.</p>	<p>Leaf</p>	 <p>Bean leaf beetle lace-like injury.</p>
<p>Leaf mining: Fine, serpentine, or looping patterns caused by insect feeding between the upper and lower epidermal layers.</p>	<p>Leaf</p>	 <p>Leafminer damage to columbine leaf.</p>
<p>Lesion: Localized area of necrotic tissue.</p>	<p>Leaf, Stem, Flower, Fruit, Root</p>	 <p>Lesion on potato leaves infected with late blight. (Photo courtesy of Gerald Holmes, Valent USA Corporation, Bugwood.org)</p>

Symptom	Plant Part(s)	Photo
<p>Mildew: Fungal disease of plants in which the mycelium and/or spores of the pathogen form a fuzzy growth on plant tissues.</p>	<p>Leaf, Stem, Flower</p>	 <p>Powdery mildew on gerbera daisy.</p>
<p>Mosaic: Diffuse light and dark green or yellow and green mottling of tissue.</p>	<p>Leaf, Stem, Flower</p>	 <p>Mosaic on hosta from Hosta Virus X infection.</p>
<p>Necrosis: Localized death of tissue.</p>	<p>Leaf, Stem, Flower, Fruit, Root</p>	 <p>Necrosis of viburnum root.</p>
<p>Notch: Margins of leaves with generally uniform, chewed out notches.</p>	<p>Leaf</p>	 <p>Large, circular notches in rose leaves caused by leafcutter bees.</p>

Symptom	Plant Part(s)	Photo
<p>Pruning: The complete removal or disconnection of a plant stem or branch.</p>	<p>Stem, Twig, Branch</p>	 <p>Pruned twigs that have been cleanly cut by a roundheaded borer beetle.</p>
<p>Pustule: Small blister-like elevation of the epidermal layer created as spores grow underneath and push outward.</p>	<p>Leaf, Stem, Flower, Fruit</p>	 <p>Soybean rust pustules, highly magnified.</p>
<p>Ringspot: Circular, colored area surrounding a normal colored area, usually as a result of a virus infection.</p>	<p>Leaf, Stem, Fruit</p>	 <p>Ringspot on tomato fruit infected with tomato ringspot virus.</p>

Symptom	Plant Part(s)	Photo
<p>Rot: Softening, discoloration, or disintegration of succulent plant tissue.</p>	<p>Stem, Flower, Fruit, Root</p>	 <p>Geranium stem rotting from blackleg infection.</p>
<p>Rugosity or Puckering: The rough, wrinkled appearance of a leaf that failed to fully extend during leaf expansion.</p>	<p>Leaf</p>	 <p>Red oaks with puckered leaves due to thrips feeding.</p>
<p>Sand-blasting: Random trails of fine, whitish or silvery speckling caused by insect mouthparts superficially scraping plant leaf surfaces.</p>	<p>Leaf</p>	 <p>Onion thrips feeding damage on green tops of onions.</p>

Symptom	Plant Part(s)	Photo
<p>Scarring: A plant response to wounding, resulting in corky tissue. Scarring is undesirable in fruit, but it still may be edible.</p>	<p>Leaf, Flower, Fruit, Stem, Twig</p>	 <p>Scarring on cucumbers caused by cucumber beetle feeding.</p>
<p>Scorch: Burning typically along leaf margins, but can also occur on other leaf tissue. Often appears as a large, blighted area.</p>	<p>Leaf</p>	 <p>Maple leaves with scorch due to environmental stress.</p>
<p>Shot-hole: Pattern of small holes on a leaf in a line or forming a group. Shot-holes become more obvious as the leaf grows and expands.</p>	<p>Leaf</p>	 <p>Corn leaves with shot-holes from a European corn borer larva.</p>

Symptom	Plant Part(s)	Photo
<p>Shredded leaves: Leaves have a cut, tattered, or torn appearance.</p>	<p>Leaf</p>	 <p>Sunflower with hail damage causing shredding of the leaves. (Photo courtesy of Howard F. Schwartz, Colorado State University, Bugwood.org)</p>
<p>Skeletonizing: Tissue between veins has been removed by chewing insects, causing a skeleton-like appearance to the leaf.</p>	<p>Leaf</p>	 <p>Feeding damage (skeletonizing) by fall webworms.</p>
<p>Slot: Short, rectangular or linear openings in a leaf, where plant tissue has been consumed by chewing insects.</p>	<p>Leaf</p>	 <p>Slot-like openings in leaf, created by rhabdopterus leaf beetle feeding.</p>

Symptom	Plant Part(s)	Photo
<p>Spot: A small lesion or area of necrotic tissue.</p>	<p>Leaf, Stem, Fruit</p>	 <p>Tomato leaf with leaf spot symptoms.</p>
<p>Stippling: Leaf with areas of fine, pale specks as if pricked by a needle. Caused by tiny insects and spider mites with piercing-sucking mouthparts.</p>	<p>Leaf</p>	 <p>Stippling created by leaf hopper feeding, which can turn yellow to brown, giving a frosted appearance known as “hopper-burn”.</p>
<p>Stubby roots: Roots that are shorter and/or thicker than normal.</p>	<p>Root</p>	 <p>Stubby root nematode symptoms on corn.</p>
<p>Swelling: Trunk and/or branches look swollen; foliage located beyond swelling point may be stressed.</p>	<p>Stem, Branch, Trunk</p>	 <p>Swollen rose canes and dying foliage, caused by a flatheaded borer, the rose cane girdler.</p>

Symptom	Plant Part(s)	Photo
<p>Tearing: The combination of cutting and twisting resulting in a break that is frayed or not cleanly broken.</p>	<p>Leaf, Stem, Fruit, Root</p>	 <p>Tearing of a branch from deer feeding. (Photo courtesy of Stephen M. Vantassel)</p>
<p>Tunneling: A long channel chewed into a plant part, caused by insect borer larvae or adults.</p>	<p>Leaf, Stem, Trunk, Branch, Fruit, Root</p>	 <p>Tunnels beneath bark caused by bark beetles.</p>
<p>Window paning: Areas on the leaf are bleached and nearly transparent; leaf veins and one leaf surface remain intact to create a window effect.</p>	<p>Leaf</p>	 <p>One side of leaf surface is superficially fed upon and the other side is intact. This damage is typical of common sawfly larvae and early-stage caterpillars.</p>

Symptom	Plant Part(s)	Photo
<p>Witches' broom: Abnormal proliferation involving dense clustering and stunting of branches and leaves.</p>	<p>Leaf, Stem, Flower</p>	 <p>Witches' broom caused by honeysuckle aphid. Some species of aphids and mites cause this kind of abnormal growth in other plants.</p>

Problem Signs	
<p>Cast skins: Skins can be transparent, pale, or opaque. They may be wrinkled or smooth, soft or rigid. Shed caterpillar skins have a head capsule, prolegs, and hairs or spines. Large numbers of cast skins are a common occurrence with whitefly, aphid, and lace bug populations.</p>	 <p>Clear cast skins of greenhouse whitefly nymphs and disk-shaped pupal cases.</p>
<p>Chemical residue: A powdery substance, of any color, typically accumulating at the leaf margins.</p>	 <p>Pesticide residue on seedlings. (Photo courtesy of Paul Bachi, University of Kentucky Research and Education Center, Bugwood.org)</p>

Egg masses: Insect eggs are of various colors and shapes and may be present on all plant parts. Some masses are covered for protection.



Squash bug eggs on underside of squash leaf.

Entry/Exit holes: Evident holes in a stalk, stem, branch, or trunk, caused by boring and tunneling insects. A hole may be accompanied with sawdust, frass (fecal pellets), or plant exudates, and may have a pupal skin protruding from it.



Entry and exit holes by bark beetle.

Exudate (ooze): Fluid masses of bacteria that typically cause bark or epidermal tissue to appear shiny and sticky. Sap or pitch discharge resulting from insect or mechanical injury.



Bacterial exudate on apple infected with fireblight.

Foam/Froth: Mass of white, bubbly, sticky substance attached to stems, branches, or leaves.



Foamy masses of white froth created by nymphs of the alder spittlebug.

Frass: Excrement produced by insects in the form of pellets, sticky spots, or specks. May be mingled with shed skins or insect body parts.



Numerous tarry fecal spots on the underside of the leaf that are excreted by hawthorn lace bugs.

Fungal fruiting structures: Visible fungal spore-bearing bodies present on any plant part.



Pycnidia formation on dogwood canker.

Honeydew: The sugary, sticky, glossy liquid secreted by some insects. Honeydew promotes growth of sooty mold.



Honeydew secretions from oak aphid coating curled oak leaves.

Mold: A general term referring to fungal growth, which may or may not contain fruiting structures; it can be any color.



Mold on a vinca leaf.

Mycelium: A mass of hyphae, thread-like structures that make up the “body” of a fungus. They can vary in color.



Summer squash with pythium mycelium. (Photo courtesy of Gerald Holmes, Valent USA Corporation, Bugwood.org.)

Rust: A disease causing the formation of orange to reddish-brown pustules, giving the plant a “rusty” appearance.



Sunflower rust.

Scales: Round or elliptical bumps occurring on leaves and stems that are the actual bodies of the scale insects themselves. Advanced infestations can practically cover the entire plant surface, giving a scaly appearance. Scale insects are either hard (armored) or soft.



Brown, oval circles covering portions of leaf are actually brown soft scale.

Slime trails: Transparent, shiny trails, either moist and sticky or dried. Trails found mainly on plants, but also on stones or on objects on or near the ground.



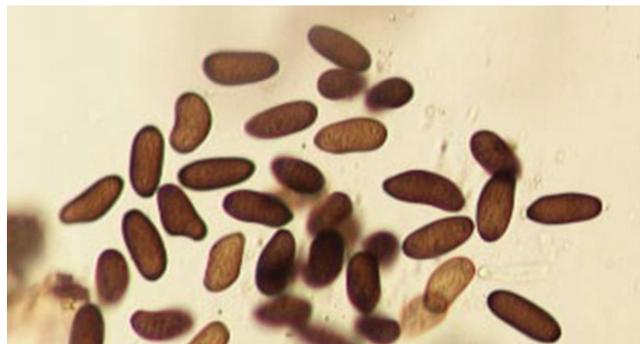
Glistening, moist slime trails on a plumbago leaf.

Sooty mold: A dark gray coating on plant parts, formed by the hyphae of fungi that grow on the surface of the affected plant part. It is often associated with the honeydew secreted by insects, typically aphids.



Sooty mold on leaves caused by brown soft scale.

Spore: A fungal reproductive unit consisting of one or more cells.



Fungal spores, highly magnified.

Warty growth: Brown to beige protrusions or swellings on leaf or stem tissue, which may be a result of excess moisture, a condition called edema.



Protrusions from the leaf that resemble warts are actually edema swellings.

Watermark: Darkened, watery, moist marking within leaf tissue.



Watermark on iris leaf, caused by iris borer.

Webbing: Layers of fine silk that cover leaves and stems. Dirt and debris can accumulate in webbing. Webbing is an indicator that the plant may have a large population of spider mites living on it.



Magnified view of twospotted spider mite webbing on a potted rose plant.

Woolly or cottony masses: Woolly or cottony-looking masses or tufts that are actually body structures of mealybugs and some aphids.



White woolly clusters of the woolly alder aphid.

To become adept at observing the signs and symptoms associated with poor plant health, first become as familiar as possible with the typical appearance and performance of healthy plants. Some variations, such as leaf size, may occur with similar plants placed in different locations or microclimates. Unusual growth may indicate a problem. Common symptoms, such as wilting, leaf curling, or cupping, may be seen in a wide range of plant species, but can indicate different causal agents. Understanding signs and symptoms that are either unique or specific to particular plants will be of value in making a diagnosis and identifying a management strategy or treatment.

Resources

“Landscape Diagnostic Guide for Problems Affecting Woody Ornamentals and Herbaceous Perennials”

“The Wildlife Damage Inspection Handbook, 3rd Edition”

<http://www.icwdm.org> — Internet Center for Wildlife Damage Management

Acknowledgments

The authors would like to thank Scott E. Hygnstrom, professor at the School of Natural Resources, University of Nebraska–Lincoln.

This publication has been peer reviewed.

UNL Extension publications are available online at <http://extension.unl.edu/publications>.