**Citrus**

**Diseases and Disorders of Leaves and Twigs**

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Names link to more information on identification and management.

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| **Click on photos to enlarge** | | |
| **Symptoms when viewed close-up** | | |
| [Bacterial blast](http://ipm.ucanr.edu/PMG/P/D-CI-PSYR-FO.007.html) [Bacterial blast](http://ipm.ucanr.edu/PMG/r107101111.html)  **Identification tip:** Infection starts as black lesions in the leaf petiole and progresses into leaf axils. Leaf blades curl, dry, and drop prematurely, often leaving petioles remaining stuck on the twig. When twig lesion girdles the stem, twig and branch dieback can result. Occurs mostly in the Sacramento Valley on the exposed side of trees facing wind-driven rain. | [Botrytis rot](http://ipm.ucanr.edu/PMG/B/D-SF-BCIN-BT.003.html) [Botrytis rot](http://ipm.ucanr.edu/PMG/r107100911.html) **Identification tip:** Botrytis fungus can infect and kill young shoots (shown here on plum), Botrytis damage to citrus is uncommon in California, but sometimes develops after prolonged rainy conditions. especially in coastal lemons where infections can move from old blooms to developing new lemons in spring. | [Wind damage](http://ipm.ucanr.edu/PMG/W/A-CI-WSNE-FO.007.html) Wind damage **Identification tip:** Scattered dead twigs can develop on trees after hot dry winds. Wind damage is more prevalent on the more exposed trees, such as trees along borders, and if soil is dry or roots are unhealthy. Bacterial blast, Dothiorella blight, and certain abiotic disorders (frost and wind) cause similar damage. Bacterial blast can also look similar to this by April when twig lesions have girdled the stems. |
| [Anthracnose](http://ipm.ucanr.edu/PMG/C/D-CI-CGLO-FO.001.html) [Anthracnose](http://ipm.ucanr.edu/PMG/r107102111.html) **Identification tip:** Twig dieback, premature leaf drop, and dark staining on fruit can occur after infection by fungi including *Colletotrichum*. Dying leaves and twigs become covered with dark fungal spores by which the pathogen spreads. Anthracnose is more common after a prolonged wet spring. | [Sooty mold](http://ipm.ucanr.edu/PMG/C/I-HO-CPSE-CD.002.html) Sooty mold **Identification tip:** Blackish sooty mold develops on leaves or fruit fouled with honeydew excreted by sucking insects such as aphids, mealybugs, scales, and whiteflies. | [Frost](http://ipm.ucanr.edu/PMG/W/A-CI-WEAT-FO.003.html) Frost **Identification tip:**  Dead leaves remain attached to trees damaged by cold weather. Injury is most prevalent on outer, exposed branches giving plants a scorched appearance. |
| [Chimera](http://ipm.ucanr.edu/PMG/G/A-CI-GDIS-FO.002.html) Chimera **Identification tip:** Variegated color and misshapen or undersized leaves can occur from genetic mutation. Bunchy shoot growth (witches' broom) and misshapen or discolored fruit may also develop. | [Phytotoxicity from glyphosate](http://ipm.ucanr.edu/PMG/P/A-CI-PTOX-FO.007.html) Phytotoxicity from glyphosate **Identification tip:** Small, puckered, needlelike leaves; elongate, willowlike foliage on new shoot growth; fewer leaves than normal; and buds that only partially open can occur after trees are contacted by glyphosate herbicide. Injury is typically confined to exposed branches on the lower outer canopy. | [Growth regulator injury](http://ipm.ucanr.edu/PMG/P/A-CI-PTOX-FO.005.html) [Growth regulator](http://ipm.ucanr.edu/PMG/r107900111.html) injury **Identification tip:** Leaves cup or curl and become yellowish if 2,4-D is incorrectly applied to manage fruit drop and fruit size. Plant growth can be stunted. Pistils may turn brown and necrotic on young fruit. |
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| [Nitrogen deficiency](http://ipm.ucanr.edu/PMG/M/A-CI-MDEF-FO.013.html) Nitrogen deficiency **Identification tip:** Foliage is pale overall when nitrogen is deficient. The causes include a true deficiency of nitrogen, adverse soil conditions, or unhealthy roots. | [Phytotoxicity from diuron](http://ipm.ucanr.edu/PMG/P/A-CI-PTOX-FO.003.html) Phytotoxicity from diuron **Identification tip:** Leaf veins can turn yellow or white (vein clearing) after herbicide application due to citrus root uptake of bromacil or diuron. After simazine exposure, leaves yellow between veins with the chlorosis increasing in severity in proportion to the amount of herbicide exposure. | [Mesophyll collapse](http://ipm.ucanr.edu/PMG/W/A-CI-WSNE-FO.001.html) Mesophyll collapse **Identification tip:** Soft tissue between leaf veins becomes sunken and translucent or pale due to moisture stress when trees are unable to provide leaves with enough water; affected leaf tissue then becomes tan-colored or necrotic. |
| [Zinc deficiency](http://ipm.ucanr.edu/PMG/M/A-CI-MDEF-FO.004.html) Zinc deficiency **Identification tip:** Extensive chlorosis develops between veins when zinc is severely deficient; leaves may be smaller in size on shoots that have shortened internodes. | [Phytotoxicity from simazine](http://ipm.ucanr.edu/PMG/P/A-CI-PTOX-FO.006.html) Phytotoxicity from simazine **Identification tip:** Pale blotches develop in leaves after exposure to simazine herbicide. Interveinal chlorosis can range from relatively mild to severe depending on the amount of herbicide absorbed. | [Citrus greening (Huanglongbing)](http://ipm.ucanr.edu/PMG/C/D-CI-CAND-FO.001.html) [Citrus greening](http://anrcatalog.ucdavis.edu/pdf/8205.pdf) (Huanglongbing) (868 KB, PDF) **Identification tip:** Leaf mottling and yellowing that crosses leaf veins helps to distinguish citrus greening; [yellowing](http://ipm.ucanr.edu/PMG/C/D-CI-CAND-FS.001.html) in just one section of a tree is characteristic of citrus greening. The cause is a bacterium spread by aphidlike psyllids. Symptoms include stunted trees, leaf and fruit drop, twig dieback, and fruit that are lopsided, small and bitter-tasting. When zinc deficiency is the cause discoloring occurs between distinctly greener veins. Report suspected citrus greening to agricultural officials if found in California. |
| [Manganese deficiency](http://ipm.ucanr.edu/PMG/M/A-CI-MDEF-FO.012.html) Manganese deficiency **Identification tip:** Leaves turn yellowish overall but larger veins remain slightly green where manganese is deficient. Zinc deficiency symptoms are somewhat similar to those of manganese deficiency. Both are more prevalent on young leaves of the fall growth flush as soils cool and root activity diminishes. | [Potassium deficiency](http://ipm.ucanr.edu/PMG/M/A-CI-MDEF-FO.009.html) Potassium deficiency **Identification tip:** Yellowish leaves with edges bent downward, especially at tip are symptomatic of insufficient potassium. | [Phytotoxicity from oil and copper](http://ipm.ucanr.edu/PMG/P/A-CI-PTOX-FS.001.html) Phytotoxicity from oil and copper **Identification tip:** Defoliation of the entire tree occurred when a sulfur-containing fungicide was applied after oil spray for scale control. Fruit drop, branch dieback, and discoloring or "water spotting" of fruit are other damage symptoms from oil misapplication. |
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| [Magnesium deficiency](http://ipm.ucanr.edu/PMG/M/A-CI-MDEF-FO.005.html) Magnesium deficiency **Identification tip:** Foliar yellowing begins at the leaf tip and margins and moves inward. A somewhat V-shaped dark green patch of foliage may remain near the leaf base. | [Iron deficiency](http://ipm.ucanr.edu/PMG/M/A-CI-MDEF-FO.007.html) Iron deficiency **Identification tip:** Interveinal chlorosis from iron deficiency appears as yellowing between the small, darker green veins. This net-vein pattern occurs primarily in young leaves of the fall growth flush as soils cool, reducing root activity. | [Sodium toxicity](http://ipm.ucanr.edu/PMG/M/A-CI-MTOX-FO.009.html) Sodium toxicity **Identification tip:** Yellowing, bronzing, or browning of leaves and premature foliage drop can be due to excess sodium. High overall salinity or an excess of either sodium or chlorine can cause this leaf damage or general symptoms throughout the tree resembling drought stress, such as stunted growth. |
| [Boron toxicity](http://ipm.ucanr.edu/PMG/M/A-CI-MTOX-FO.014.html) Boron toxicity **Identification tip:** Leaf mottling or yellowing, spotting on the underside of leaves, and premature leaf drop can occur from excess boron; severe symptoms can include twig dieback. | [Hail damage](http://ipm.ucanr.edu/PMG/W/A-CI-WEAT-BT.002.html) Hail damage **Identification tip:** Small scars on twigs or fruit all occur on the upper or outer exposed side of branches injured by hail. Wounded tissue is sunken, leaves are torn and shredded, and may drop prematurely after hail impact. | [Sunburn damage](http://ipm.ucanr.edu/PMG/W/A-CI-WEAT-FR.012.html) Sunburn damage **Identification tip:** Leaves with chlorotic or necrotic spots and fruit with yellow to brownish, leathery areas occur mostly in the south and west canopy sides when sunburn is the cause. |
| [Citrus canker](http://ipm.ucanr.edu/PMG/X/D-CI-XAXO-FO.002.html) [Citrus canker](http://anrcatalog.ucdavis.edu/pdf/8218.pdf) (Bacterial canker) (636 KB, PDF) **Identification tip:** Circular, scabby lesions develop on fruit, both sides of leaves, and on twigs. Lesions on fruit and leaves are surrounded by a dark or water-soaked margin and yellowish halo. Citrus canker lesions are raised, unlike the sunken twig scars from hail injury or the roundish discoloring on fruit from cold and sunburn. Report to agricultural officials this exotic disease if found in California. | *Photo not available.*  [Citrus nematode](http://ipm.ucanr.edu/PMG/r107200111.html) **Identification tip:** Reduced tree and fruit size, twig dieback, and decline in growth can be caused by root-infecting nematodes. Diagnosing this malady entails ruling out other causes, inspecting roots, and sending root and soil samples to a diagnostic laboratory. |  |
| **Symptoms when viewed from a distance—**[**Top of page**](http://ipm.ucanr.edu/PMG/C107/m107bpleaftwigdis.html#ipmpagecontent) | | |
| [Armillaria root rot](http://ipm.ucanr.edu/PMG/A/D-CI-AMEL-FS.003.html) [Armillaria root rot](http://ipm.ucanr.edu/PMG/r107100311.html) **Identification tip:** A sparse canopy of pale, wilted leaves is a typical aboveground symptom of root and crown diseases. Inspecting roots and beneath bark helps to diagnose these causes. | [Phytophthora gummosis](http://ipm.ucanr.edu/PMG/P/D-CI-PCIT-BT.001.html) [Phytophthora gummosis](http://ipm.ucanr.edu/PMG/r107100411.html) **Identification tip:** Leafless branches and pale foliage can be caused by California red scale, inappropriate irrigation, and pathogens. *Phytophthora citrophthora* has infected this navel orange. During wet weather *Phytophthora*-infected bark may exude resin. | [Phytophthora root rot](http://ipm.ucanr.edu/PMG/P/D-AV-PCIN-FO.001.html) [Phytophthora root rot](http://ipm.ucanr.edu/PMG/r107100111.html) **Identification tip:** The pale green to yellowish leaves on the left tree can have several causes, including root nematodes and diseases such as Armillaria root rot and Tristeza. Shown here is Phytophthora root rot on avocado. |
| [Dothiorella blight](http://ipm.ucanr.edu/PMG/D/D-CI-DGRE-FF.001.html) Dothiorella blight **Identification tip:** Leaves and twigs in a group may decline and die, either on scattered branches or overall on the entire tree. Fruit and leaves may remain attached on dead branches. Bark may discolor and exude gum. Cutting into cankers may reveal discolored brown to yellowish cambium. Young trees may die if affected tissue is not removed. | [Tristeza twig dieback](http://ipm.ucanr.edu/PMG/T/D-CI-TRIV-FS.005.html) [Tristeza](http://ipm.ucanr.edu/PMG/r107101311.html) twig dieback **Identification tip:** Fruit, leaves, and twigs may dry and die on infected trees. Citrus may die suddenly or after a slow decline. Other infected trees may recover from symptoms. Tristeza occurs primarily on old trees where sweet orange scion is grafted to a sour orange rootstock. *Armillaria*, *Phytophthora*, and red scale are among the more common causes of dieback. | [Citrus greening](http://ipm.ucanr.edu/PMG/C/D-CI-CAND-FS.001.html) Citrus greening **Identification tip:** Yellowing in just one section of a tree is characteristic of citrus greening. The cause is a bacterium spread by aphidlike psyllids. Symptoms include stunted trees, leaf and fruit drop, twig dieback and fruit that are lopsided, small and bitter-tasting. Report to agricultural officials this exotic disease if found in California. |
| [Stubborn disease](http://ipm.ucanr.edu/PMG/S/D-CI-SCIT-FS.006.html) [Stubborn disease](http://ipm.ucanr.edu/PMG/r107101211.html) **Identification tip:** Young trees affected by stubborn disease are stunted and produce undersized and few fruit. Off-season growth flush or bloom and upright leaf growth are other symptoms of this disease caused by a phytoplasma, *Spiroplasma citri*. | [Exocortis](http://ipm.ucanr.edu/PMG/E/D-CI-EXOV-FS.001.html) [Exocortis](http://ipm.ucanr.edu/PMG/r107100511.html) **Identification tip:** Reduced tree size and low yields in older trees are characteristic of infection by *Exocortis viroid*. Examining around the root crown will usually reveal cracked and peeling bark when Exocortis is the cause. | [[Frost damage to citrus trees](http://ipm.ucanr.edu/PMG/W/A-CI-WEAT-FF.004.html)](http://ipm.ucanr.edu/PMG/W/A-CI-WEAT-FF.004.html) Frost **Identification tip:** Cold weather may kill only outer foliage and leaf tips or cause virtually all foliage on the tree to turn brown and die. Cold-damaged fruit may drop. |