UC Integrated Pest Management
University of California
Agriculture & Natural Resources

Home & Garden Pest Newsletter

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Common Vegetable Garden Diseases and Disorders

When you have a vegetable garden, sometimes you might discover your plants aren't growing as well as expected and look sick. Vegetable plants can get diseases just like animals. A plant disease is an abnormal condition caused by microorganisms such as bacteria, fungi, water molds, or viruses. These are known as pathogens or infectious agents. Plants can also be affected by environmental issues, which are called disorders. Disorders can result from improper irrigation or nutrient levels, poor air quality, incorrect soil pH, exposure to too much or too little sunlight, or extreme temperatures.

To help identify diseases and disorders, we use symptoms, or the visible effects on the plant, and signs, any physical evidence of an infectious agent. Symptoms can take many forms, such as wilting, discoloration, abnormal growth, leaf spots, rot, or stunted growth. Examples of signs of plant diseases include visible fungal growth and bacterial ooze. By knowing where to look and what to observe, you can narrow down which diseases and disorders you might be dealing with.

B Messenger-Sikes, UC IPM

Powdery mildew on pea leaves.

G Holmes, Bugwood.org

Squash leaves showing typical mosaic virus symptoms

Diseases

Plant diseases can be host-specific, depending largely on the pathogen, the infectious agent. Some diseases are named after the pathogen that causes them; for example, Fusarium wilt is caused by *Fusarium* fungi. Others are

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named for the symptoms or signs they produce, such as the fungal disease powdery mildew. Below are some common vegetable diseases, the pathogens that cause them, and general management strategies.

Damping-Off

Early in the growing season, you might see damping-off in your vegetable garden. Damping-off is a seedling disease caused by several soil-borne pathogens including *Pythium, Rhizoctonia, Fusarium,* and *Phytophthora*. Damping-off pathogens primarily infect young seedlings, whose tender tissues make them highly susceptible, while older plants are less affected. Seeds may rot or decay before germination or soon after. Infected seedlings will often collapse, and the lower stem and crown may disintegrate. Damping-off diseases are worse in cold, wet, compact soil and when nitrogen levels are excessive. Control this disease with good sanitation, including cleaning equipment and using clean seed or growing material. Grow seedlings in well-draining soil or media.

Downy Mildew

Another early-season disease is downy mildew. Downy mildews are a group of diseases caused by fungal-like organisms known as oomycetes (water molds). Downy mildew pathogens are relatively host-specific, infecting either a single or a group of closely related hosts. Symptoms appear as necrotic (dead) or chlorotic (yellow) patches on the top of leaves. Spores are produced on the undersides of leaves, forming white to brown velvety patches. Downy mildew thrives in cool, wet conditions. Manage this disease by increasing airflow and reducing leaf wetness. Vegetables susceptible to downy mildew include beets, brassicas, chard, cucurbits, garlic, lettuce, onions, peas, spinach, and radishes.

Fusarium Wilt

As plants mature, they may show signs of Fusarium wilt, a disease caused by fungi in the *Fusarium* genus. These fungi are generally very host-specific; however, some can infect related crops. Infected plants will wilt or become chlorotic on one side or branch, and their water-conducting tissues may be discolored and brown. Vegetables susceptible to Fusarium wilt include asparagus, broccoli, cabbage, cauliflower, cantaloupe, peas, solanaceous crops, and some cucurbits. There is no cure for Fusarium infection, and infected plants should be removed and destroyed. Unfortunately, once the *Fusarium* fungus is introduced to an area, eradication is very difficult. Cultural management of Fusarium wilt includes rotating to an unrelated crop, using resistant varieties, and solarization.

J Brock, U Georgia, Bugwood.org

Downy mildew on cantaloupe leaves.

Powdery Mildew

The distinctive white patches of powdery mildew are common later in the growing season as plants mature. Powdery mildew is a fungal disease caused by several different fungal genera. These fungi tend to be host-specific, often infecting a single species, or at most a few closely related plants. The primary sign of this disease is white powdery fungal growth generally found on the tops of leaves. Early infection may appear as pale-yellow patches on leaves. Powdery mildew can occur on many leafy greens, solanaceous plants, cucurbits, beans, artichoke, carrots, and brassicas. Some vegetables, like tomatoes and cucumbers, have resistant varieties. Cultural management includes providing sunny areas and increasing airflow. If

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treatment is necessary, oils and sulfur products can provide control.

Mosaic Viruses

As vegetable plants grow and mature, mosaic virus disease symptoms become apparent in infected plants. Mosaic viruses are caused by a wide variety of plant viruses that produce similar symptoms, making individual viruses difficult to distinguish. Symptoms include leaf twisting and distortion, a chlorotic mosaic pattern, and stunting. While most viruses are carried from plant to plant through aphid feeding, some can be transmitted through seed, other insects, or infected sap. Unfortunately, there is no cure for plants infected with mosaic viruses. In some cases, resistant varieties exist, but using virus-free plants is the most effective way to prevent virus diseases. Vegetables susceptible to mosaic viruses include beans, beets, cucurbits, chard, solanaceous plants, lettuce, peas, and spinach.

Soft Rot

Ripe vegetables can become infected with soft rot diseases. These diseases are caused by the bacteria genera *Erwinia, Pseudomonas, Pectobacterium,* and *Dickeya*. Infected plants will become water soaked, mushy, and may have a foul-smelling odor. Vegetables commonly affected by soft rot diseases include brassicas, carrots, corn, garlic, onions, and potatoes. Soft rot most often affects corms, bulbs, and tubers; however, the thick stems and crowns of lettuce and brassicas can also become infected. Bacteria enter through plant wounds, so preventing physical damage and injury from insects is important in reducing soft rot diseases. Improving airflow between plants and well-draining soil can minimize soft rot. If the problem persists, rotate crops to a less susceptible host for at least 3 years.

Disorders

Sunscald and Heat Stress

Even though plants need sunlight to grow, too much sunlight or high temperatures can damage many vegetable plants. Sunscald on fruit or leaves is caused by excess sun exposure and will appear as pale or necrotic patches. It is usually limited to the exterior or most exposed parts of a plant. Heat stress in plants occurs after prolonged exposure to high temperatures. It can cause a wide variety of symptoms such as tip-burning of leaves, wilting, leaf rolling, and dropping of blossoms.

A Vinchesi-Vahl, UCCE

Blossom-end rot on tomatoes caused by calcium imbalance.

Incorrect Irrigation

Inconsistent or incorrect irrigation can result in drought stress or waterlogging. Drought stress (too little water) and waterlogging (too much water) can cause similar symptoms, despite being opposite conditions. Both abiotic stressors can result in whole plant necrosis, chlorosis, and wilting. Check soil moisture if you see these symptoms.

Blossom-End Rot

This common abiotic condition is caused by a calcium imbalance. While low calcium levels can cause this disorder, it is often triggered by inconsistent irrigation which affects calcium uptake. Blossom-end rot causes the end of an immature fruit to have sunken brown or black lesions as fruit ripen. Vegetables susceptible to blossom end rot include tomatoes, peppers, eggplants, squash, melons, pumpkins, and cucumbers.

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Nutrient Deficiencies

Although vegetable plants have different nutrient requirements, deficiencies often produce similar symptoms. For instance, overall plant chlorosis is often due to low nitrogen levels. Low potassium levels can cause tip-burn or marginal necrosis on older leaves. A deficiency in iron or manganese often appears as interveinal chlorosis on the youngest leaves. While these symptoms are helpful in figuring out the cause, the only reliable way to determine a nutrient deficiency is to perform a foliage or soil test through a commercial laboratory.

Is It a Disease or a Disorder?

When trying to determine whether a plant problem is a disease or a disorder, there are several key factors that can help. First, identify the plant species and determine the observed symptoms or signs. Consider the plant's age, its location, recent weather conditions, and whether other nearby plants are affected. Lastly, consider the timeframe of symptom development. Diseases typically develop unevenly in a population, worsen over time, and affect only susceptible hosts. In contrast, disorders often appear suddenly and consistently, affecting multiple unrelated plants. You are likely to encounter problems in your vegetable gardens from time to time, and identifying the root cause can help you properly address it!

See the UC IPM website for specific vegetables and the diseases and disorders that can affect them at ipm.ucanr.edu/home-and-landscape/pests-in-gardens-and-landscapes/#vegetables-melons-and-herbs.

—MacKenzie Patton,
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Revised *Pest Notes*

Powdery Mildew on Ornamentals

Spring is often when the distinctive white patches of powdery mildew appear on ornamental landscape plants like roses, crape myrtle, and sycamore.

The newly revised *Pest Notes: Powdery Mildew on Ornamental*s, authored by UCCE advisors Jim Downer and Maria de la Fuente, and Belinda Messenger-Sikes from UC IPM, contains cultural control tactics to help you manage powdery mildew on ornamental plants.

Online at
ipm.ucanr.edu/home-and-landscape/powdery-mildew-on-ornamentals/

Indian Walking Stick

The Indian walking stick, native to India, has established in coastal California landscapes after escaping from captivity. They are popular as pets in classrooms and homes. Walking stick insects are mostly a nuisance, but can defoliate plants.

For more details on the biology of this insect, how to identify its eggs, and how to manage the spread of the Indian walking stick, see the newly revised *Pest Notes: Indian Walking Stick*. This publication was authored by David Headrick from Cal Poly SLO and UC IPM's Karey Windbiel-Rojas.

Online at
ipm.ucanr.edu/home-and-landscape/indian-walking-stick/

Visit UC IPM's Pest Notes web page ipm.ucanr.edu/home-and-landscape/pest-notes-library/ for these and many more titles

Hiring an Arborist: What to Know to Make Informed Tree Care Decisions

Trees are long-lived resources that provide environmental, aesthetic, and community benefits. When a tree shows signs of decline, damage, or pest infestation, it is common to seek help from a tree care professional. While professional tree care is essential in many situations, the quality and appropriateness of recommendations can vary, particularly when invasive pests are involved, such as invasive shothole borers or the goldspotted oak borer. Because there are no pest-specific certifications for many tree pests, it is important to take an active role in ensuring management decisions are appropriate, effective, and consistent with research-based guidance. This article outlines how to work productively with arborists and make informed tree care decisions.

J Brock, U Georgia, Bugwood.org

A professional arborist removing a branch high in the canopy of a tree.

Start with Pest Identification and Basic Research

Before hiring an arborist, it is helpful to understand what problem you may be dealing with. Tree decline can have many causes including drought stress, soil conditions, root damage, fungal diseases, and insect pests. Because management options depend on the underlying cause, accurate identification is a critical first step.

Consider the following steps:

- Document symptoms with clear photos (for example, entry holes, sap flow, sawdust, or canopy thinning) and seek help with identification from a local University of California Cooperative Extension office or County Agricultural Commissioner.
- Consult pest-specific resources developed by UC IPM, such as *Pest Notes,* to learn about pest biology, damage patterns, and recommended management strategies.

Even a basic understanding of the issue helps assess whether proposed actions are consistent with current recommendations.

Look for Professional Credentials and Ask Follow-Up Questions

Most tree maintenance work beyond routine watering or minor pruning should be done by professional arborists. Start by looking for arborists certified by the International Society of Arboriculture (ISA) or consulting arborists affiliated with the American Society of Consulting Arborists (ASCA).

Certification indicates that an arborist has met education and experience requirements and participates in continuing education. However, certification alone does not guarantee familiarity with all tree pests or local management recommendations.

Because many invasive pests do not have pest-specific licensing or certification requirements, the following questions can help clarify experience with specific pests:

- Are you familiar with this pest and its current management recommendations?
- How do you determine whether treatment, monitoring, or removal is appropriate?

Clear, transparent explanations are an important indicator of professional practice.

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Request a Written Description of the Problem and Proposed Work

Before agreeing to work, request a written description of the problem and the proposed actions, often provided as part of the estimate or quote. This is particularly important for pest-related issues, where unnecessary or ineffective treatments can add cost without improving outcomes.

The written description should clearly explain:

- The suspected cause of decline or pest issue
- The recommended actions and why each service is being proposed
- Whether non-chemical options are appropriate and included (such as pruning infested branches)
- If pesticides are recommended, the purpose of the treatment and how it fits into an integrated pest management (IPM) approach

Under an IPM framework, treatments are based on thresholds for action, not routine schedules. Ask when treatment is recommended versus continued monitoring, how success will be evaluated, and what criteria would justify reapplication, if needed. The need for a pesticide treatment should be reassessed each time based on tree condition and pest activity, rather than applied automatically on a calendar basis.

Review Quotes Carefully and Ask About Add-On Services

Always request a detailed, written estimate that itemizes the proposed work. This helps clarify what is essential versus optional.

Be cautious of add-on services that are not clearly tied to the diagnosis. For example, routine fertilization or generalized "tree health treatments" may not be appropriate for trees affected by certain pests or stressors. In general, established landscape trees rarely require fertilization, except in specific situations such as fruit production or documented nutrient deficiencies.

When reviewing estimates, it may be helpful to ask questions such as:

A Eskalen, UC Davis

Oozing sap on the trunk of this sweet gum tree is a symptom of Fusarium decline, a disease spread by invasive shothole borers.

- What specific problem is each of the itemized services addressing?
- Which of these services are most critical now?

This keeps the focus on transparency and ensures that proposed services are aligned with the tree's condition and management goals.

Ask How Infested Material Will Be Handled

For invasive pests, proper handling of removed wood and debris is a key component of management. Many tree-killing insects can survive for extended periods in cut logs or branches, making improper disposal a pathway for pest spread.

If pruning or tree removal are included in the quote, ask the tree care provider:

- How will infested material be handled after removal?
- Will it be chipped, processed, or transported to an appropriate facility?
- What steps are taken to reduce the risk of moving live pests?

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Hiring an Arborist *continued from p.6*

Responsible green waste management supports broader efforts to slow the spread of invasive tree pests in California.

K Windbiel-Rojas, UC IPM

Cut logs can harbor tree-killing insects.

Consider Multiple Opinions or Quotes

Shop around and obtain multiple estimates. Comparing recommendations can help clarify whether there is agreement on diagnosis and management goals.

Differences in recommendations do not necessarily mean that one arborist is "wrong," but they do provide an opportunity to ask additional questions and make more informed decisions.

Effective tree care depends on informed decision-making and clear communication with trained professionals. Asking questions and understanding the basis for recommendations helps ensure actions are science-based, appropriate, and effective.

—Beatriz Nobua-Behrmann,
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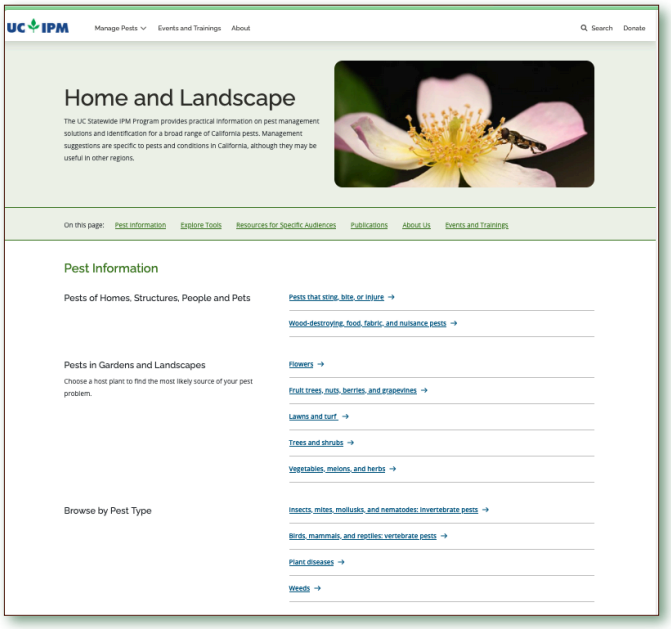
UC IPM Web Content Changes

UC IPM's website is undergoing design changes and our readers will notice the pages look a bit different. UC IPM staff have been working for years to redesign and update the content of our website to improve not only the overall look, but accessibility for those with disabilities.

UC IPM, as well as everyone within UC Agriculture and Natural Resources, have been converting online content to be in compliance with title II of the Americans with Disabilities Act (ADA). While these important changes are still in progress, we wanted to let our readers know that some of UC IPM's web content will be temporarily unavailable as of May 12, 2026. Some older, outdated resources will be taken down permanently.

For a list of changes, see our blog post: ucanr.edu/blog/pests-urban-landscape/article/uc-ipm-web-content-changes



UC IPM's new Home and Landscape homepage, https://ipm.ucanr.edu/home-and-landscape/

Invasive Pest Spotlight: Japanese Beetle

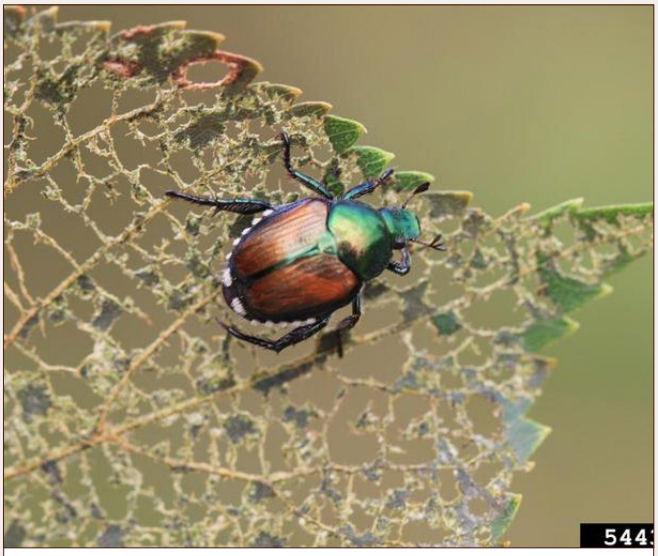
The invasive pest spotlight focuses on emerging or potential invasive pests in California. In this issue we are covering the Japanese beetle.

Japanese beetle facts

The Japanese beetle is an insect that feeds on over 300 different ornamental plants, crops, and turfgrasses. Among their preferred host plants are grape, apple, cherry, peach, plum, rose, and corn. Adults are about ½ inch long, oval-shaped, and metallic green with copper-colored outer wing cases. The larvae (immature beetles) are c-shaped white grubs that live in the soil. Many other beetle species found in California can be mistaken for this pest. Unlike similar-looking beetles, Japanese beetles have 12 short tufts of white hairs along the outer edge of their abdomen.

The adults damage plants by feeding on flowers, fruit, and foliage. They commonly skeletonize leaves by chewing holes between major veins, leaving a lace-like pattern. The larvae feed on roots, especially on turfgrass. Infested lawns will develop brown, dead patches.

Japanese beetles have spread throughout much of the Midwest and Eastern United States. This pest is not established in California, though it is occasionally detected and eradicated. Most recently, Japanese beetles were found in a small, isolated area in Sacramento County in 2024. The California Department of Food and Agriculture (CDFA) is actively carrying out an eradication response in this area.



S Katovich, Bugwood.org

An adult Japanese beetle on a leaf with feeding damage.

What can you do?

If you think you have found a Japanese beetle in California, take a photo or collect it in a sealable container, place it in alcohol or the freezer to kill it, then report it to your local county agricultural commissioner or to CDFA. To prevent accidentally spreading them to new areas, do not move collected beetles from your residence. For more information about this pest, visit www.cdfa.ca.gov/plant/pdep/target_pest_disease_profiles/japanese_beetle_profile.html.

—Lindsey Hack
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For more information about managing pests, contact your University of California Cooperative Extension office, or visit the UC IPM website at ipm.ucanr.edu.

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