



Prevention is the best treatment

Many pests and diseases can be prevented by following the best practices described in the “Cultural” foundation of the pyramid below. Then as the season progresses, regular monitoring of your garden will enable you to proceed up the pyramid and apply targeted physical and biological methods. Chemical interventions should only be used as a last resort and according to product labels and instructions. Even organic products may harm you, your plants, and beneficial organisms, so more does not equal better.

This holistic and tiered approach is adapted from “Integrated Pest Management” practices (IPM), but in our gardens, all products must be certified organic or derived from natural sources. Look for product ingredients and labels such as the Organic Materials Review Institute (OMRI).



*For
control
methods,
proceed from
the bottom up*

4. Chemical - If other options aren't enough:

- Insecticidal soaps ● Microbial insecticides like Bt and spinosad
- Botanical insecticides derived from plants like chili pepper and garlic
- Insecticidal oils like neem and karanja

3. Biological - Invite natural enemies:

- Plant an “insectary” of natives and flowers to attract beneficial insects that eat pests ● Use “trap crops” to draw pests away from food crops
- Apply predatory nematodes to soil ● Provide habitat nearby for pest-eating birds, such as shrubs and trees

2. Physical - Remove pests before reaching for a spray:

- Exclude with row covers or netting immediately after planting your crops ● Hand-pick, use a vacuum, or spray off pests with water in the morning ● Use traps like beer, soy sauce and oil, soapy water, and cardboard ● Discard diseased leaves and plants in the trash, not the compost pile ● Apply diatomaceous earth sparingly – it harms beneficial insects too – and always wear a mask while applying it

1. Cultural - Create conditions where plants thrive and pests struggle:

- Remove weeds ● Increase airflow by pruning ● Avoid getting leaves wet when irrigating ● Rotate crop locations each year and plant cover crops ● Choose a diverse range of disease-resistant varieties that thrive in our region ● Build healthy soils and don't under or over fertilize (see our “Organic Amendments and Fertilizers” factsheet)
- Harden off seedlings and plant them out when soil and air temperatures are appropriate

A trained eye is a powerful diagnostic tool

Many pests and diseases present symptoms on your plants similar to a lack of water, such as wilting, yellowing and dying leaves. You should rule this out first, by checking for moisture a few inches below the surface. If the soil feels moist there, or can be rolled into a ball that doesn't readily crumble when pressed, then additional water is unlikely to help. In fact, overwatering can cause root rot and lead to dying leaves and stunting.

Use page two of this factsheet to investigate the signs left by potential causes. For assistance, contact Utah State University (USU) Extension's free Plant Pest Diagnostic Lab by emailing upddl@usu.edu with your name, county, photos, and relevant details. We also recommend USU's *Vegetable Pests of Utah* and *Beneficial Insects of Utah* guidebooks. Some beneficial insects appear similar to pests, so make sure you can tell the difference!

Intervention

Prevention

Appropriate pest and disease management choices are highly nuanced, so take the time to do your research

The internet is tremendously useful for sharing information, but not all of it is reliable. To assess your garden challenges and determine appropriate solutions, consult reputable sources like USU Extension (extension.usu.edu) or the University of California, Davis (ipm.ucanr.edu).

Like other aspects of gardening, pest and disease management is climate and location specific. For example, amending the soil with epsom salts might be a useful remedy for magnesium deficiency but NOT in Utah soils, which are typically high in magnesium. Get a soil test to be sure!

Some home-remedy pest treatments like dish soap spray can be effective, but beware: they can also harm your plants depending on their ingredients, dilution, and application. For any insecticide, apply a test treatment to one leaf first, and then wait 24-48 hours to observe any leaf burning.

Cause and Symptoms	Recommended Best Practices Cultural (Cul), Physical (Phys), Biological (Bio), Chemical (Chem)
Aphids - Small, pear-shaped insects (green, yellow, black) cluster on tender new growth, causing mishapen leaves and sticky residue. Common on brassicas such as kale and solanaceous crops like peppers and tomatoes.	(Cul) Apply several low doses of nitrogen rather than a single high dose. (Phys) Spray off with water or diluted castile soap; use row covers or netting. (Bio) Attract predators with alyssum and herbs. (Chem) Cover the plant thoroughly with multiple rounds of insecticidal sprays or oils.
Cutworms - Soil-dwelling larvae that cut down young seedlings at night.	(Cul) Lightly disturb soil in the fall to destroy larvae. (Phys) Hand-pick at night; protect seedlings with cardboard collars. (Chem) Bt and spinosad.
Earwigs and Pillbugs - Small irregular holes in leaves, with heavy infestations fully skeletonizing plants (only veins remaining) and mowing down young seedlings.	(Cul) Eliminate hiding places such as debris, leaves or wood. (Phys) Soy sauce/oil traps; exclude by placing sticky adhesive, such as Tangletrap, around plant stems; diatomaceous earth. (Chem) Spinosad; Sluggo Plus.
Flea Beetles - Tiny black jumping insects that leave many shotgun-like round holes in leaves. Damage is often only cosmetic, unless the infestation is severe. Common on brassicas and solanaceous crops like eggplant.	(Cul) Remove plants in the mustard family; mulch to provide habitat for ground-dwelling predators. (Phys) Row covers or netting; diatomaceous earth. (Bio) Trap crops such as radish and daikon; plant anise, chamomile, dill, and marigolds for predators; apply nematodes. (Chem) Spinosad.
Grasshoppers - Eat nearly any plant material available, making large ragged holes and chewed leaf edges.	(Phys) Hand-pick; row covers or metal mesh. (Bio) Trap crops of tall grasses. (Chem) No effective organic options are commercially available.
Leaf Miners - Larval stage of various insect species that live and feed within leaf tissue, leaving pale trails and blotches. Common with leafy greens and beets.	(Cul) Destroy infested leaves; avoid excessive nitrogen fertilization; plant resistant varieties. (Phys) Row covers or netting. (Bio) Plant dill and fennel for predators. (Chem) Insecticidal soap/oil and spinosad during egg stage.
Powdery Mildew - Fungal disease that appears as white, powdery spots on the leaves/stems/flowers. Most common in cucurbits such as squash and cucumbers.	(Cul) Plant resistant varieties; regularly remove infected leaves; increase air circulation by trellising and not overcrowding. (Bio) Bacillus subtilis. (Chem) Neem oil; potassium bicarbonate only works preventatively.
Slugs and Snails - Glistening slime trails and large irregular holes in leaves. Leafy greens are most susceptible, but they will feed on a large variety of plants.	(Cul) Water infrequently but deeply; avoid watering areas without plants; remove hiding spots like boards and stones. (Phys) Beer traps; hand-pick; copper barriers. (Chem) Sluggo, but be careful as it is poisonous to pets.
Spider Mites - Nearly microscopic insects cause stippling and bronzing of leaves as they suck out chlorophyll. Heavy infestations create fine webs and cause total defoliation. Common on beans, cucurbits and solanaceous crops.	(Cul) Avoid drought stress and irregular irrigation; limit nitrogen applications. (Phys) Floating row covers; spray plants with water. (Bio) Attract ladybugs and lacewings with coreopsis, cosmos, sunflowers and buckwheat. (Chem) Insecticidal soap; neem oil; botanical insecticides.
Squash Bugs - Grayish-brown, shield-shaped insects cause yellow spots that turn brown on leaves, yellowing leaf edges, and sudden plant collapse and death. Look for clusters of red oblong eggs under leaves and flush adults out of hiding by watering near base of cucurbit plants.	(Cul) Throw away vines and unripened squash immediately after harvest; remove nearby debris piles where the bugs hide for the winter; plant more resistant varieties such as butternut squash. (Phys) Hand-pick eggs, nymphs, and adults; row covers/netting. (Bio) Interplant buckwheat and phacelia to attract predators. (Chem) No effective chemical options exist!
Sunscald - Abiotic disorder with white, yellow, or brown patches on the side of fruit exposed to sun, typically with tomatoes, peppers and cucurbits.	(Cul) Promote dense foliage by minimizing pruning and leaf/vine breakage; provide trellising for crops with heavy fruit load; cover with 30% shade cloth - timing of application varies by crop; choose resistant cultivars.
Thrips - Tiny slender insects with fringed wings that cause stippling, discolored flecking, or silverying of the leaf surface, and can also spread diseases. Commonly found on onions and legumes, but can occur on other crops.	(Cul) Remove or destroy volunteer onion plants and debris; limit nitrogen applications; plant tolerant varieties; mulch with straw or other materials. (Phys) Spray off with water; row covers or netting. (Bio) Fennel, dill, and cilantro attract predators like predatory mites and minute pirate bugs.
Tomato Blossom-End Rot - While calcium is abundant in Utah's lime-based soils, this physiological disorder is due to a shortage of bio-available calcium, resulting in leathery, beige or black lesions on the end of the fruit.	(Cul) Ensure roots have access to soil calcium by avoiding drought stress and irregular irrigation; apply mulch to maintain soil moisture; plant resistant varieties; it may be beneficial to apply calcium in forms that are bio-available such as liquid calcium chloride, but too much can harm soils.
Tomato Fungal and Viral Diseases Early Blight - Brown spots with concentric rings, and a yellow margin on mature lower leaves. Curly Top - Young leaves show upward curling, often leading to yellowing, crisping, severe stunting and death.	(Cul) Plant resistant varieties; remove and dispose of infected plants; avoid overhead irrigation and excessive nitrogen applications. (Phys) Use row covers before plants become infected in the spring by the beet leafhopper that carries Curly Top virus; shading with 30% shade cloth may be effective for Curly Top as leafhoppers prefer full sun conditions.
Whiteflies - Tiny white insects feed on the underside of leaves, causing yellowing and weakening of plants. Most common on brassicas, but can occur on many crops.	(Cul) Remove infested leaves or plants. (Phys) Vacuum; spray with strong stream of water; repel by applying shiny metallic-coated paper at the base of seedlings. (Bio) Attract ladybugs and lacewings with coreopsis, cosmos, sunflowers and buckwheat. (Chem) Insecticidal soap; neem oil.