

Common Diseases in the Home Garden

Parasitic diseases and nonparasitic disorders can cause serious vegetable losses in home gardens. Many species of microorganisms — including fungi, bacteria, viruses, phytoplasmas and nematodes — cause diseases of vegetable crops. For disease to occur, plant pathogens must come in contact with a susceptible host plant. Pathogens can be carried to the plants by various means, including wind, water, insects, infested seed, transplants, soil, animals and humans, alone or in combination. Favorable environmental conditions must be present for the plant pathogen to infect and thrive on the plants.

Many plant disorders can be caused by abiotic (non-living) issues, including temperature and moisture stresses, nutrient deficiencies or excesses, wind damage, herbicide injury or quick and drastic changes in environment. These nonparasitic problems are stresses on the plant and can make the plant more susceptible to diseases. Effective control depends on differentiating between abiotic or biotic (living) causes of plant problems. Many times it is a combination of both.

Insects often transmit diseases by carrying viruses, phytoplasmas and certain bacteria, such as those causing Stewart's wilt of corn and bacterial wilt of cucumbers and squash. Weeds in and around the garden also can harbor insects that spread disease or the plant pathogens.

Prevention is the best approach to managing plant diseases in the home garden, but sometimes diseases occur despite the best efforts at prevention. For some plants, disease-resistant varieties are available to prevent or reduce the impact of some common diseases (see MU Extension publication G6202, *Disease Prevention in Home Vegetable Gardens*).

Chemicals are seldom needed and often are not economical for use in the home garden. By following disease prevention practices, or cultural controls, many issues can be resolved without the use of chemicals. In this publication, chemicals are listed by active ingredient. These

products may be sold under various names. Look at the ingredients to identify the correct product for use. Read and follow the directions on the product label. Fungicide labels may change and recommendations may become invalid.

Plants from the same family often are susceptible to the same diseases. Therefore, one could expect a disease that attacks many members of the same family to spread through the garden if plants from the same family are planted close to each other and no steps are taken to prevent the disease or to manage it once it appears. Examples of plants by family are as follows:

- Cabbage family: broccoli, Brussels sprouts, cabbage, cauliflower, Chinese cabbage, mustard greens, kohlrabi, radish, rutabaga and turnip
- Cucumber family: cucumber, cantaloupe, gourds, muskmelon, pumpkin, squash and watermelon
- Potato family: eggplant, pepper, potato and tomato
- Beet family: table beet and spinach
- Bean family: beans and peas
- Carrot family: carrot, celery and parsnip
- Onion family: chive, garlic, leek, onion and shallot

Sometimes diseases and disorders can be difficult to identify. Without proper identification of plant damage, it is not possible to determine what measures, if any, can be used to help correct or prevent the problem. In difficult cases, to ensure that a problem is properly identified and proper control measures are taken, you can take a sample to your local MU Extension center or submit it to:

University of Missouri Plant Diagnostic Clinic
28 Mumford Hall
University of Missouri
Columbia, MO 65211
Phone: 573-882-3019
Website: <http://plantclinic.missouri.edu>

The following table describes some of the common diseases of garden vegetables and suggests prevention methods and chemicals available for controlling them.

Table 1. Management options for common diseases in the home garden.

VEGETABLE Disease and symptoms	Cultural controls		Chemical options
	Before planting	During season	
ASPARAGUS			
Crown rot (fungus) — weak, spindly spears in spring. Severely infected crowns may turn a brilliant yellow and show vascular discoloration. Feeder roots frequently are rotted.	Plant healthy crowns in well-drained soil or raised beds.	Minimize plant stress. Avoid mechanical injury. Sanitation ¹	
Rust (fungus) — elongated orange-red, reddish-brown or black pustules on leaves and stems. Rust fungus overwinters on leaves and stems.	Do not crowd plants. Remove volunteer plants.	Remove ferns in the fall. Limit overhead watering.	Mancozeb Chlorothalonil Wettable sulfur applied after harvest
Anthraxnose (fungus) — small angular lesions on leaves; lower veins turn black; portions of leaves may wither and turn brown. Tiny brown spots on pods that later enlarge, become sunken and darkened with brown to purplish borders. In moist weather, pink sticky spore masses may be produced.	Sanitation ¹ Use disease-free seed. Rotate crops.	Do not work when plants are wet. Limit overhead watering. Water in morning.	Chlorothalonil ²
BEAN FAMILY — dry, lima, snap, peas			
Common blight (bacterium) — water-soaked spots on leaves. Areas surrounding spots may become yellowish, brown and brittle. Pods have small watery spots that enlarge to irregular blotches. Blotches later become brown, sunken and dry.	Use disease-free seed. Rotate crops.	Do not work when plants are wet. Limit overhead watering. Water in morning.	Copper hydroxide
Rust (fungus) — small red to reddish-brown pustules on undersides of leaves; sometimes on pods. Most serious on pole beans.	Sanitation ¹ Do not crowd plants.	Limit overhead watering. Water in morning.	Chlorothalonil ² Wettable sulfur
Seed decay and damping off (fungus) — Preemergence and postemergence damping off, root rots and stem rots.	Use treated seed. Plant in warm, well-drained soil. Sanitation ¹	Sanitation ¹	
Viruses (bean common mosaic, bean yellow mosaic, cucumber mosaic) — symptoms vary with viruses and varieties, but leaves may have irregular light-green areas merging with dark-green patches. Leaf puckering or curling. Whole plants may be stunted, dwarfed and sickly yellow.	Plant certified seed.	Sanitation ¹ Control insect vectors such as aphids and bean leaf beetle. See MU Extension publication M163, <i>Managing Insect Pests in the Home Vegetable Garden</i> . Control weeds.	
CABBAGE FAMILY — broccoli, Brussels sprout, cabbage, cauliflower, collard, kale, kohlrabi, mustard greens, radish, rutabaga, turnip			
Black leg (fungus) — pale spots appear on leaves; later turn ashen gray with tiny black specks. Spots on stems, dark, sunken, circular to irregular with purple borders. Roots decay. Plants may topple over or wilt and die.	Use four-year rotation between similar crops. Use disease-free seed and transplants. Tillage to bury crop residue.	Sanitation ¹	
Black rot (bacterium) — leaf margins yellow with V-shaped patterns. Dwarfed or one-sided plants with yellow to brown leaves. Discoloration in vascular rings of stems	Use four-year rotation between similar crops. Use heat-treated seed (122 degrees F for 20 minutes) and disease-free transplants.	Limit overhead watering.	Copper hydroxide
Yellows (Fusarium wilt) (fungus) — foliage takes on lifeless, yellow-green color and curls. Lower leaves turn yellow first, then brown and brittle. Vascular tissues in stem become yellow to dark brown.	Sanitation ¹ Plant resistant varieties. Use a 6 year crop rotation. Use disease-free seed.	Sanitation ¹	
CARROT and PARSNIP			
Root-knot nematodes — plants stunted and appear deficient in nutrients and water. Small to large galls on roots. Southern root-knot nematode is native in Missouri south of Interstate 70 but can be introduced on southern transplants and is the most damaging root-knot species. See MU Extension publication G6204, <i>Managing Nematodes in Gardens</i> , for more information	Relocate garden. Solarize soil. Apply ClandoSan if significant galling is found in roots the previous year and relocation of garden is not possible.	Sanitation ¹	
Leaf spot (<i>Alternaria</i> or <i>Cercospora</i>) (fungus) — Water-soaked angular spots on foliage eventually result in general yellowing and browning of the foliage.	Rotation between similar crops. Tillage to bury crop residue.	Limit overhead watering.	Chlorothalonil Copper hydroxide
Aster yellows (phytoplasma) — plants stunted, yellowing leaves, multiple shoots from crown, roots with off color and flavor.		Sanitation ¹ Control leafhoppers. Control weeds.	

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	Before planting	During season	
Common smut (fungus) — silver swellings or galls on leaves, ears, tassels or stems enlarge and turn black, breaking open to expose masses of black spores.	Rotate crops. Avoid use of smut-contaminated manure.	Sanitation — Remove smut galls before they break. Avoid mechanical injury.	
CORN, SWEET			
Northern or Southern leaf blight (fungus) — grayish-green to tan oval lesions on leaves.	Rotate crops.		Mancozeb Chlorothalonil
Rust (fungus) — red to brown pustules erupting on upper leaf surface and or stalks.			Mancozeb Chlorothalonil
Goss's wilt (bacterium) — long, wavy lesions that turn brown and dry. Dark freckles appear on older lesions. Leaf blight or vascular wilt. Newly confirmed in Missouri in 2014.	Use disease-free seed.	Avoid overhead irrigation.	
Stewart's wilt (bacterium) — stunting and wilting plants. Long, pale green to yellow streaks in leaves turn brown and dry. This disease is transmitted by flea beetles.	Use disease-free seed.	Control flea beetles. See MU Extension publication M163, <i>Managing Insect Pests in the Home Vegetable Garden</i> .	
CUCUMBER FAMILY — cucumber, gourds, melons, pumpkin, squash			
Alternaria leaf blight (fungus) — Yellow lesions expand to dark brown necrotic (dead) areas. Eventually causes leaf death.	Rotate crops.		Chlorothalonil Maneb
Angular leaf spot (bacterium) — small, water-soaked spots on leaves become tan on upper surface and gummy or shiny on lower surface. Spots take angular shapes up to one-eighth of an inch. Later dry and drop off.	Use treated seed. Avoid excessive nitrogen. Plant resistant varieties. Rotate crops. Tillage to bury crop residue.	Limit overhead irrigation and working among wet plants.	Copper hydroxide Mancozeb ³
Anthrachnose (fungus) — brown-colored leaf spots. Elongated sunken cankers on stems. Sunken circular cankers with pink centers and brown margins on fruit.	Use treated seed. Plant resistant varieties. Rotate like crops. Tillage to bury crop residue.	Limit overhead irrigation. Avoid working among wet plants.	Copper hydroxide Maneb Chlorothalonil Mancozeb ³
Bacterial wilt — plants wilt and die. This disease is transmitted by cucumber beetles. When stems are cut, bacterial ooze strings between the cut stems.	Improve soil drainage. Floating row covers up to flowering.	Control striped and spotted cucumber beetles. See MU Extension publication M163, <i>Managing Insect Pests in the Home Vegetable Garden</i> . Sanitation ¹	Kaolin clay (prevent insect feeding)
Downy mildew (fungus) — yellowish angular spots on upper leaf surface. White to purplish downy growth on lower leaf surfaces. Leaves may curl, turn brown and die.	Plant resistant varieties.	Limit overhead irrigation.	Maneb Chlorothalonil Mancozeb ³
Fusarium wilt (fungus) — vines turn yellow and wilt around fruiting time. Vascular tissues of stems appear discolored and may ooze sap. This disease is more prevalent in muskmelons and watermelons.	Use a three-year rotation. Plant resistant varieties.	Sanitation ¹	
Gummy stem blight (fungus) — plants wilt. Water-soaked lesions on leaves and stems turn dark brown. Cankers girdle stems. Cankers have brown, sticky exudate.	Rotate crops. Use disease-free seed.		Maneb Chlorothalonil Mancozeb ³
Powdery mildew (fungus) — yellow or brown spots on upper side of leaves, underside is covered with white, powdery fungal structures.	Rotate crops. Tillage to bury crop residue.	Limit overhead irrigation.	
Viruses (cucumber mosaic, watermelon mosaic, squash mosaic virus) — stunted plants with yellow and green mottling of leaves. Leaves distorted. Fruit mottled, misshapen, warty.	Plant resistant varieties.	Sanitation ¹ Control cucumber beetles and aphids. See MU Extension publication M163, <i>Managing Insect Pests in the Home Vegetable Garden</i> . Control weeds.	
LEAFY VEGETABLES — lettuce, spinach			
Aster yellows (phytoplasma) — stunted yellow plants, leaves small and thickened.		Control weeds. Control leafhoppers. Sanitation ¹	
Drop (fungus) — starts as soft water-soaked spots on stem or near soil surface and spreads up and down. White cottony mass with embedded brown to black bodies (sclerotia) on stems.	Plant in well-drained soil. Rotate crops. Avoid ground where cabbage or celery has been grown.	Sanitation ¹	

VEGETABLE Disease and symptoms	Cultural controls		Chemical options
	Before planting	During season	
Damping off and root rot (fungus) — seed and seedlings can be attacked before emergence. Postemergence damping off symptoms consist of stunting, yellowing, poor growth, collapse and death.	Well-drained soil. Fungicide seed treatment.	Sanitation ¹	
White rust (fungus) – white pustules on undersides of leaves that produce chlorotic areas on upper leaf surface.	Sanitation ¹ Rotate crops.	Destroy weeds that harbor rust.	
ONION FAMILY — onion, garlic, leek			
Downy mildew (fungus) — spots begin as light areas in leaf margins. Whitish mold develops on undersides of leaves. Plants become dwarfed and yellowish.	Plant healthy sets. Use a three-year rotation.		Maneb Mancozeb
Fusarium basal rot (fungus) — plants wilt and die. Roots have dark-colored rot, fungus invades bulb to cause rot. Under moist conditions white mold may develop between seals. Under dry conditions, roots may dry and shrivel.	Plant in well-drained soil. Rotate crops.	Allow tops to dry before harvest. Sanitation ¹	
Neck rot (fungus) — exhibits sunken, dry lesions around the neck. Inside the bulb may be soft, light-brown with gray powdery-looking mold. A postharvest disease.		Allow tops to dry before harvest. Store harvested bulbs in well-ventilated, cool, dry place.	Mancozeb
Soft rots (bacterium) — begins as onions approach maturity. Wet, slimy and foul-smelling rots from neck area down into scale.		Allow onions to mature before harvest. Harvest promptly.	
PEPPER			
Anthracnose (fungus) — tan or gray sunken lesions with pink dots on fruit; dark green margins, water-soaked and wrinkled leaves and fruit.	Rotate crops. Tillage to bury crop residue.	Limit overhead irrigation. Control weeds.	Maneb
Bacterial spot (bacterium) — irregular water-soaked spots on leaves. Leaves develop a ragged appearance, yellow and drop. Small, brown, raised scabs on fruit.	Use healthy seed or transplants. Plant resistant varieties. Rotate crops. Tillage to bury crop residue.	Limit overhead irrigation.	Copper hydroxide
Blossom-end rot (physiological problem) — fruit becomes water-soaked near blossom end. Tissues collapse and dry out rapidly, leaving whitish papery area. Secondary fungi may invade, turning this area black.	Maintain proper balance of calcium in soil.	Water evenly. Keep plants mulched.	
Phytophthora blight/root and crown rot (fungus) — water-soaked black lesions on stems, leaves, and roots. Rest of foliage wilts and dies. Fruit infection results in rotted fruit.	Well-drained soil. Plant resistant varieties. Rotate crops.	Sanitation ¹	
Viruses (tobacco mosaic, cucumber mosaic) — yellow mottling or streaking of leaves, distortion and dwarfing.		Sanitation ¹ Control insect vectors. See MU Extension publication M163, <i>Managing Insect Pests in the Home Vegetable Garden</i> . Control weeds.	
POTATO			
Early blight (fungus) — dark brown spots on leaves, starting with lower leaves. Spots become leathery with concentric rings, or “targets.”	Use well-drained soil. Sanitation ¹ Rotate crops. Tillage to bury crop residue.	Reduce plant stress. Use balanced fertilizer. Limit overhead watering.	Chlorothalonil Mancozeb Maneb
Late blight (fungus) — large water-soaked, brown, irregular spots on leaves, petioles and stems. Undersides of leaves develop white to gray mold under moist, humid conditions. Tuber infections and rots can occur.	Use healthy seed tubers. Sanitation ¹	Limit overhead watering.	Chlorothalonil Maneb Mancozeb
Rhizoctonia (fungus) — poor stands result from killing of young sprouts. Cankers on stems at ground line cause stunting, rosetting and purpling leaves. Tubers have raised, hard black patches of varying sizes and shapes on their skins, or black scurf.	Use healthy seed tubers. Plant in warm soil.	Sanitation ¹	

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	Before planting	During season	
Scab (bacterium) — rough, raised or pitted corky area randomly across tuber surface. Do not confuse with enlarged lenticels.	Plant healthy seed tubers. Maintain soil pH at 5.2 or lower. Avoid lime applications and manure in the spring. Plant resistant varieties. Rotate crops.	Sanitation ¹	
Wilt (<i>Fusarium</i> , <i>Verticillium</i>) (fungus) — vines turn yellow, wilt and die, often branch by branch. Vascular tissues may be discolored.	Use healthy seed tubers. Rotate crops.	Sanitation ¹	
Virus (potato leafroll, potato virus Y) — leaves mottled with light green and dark green areas. Curled or wrinkled leaves. Plants dwarfed or distorted.	Use healthy seed tubers.	Sanitation ¹ Control aphids and leafhoppers. See MU Extension publication M163, <i>Managing Insect Pests in the Home Vegetable Garden</i> .	
RHUBARB			
Ascochyta leaf spot (fungus) — many small, greenish-yellow areas on upper leaf surface. When spots unite, they give the appearance of mosaic mottling. Invaded tissues turn brown and die, leaving spots with white centers surrounded by a red zone or gray-green zones. Centers of holes may drop out.	Sanitation ¹	Limit overhead irrigation.	
Crown rot (several fungi) — lesions develop at the bases of stalks of the lower leaves and may cause the sudden collapse of entire leaves. The crowns may be firm, but they will have brown to black tissues in lower stems. Secondary organisms cause continued disintegration that can kill the plant.	Plant in well-drained soil or raised beds. Avoid planting too deeply.		
SWEET POTATO			
Black rot (fungus) — Yellow, sickly foliage. Black cankers on portions of stems below ground. On the fleshy roots, circular gray-black depressed spots occur, accompanied by a shallow dry decay. Bitter taste.	Use healthy seed potatoes. Rotate crops. Rotate planting beds.	Cure roots after harvest.	
Internal cork (virus) — dark brown to blackish, hard, corky spots develop in sweet potato roots. They increase in size and number the longer they are held in storage. Insects may aid in transmission. See MU Extension publication M163, <i>Managing Insect Pests in the Home Vegetable Garden</i> .	Use healthy seed potatoes.	Sanitation ¹	
Scurf (fungus) — superficial dark brown irregular discoloration on roots. Roots shrink rapidly in storage due to water loss.	Rotate beds. Use healthy seed potatoes. Cut slips above soil line.	Sanitation ¹	
Soft rot (bacterium) — soft, watery rots progress rapidly in fleshy tissues. Skin breaks. A gray mold growth may appear, giving a whiskery effect.	Rotate beds.	Sanitation ¹ Avoid chilling plants.	
Soil rot (fungus) — small, dark lesions appear on stems below soil line. Leaves are small, stems stunted. Fleshy roots show water-soaked lesions on the surface, develop into pits of various sizes with irregular jagged margins, or edges.	Plant in soil with pH below 6.0. Rotate beds. Use healthy seed potatoes.	Sanitation ¹	
TOMATO			
Anthraxnose (fungus) — infections begin on green fruit; symptoms most apparent when ripe. Small, water-soaked, slightly sunken circular spots on fruit.	Sanitation ¹ Rotate crops.	Limit overhead irrigation. Stake and space to improve air circulation. Control weeds.	Chlorothalonil Maneb Mancozeb
Bacterial spot (bacterium) — small, angular greasy spots on leaves and stems. Raised, crusty spots on fruit.	Use fungicide-treated seed. Plant healthy seedlings. Rotate crops.	Limit overhead irrigation. Sanitation ¹ Sterilize stakes.	Copper hydroxide
Blossom-end rot (physiological disorder) — water-soaked spots on blossom end of green or ripening fruit (may not be noticed until fruit is ripe). Spots enlarge and become slightly depressed. Spots turn black and rot due to secondary fungi.	Maintain adequate calcium level by liming if soil test indicates low calcium.	Maintain an even soil-moisture level. Use mulches to retain moisture. Do not oversupply nitrogen.	

VEGETABLE Disease and symptoms	Cultural controls		Chemical options
	Before planting	During season	
Early blight (fungus) — dark-brown circular spots with concentric rings, or “targets,” on leaves. Tissues around spots become yellow. When spots are numerous, leaves wither and dry up.	Use healthy plants. Rotate crops.	Limit overhead irrigation. Sterilize stakes. Stake and space to improve air circulation. Water in morning. Mulch	Chlorothalonil Maneb Mancozeb
Fusarium wilt (fungus) — lower leaves yellow and dry. Leaves roll up and wilt during hot part of day. Inner stem tissues have dark discoloration.	Use healthy transplants. Plant resistant varieties. Rotate crops.	Sanitation ¹	
Herbicide injury (nonparasitic) — growing tips curl; leaves distort. Veins close together in a parallel fashion. Can be confused with virus infections.	Be careful using herbicides in or around the garden, especially growth regulators such as 2,4-D. Some lawn fertilizers also contain herbicides; check the bag before spreading lawn fertilizer on the garden.	Do not mulch with: <ul style="list-style-type: none"> • Herbicide-treated lawn clippings. • Manure from animals fed forage treated with herbicides • Straw of grasses treated with herbicides • Compost containing any of the above materials. 	
Seed decay and damping off (several fungi) — preemergence death of seed and postemergence death of seedlings.	Use fungicide-treated seed.	Sanitation ¹	
Septoria leaf spot (fungus) — small, roughly circular spots with dark-brown borders and gray centers on leaves. Leaves may die and drop off if heavily infected.	Use healthy transplants Rotate crops.	Limit overhead irrigation. Water in morning. Mulch Stake and space to improve air circulation.	Chlorothalonil Maneb Mancozeb
Viruses: (tobacco mosaic, cucumber mosaic, tobacco streak) — causes mottling with light- and dark-green areas in leaves. Leaf blades may be distorted and fernlike.	Use healthy transplants. Plant resistant varieties.	Avoid tobacco while working with young plants. Wash hands with soapy water before handling plants. Control weeds that can harbor viruses. Control insect vectors. See MU Extension publication M163, <i>Managing Insect Pests in the Home Vegetable Garden</i> . Sanitation ¹	
Root-knot nematodes — plants stunted and appear deficient in nutrients and water. Small to large galls on roots. Southern root-knot nematode is native in Missouri south of Interstate 70 but can be introduced on southern transplants and is the most damaging root-knot species. See MU Extension publication G6204, <i>Managing Nematodes in Gardens</i> , for more information.	Relocate garden. Solarize soil. Use healthy transplants Apply ClondoSan if significant galling is found in roots the previous year and relocation of garden is not possible.	Sanitation ¹	

Notes

1. Sanitation includes removing plant debris from the garden, whether it originates in the current growing season or the previous year. Remove affected plants from the garden and destroy them so that they do not act as a source of disease-causing microorganisms. Discard any plant, transplant or seed piece that does not look healthy. Diseased plants should not be added to home compost piles; the temperature reached in most home compost piles is not high enough to kill plant pathogens.
2. Chlorothalonil is not labeled for all crops in the bean family.
3. Mancozeb is not labeled for all cucurbit crops.

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ALSO FROM MU EXTENSION PUBLICATIONS

- G6202 *Disease Prevention in Home Vegetable Gardens*
G6204 *Managing Nematodes in Gardens*
M163 *Managing Insect Pests in the Home Vegetable Garden*

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