

Descriptions of Common Disease Problems and Management Tactics of Woody Ornamentals

Disease and Description

Management Strategies

Ash (*Fraxinus*)

Anthracnose (fungal)

Symptoms: Large brown lesions on leaves and premature leaf drop. Defoliated branches often produce new leaves by mid-summer. White ash is more susceptible to anthracnose than green ash.

Rake and compost, or destroy, leaves. For valuable specimen trees that have a history of anthracnose, apply a fungicide spray when buds begin to open. Repeat at 10 to 14-day intervals.

Azalea (*Rhododendron*)

Phomopsis Canker (fungal)

Symptoms: Individual branches wilt and die.

Prune out diseased branches. Irrigate and fertilize to stimulate vigorous growth.

Phytophthora Root Rot (fungal)

Symptoms: Plants may wilt rapidly, even with adequate soil moisture. Diseased roots are dark reddish-brown. May spread rapidly in nurseries with poor sanitation. Root rot may be more severe in poorly drained clay soils.

Buy disease free plants. Plant in well-drained soils. If planting in areas where water stands or in poorly drained soils, use raised beds. Soil can be amended with 4 inches of pine bark to improve drainage. Do not irrigate excessively. Azalea cultivars resistant to root rot include *Rhododendron yedoense* var. *poukhanense*, Glenn Dale hybrids: Fakir, Glacier, Merlin and Polar Seas; Back Acre hybrids: Corrine Murrah and Rachel Cunningham; Pericat hybrids: Hapton Beauty and Sweetheart Supreme; Satsuki hybrids: Higasa, Eikan, Shinkigen and Pink Gumpo; Gable hybrid: Rose Greeley; Rutherfordiana hybrid: Alaska; Kurume hybrid: Morning Glow; and Carla hybrids: Fred D. Cochran and Jan Cochran.

Powdery Mildew (fungal)

Symptoms: White powdery spots appear on leaves. The entire leaf surface may be covered. Deciduous azaleas are most susceptible.

Spray with fungicide at the first sign of disease. Repeat at 10 to 14-day intervals.

Flower and Leaf Gall (fungal)

Symptoms: Leaves and flowers may develop fleshy pale green, or whitish, galls.

Remove and destroy galls.

Boxwood (*Buxus*)

Volutella Canker (fungal)

Symptoms: Plants may develop irregular, brownish and sometimes concentric lesions on leaves. Brownish cankers also develop. Plants may wilt and then die.

Remove diseased branches. Apply first fungicide spray after branch removal in spring; second after new growth is 1/2 expanded; third after growth is completed; fourth in the fall.

Phytophthora Root Rot (fungal)

Symptoms: Individual or multiple branches may turn yellow then brown. Roots are discolored and decayed.

Apply fungicide as a drench to containers or beds. Use enough to saturate the soil mixture. Plant in well-drained sites and avoid planting in poorly drained clay soils.

Macrophoma Leaf Spot (fungal)

Symptoms: Straw colored leaves are covered with black fruiting bodies. Symptoms may indicate root or stem injury. This disease is most visible in the early spring.

This fungus frequently colonizes dead or injured leaves. No control methods are needed. Remove dead leaves for aesthetic value.

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Nematodes

Symptoms: Yellowing and bronzing followed by thinning foliage. Leaf size is reduced, growth is retarded and defoliation may follow.

Purchase nematode free plants. Irrigate during periods of drought. Avoid planting in soils infested with lesion nematodes.

Buckeye (*Aesculus*)

Anthracnose, Leaf Blotch (fungal)

Symptoms: Large areas of necrotic tissue develop on leaves and complete defoliation may occur. Blotch is most severe on Ohio buckeye and common horse chestnut. Red and yellow buckeye may also be infected.

Spray with fungicide at bud break and at 7 to 14-day intervals during cool, moist weather. On mature landscape trees, this disease usually develops after annual growth is complete and may not influence the tree's growth.

Cotoneaster

Fire Blight (bacterial)

Symptoms: Leaves and branches turn dark brown to black.

Spray with pesticide at early bloom and repeat at 5- to 7-day intervals during bloom. Best control is obtained from spraying at night. Prune out infected branches and disinfect shears between cuts.

Crabapple (*Malus*)

Cedar Apple Rust (fungal)

Symptoms: Yellow leaf spots develop on leaves and fruit.

Spray with fungicide as new growth appears and flower buds open. Repeat three to four times at 7- to 14-day intervals. See disease resistant cultivars listed under scab management strategies.

Fire Blight (bacterial)

Symptoms: Young twigs and branches are killed. Disease foliage turns dark brown with a distinctive "shepherds crook" at the tip.

Spray with an antibiotic or copper spray when 20 percent of the blossoms are open and repeat at 5- to 7-day intervals during bloom; then apply weekly for 5 to 6 weeks. Prune out diseased branches. Disinfect shears between cuts. See disease resistant cultivars listed under scab management strategies.

Powdery Mildew (fungal)

Symptoms: White powdery spots appear on leaves. New growth may be distorted.

Spray with fungicide when disease first appears and repeat at 14-day intervals. See disease resistant cultivars listed under scab management strategies.

Scab (fungal)

Symptoms: Olive-brown lesions develop on leaves and fruit. Leaves turn yellow and severe defoliation may occur.

Spray with a fungicide at green tip. Repeat four more times at 7- to 14-day intervals. Disease resistant crabapple cultivars include Adams, Adirondack, Baskatong, Bob White, Centurion, David, Donald Wyman, Indian Summer, Jackii, Jewelberry, Liset, Louisa, Molten Lava, Narragansett, Ormiston Roy, Prairifire, Professor Sprenger, Sargent, Sentinel, Silver Moon, Sugar Tyme, Tina, and White Cascade.

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Powdery Mildew (fungal)

Symptoms: White powdery spots appear on leaves. New growth may be severely distorted.

Spray with fungicide at the first sign of disease. Repeat two to three times at 10- to 14-day intervals. Resistant cultivars of crape myrtle include Acoma, Apalachee, Basham's Party Pink, Biloxi, Byers Standard Red, Byers Wonderful White, Caddo, Catawba, Centennial, Centennial Spirit, Cherokee, Choctaw, Comanche, Fantasy, Glendora White, Hardy Lavender, Hope, Hopi, Lipan, Miami, Muskogee, Natchez, Near East, Osage, Pecos, Powhatan, Regal Red, Sarah's Favorite, Seminole, Sioux, Tonto, Tuscarora, Tuskegee, Velma's Royal Delight, Victor, Wichita, William Toovey and Yuma.

Sooty Mold (fungal)

Symptoms: Black fungal growth on leaves and stems. Sooty mold may interfere with photosynthesis by blocking out the sun.

Sooty mold grows on insect excrement (honeydew) deposited by aphids or scale insects. Monitor insect populations and treat insecticide. Check the label for application frequency.

Dogwood (*Cornus*)

Spot Anthracnose (fungal)

Symptoms: Small, circular lesions (1/16") develop on flower bracts and leaves.

Fungicide should be applied when bracts begin to open, when bracts have fallen and in the fall when flower buds have formed. Resistant cultivars of dogwood include Pinea, Cherokee Princess, First Lady, Spring Time, Fragrant Cloud, and Purple Glory.

Dogwood Anthracnose (fungal)

Symptoms: Large lesions develop on leaves in the late spring. Lower branches are killed. Cankers form on trunk that may kill tree.

Apply fungicide at bud break and repeat at 2-week intervals in areas with moderate to severe damage throughout growing season. Remove dead branches. Remove water sprouts in fall. Plant trees in sunny areas with good air movement. Buy trees from reputable nurseries. Do not remove trees from the wild. Some cultivars of dogwood are resistant to anthracnose.

Powdery Mildew (fungal)

Symptoms: White powdery leaf spots develop on leaves. Sometimes, the entire leaf surface may be covered. Leaves may turn red in response to infection. Young growth may be distorted.

Spray with fungicide at first sign of disease and repeat two to three times at 14-day intervals. *Cornus florida* Cherokee Brave, and *C. kousa* Milky Way Select are resistant to mildew. *C. florida* X *C. kousa* crosses, Aurora, Constellation, Galaxy and Stellar Pink are resistant to powdery mildew.

Dogwood Canker (unknown)

Symptoms: Areas of swollen or sunken cankers develop on the trunks of affected trees. Cracked bark develops on cankers.

The cause of dogwood canker is unknown. Control measures have not been developed. *Cornus florida* Purple Glory appears to be highly susceptible. *C. kousa* is resistant to canker. Trees with canker are very susceptible to damage by the dogwood borer.

Euonymus

Powdery Mildew (fungal)

Symptoms: White leaf spots appear on leaves. Sometimes the entire leaf surface may be covered. *Euonymus japonicus* and *E. kiautschovicus* are very susceptible to mildew.

Spray with fungicide when disease first appears. Repeat two to three times at 14-day intervals.

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Crown Gall (bacterial)

Symptoms: Tumor-like growths appear on stems or roots. Young trees or shrubs may be stunted or killed. Older established plants are rarely killed.

Buy disease free plants. Bacteria can be spread via infected plants, infested soil, pots, tools, insects and irrigation water. Do not replant susceptible plants. Galls may be removed by pruning. Disinfect shears between cuts. Prune when foliage is dry.

Hawthorne (*Crataegus*)

Cedar-Hawthorne Rust (fungal)

Symptoms: Orange spots appear on leaves and swollen fruit and cankers develop on young shoots.

Spray with fungicide as new growth appears, three to four times at 7- to 10-day intervals. *Crataegus X lavalleyi* appears to be resistant to cedar hawthorne rust. *Crataegus crugalli* appears to be highly susceptible to cedar hawthorne rust.

Fire Blight (bacterial)

Symptoms: Infected leaves and shoots turn black. "Shepherd's crook" symptoms, when the terminal end of the shoot is hooked, may also be present.

Spray with an antibiotic copper fungicide when 20 percent of blossoms are open and repeat at 5- to 7- day intervals during bloom. Then apply weekly for 5 to 6 weeks. The best control is obtained from spraying at night. Prune out diseased branches. Disinfect shears between cuts.

Holly (*Ilex*)

Black Root Rot (fungal)

Symptoms: Blue, English and Japanese holly may appear stunted, yellowed and may die. Roots are dark brown or black and decayed. Diseased plants are particularly susceptible to drought stress.

Buy disease free plants. Do not replant with susceptible *Ilex* sp.

Leaf Spots (fungal)

Symptoms: Many fungi cause brown spots on leaves. Older leaves are often affected.

Spray with fungicide at bud break and continue at 7-day intervals during cool, wet weather.

Ivy, English (*Hedera*)

Anthracnose (fungal)

Symptoms: Brown leaf spots develop on leaves. Diseased tissue may fall out of spots. Often found on weakened, stressed plant material.

Spray foliage with fungicide to protect new growth at 7- day intervals.

Bacterial Leaf Spot (bacterial)

Symptoms: Irregular, brown, water soaked spots develop on leaves. Lesions may extend into petioles and cause leaf death. May be severe under overhead irrigation.

Reduce overhead watering.

Juniper (*Juniperus*)

Phomopsis Blight (fungal)

Symptoms: Young twigs die-back. They change from light yellow to ash gray as they die.

Spray new growth with fungicide as it appears. Repeat at 7- to 10-day intervals until new growth has matured. Resistant junipers include *Juniperus chinensis* : *Foeninia*, *Iowa*, *Keteleeri*, *Pfitzeriana Aurea*, *Robusta*, *Sargentii*, *Glauca* and *Shoosmith*; *Juniperus communis* : *Ashfordii*, *Auro-spica*, *Depressa*, *Hulkjaerhus*, *Prostrata Aurea*, *Repanda*, *Saxatilis*, and '*Suecica*'; *Juniperus sabina* : *Arcadia*, *Broadmoor*, *Knap Hill*, *Pepin*, *Skandia* and *Von Ehren*; *Juniperus Virginia*: *Tripartita*.

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Phytophthora Root Rot (fungal)

Symptoms: Needles and branches turn yellow then brown. Roots are discolored and decayed. Often mistaken for a foliar blight if the roots are not examined.

Buy disease free plants. Plant in well-drained beds. Do not irrigate excessively. Use raised beds if planting into poorly drained soils.

Laurel Mountain (*Kalmia*)

Cercospora Leaf Spot (fungal)

Symptoms: Circular gray to light brown spots develop on leaves. Severe infection may retard growth and suppress flowering.

Spray with fungicide at bud break and repeat at 7- to 14-day intervals. Remove diseased foliage. Rake and remove fallen leaves.

Laurel, Cherry or English (*Prunus*)

Bacterial Leaf Spot (bacterial)

Symptoms: Brown leaf spots develop and tissue falls from spots forming "shot hole" type symptoms -the centers of the leaf spots fall out, creating a shot hole effect. Defoliation may occur.

Spray with fungicide at bud break and repeat at 7- to 14-day intervals. However, this interval may need to be shortened during wet weather. Space plants to allow for air movement. Use drip irrigation if possible. This will help keep foliage dry.

Leucothoe

Cercospora Leaf Spot (fungal)

Symptoms: Gray spots with purple margins. Leaf spots may be severe, resulting in severe defoliation and death.

For severely diseased plantings, prune out diseased foliage in late winter/early spring and spray with fungicide at bud break and at 10 to 14-day intervals during wet weather.

Powdery Mildew (fungal)

Symptoms: White powdery spots appear on leaves. The entire leaf surface may be covered. Severe infections may cause stunted growth.

Spray with fungicide at the first sign of disease. Repeat at 10 to 14-day intervals.

Lilac (*Syringa*)

Bacterial Blight (bacterial)

Resembles fire blight of apples and pears. Young shoots are killed and blackened. Usually occurs during cool, moist weather.

Prune out diseased shoots when foliage is dry. Disinfect shears between cuts. Avoid use of high nitrogen fertilizers.

Powdery Mildew (fungal)

Symptoms: White powdery spots appear on leaves. The entire leaf may be covered. Often appears in early summer. Most severe on common and Persian lilac.

Spray with fungicide when disease appears and repeat at 14-day intervals. Choose lilac with some resistance to mildew such as: *Syringa meyeri*; *S. microphylla*; *S. patula* Miss Kim and *S. reticulata*.

Magnolia

Winter Leaf Burn (weather)

Symptoms: On *Magnolia grandiflora* leaves may be desiccated during winter months and exhibit marginal necrosis (browning). Leaves may also become colonized by a weak pathogen.

No control measures needed. The new foliage produced in the following spring should be unaffected.

Powdery Mildew (fungal)

Symptoms: White powdery spots appear on leaves.

Spray with fungicide when disease first appears and repeat at 14-day intervals.

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Maple (*Acer*)

Anthracose (fungal)

Symptoms: Black irregular leaf spots develop on leaves during wet springs.

Landscape trees are rarely permanently damaged. Rake and compost leaves.

Phyllosticta Leaf Spot (fungal)

Symptoms: Leaf spots with brown centers and purple margins. This leaf spot rarely causes premature defoliation. Common disease of *Acer palmatum*.

Spray with fungicide at bud break and repeat two to three times at 7- to 10-day intervals.

Verticillium Wilt (fungal)

Symptoms: One limb, multiple limbs or an entire tree may wilt and die. Brown discoloration may appear in sapwood. Symptoms may progress rapidly or slowly over a long period of time.

Severely infected trees should be cut and removed. As many roots as possible should be removed. Trees with mild infections may recover after application of high rates of a water-soluble fertilizer. Do not replant with susceptible trees. Resistant trees and shrubs include conifers, katsura, dogwood, ginkgo, sweet gum, honey locust, crabapple, sycamore, oak, pear, birch, hackberry, zelkova, hawthorne, walnut, willow, mountain ash, boxwood, holly and mulberry.

Oak (*Quercus*)

Anthracose (fungal)

Symptoms: Leaf spots may merge to form large blighted areas.

Anthraco

se - Rake and compost, or destroy, leaves. Spray with fungicide at bud break and two to three times at 7- to 10-day intervals.

Taphrina Leaf Blister (fungal)

Symptoms: Raised blisters develop on upper leaf surface.

Taphrina Leaf Blister - Spray with fungicide once at bud swell.

Tubakia Leaf Spot (fungal)

Symptoms: Leaves usually blighted from margin, inward. Often appears in late summer.

Tubakia Leaf Spot - Rake and compost, or destroy, leaves. Spray with fungicide at 7- to 10-day intervals.

Powdery Mildew (fungal)

Symptoms: White spots appear on leaves. The entire leaf may be covered. This is often a late-season disease.

Spray with fungicide when the disease first appears and repeat at 14-day intervals. No control necessary for late summer/early fall infections.

Pachysandra

Volutella Blight (fungal)

Symptoms: Large leaf spots and stem lesions develop. Large areas of beds may be destroyed-especially in plants in the full sun.

Apply as a heavy fungicide spray or drench. Treat immediately after disease appears.

Photinia

Entomosporium Leaf Spot (fungal)

Symptoms: Red spots develop on leaves. The spots enlarge and have brown centers with purple margins. Severe defoliation may occur. This leaf spot is most common on *Photinia X fraseri*.

Buy disease free plants. Spray with fungicide at bud break and repeat at 7- to 10-day intervals. Prune out severely infected branches. Rake and remove diseased leaves.

Pine (*Pinus*)

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Needle Rust (fungal)

Symptoms: Off-white blisters erupt to release orange-yellow spores before candles expand in the spring. The current year's growth is rarely affected.

Fungicide sprays are rarely needed for needle rusts.

Sphaeropsis Dieback, Tip Blight (fungal)

Symptoms: Multiple shoots of new growth are blighted during wet springs. Infected shoots turn yellow, then brown and then wilt. The current year's shoots may be stunted and curled downward.

Prune out diseased shoots when branches are dry. Spray with fungicide three to four times, at 10-day intervals, starting prior to new growth. Do not shear trees during wet weather. Shear healthy trees prior to diseased trees. Severely infected trees should be cut and destroyed.

Pyracantha

Fire Blight (bacterial)

Symptoms: Leaves and shoots wilt and then turn brown or black.

Prune out diseased branches and disinfect shears between cuts.

Scab (fungal)

Symptoms: Disease closely resembles scab or crabapple. Dark brown lesions develop on leaves, twigs and fruit. Leaves turn yellow, then brown and then drop prematurely.

Spray with fungicide at bud break and repeat four times at 7- to 10-day intervals. *Pyracantha coccinea* hybrids reported to be resistant to scab and fire blight include Apache, Fiery Cascade, Mohave, Navaho, Pueblo, Red Elf, Rutgers, Shawnee and Teton.

Rhododendron

Botryosphaeria Canker (fungal)

Symptoms: Single or multiple branches wilt, turn brown and die. Occurs most often on plants in landscape beds.

Prune out diseased branches. Spray with fungicide after any summer pruning. Irrigate during periods of drought. *Rhododendron catawbiense* cultivars moderately resistant to canker include Boursalt, Chinoides White, Cunningham's White, English Roseum, Le Bar's Red, Roseum Two, Sweet Simplicity and Wissahickon.

Gray Leaf Spot (fungal)

Symptoms: Gray, dead areas develop on margins or tips of older leaves. Often follows environmental stress.

Fungicide sprays are rarely necessary. Irrigate and fertilize plants to keep them in a vigorous state of growth.

Leaf Galls (insects or mites)

Symptoms: Leaves develop fleshy, pale green to whitish galls.

For light infestations, simply remove and destroy galls. Spray with fungicide just prior to new leaf growth and afterwards at 7- to 14-day intervals.

Phytophthora Root Rot (fungal)

Symptoms: Plants may wilt rapidly even with adequate soil moisture. Diseased roots are dark reddish-brown. There are a limited number of resistant varieties available.

Buy disease free plants. Improve soil drainage and use raised landscape beds in poorly drained soils. Do not irrigate excessively. Resistant hybrids include Caroline, Martha Isaacson, Pink Trumpet, Professor Hugo de Vries, Red Head. Moderately resistant hybrids include Brickdust, Broughtonni Aureum, Disca, Dr. A. Blok, Dr. Arnold W. Endtz, English Roseum, Lucky Strike, Madame Carvalho, Mrs. A. T. de la Mare, Mr. C. B. Van Nes, Prize, Bosley's Dexter 1020, Rocket, Wilbrit and Van Veen.

Rose (Rosa)

Descriptions of Common Disease Problems and Management Tactics of Woody Ornamentals

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Black Spot (fungal)

Symptoms: Dark brown to black spots develop on leaves and canes. Severe defoliation may occur.

Management Strategies

Spray with fungicide at 7- to 10-day intervals starting when new growth appears. Shorten spray intervals to 5- to 7- days in wet weather. Rake and destroy diseased leaves. Remove infected canes. Use drip irrigation.

Rhizosphaera Needle Cast (fungal)

Symptoms: Fuzzy black fungal fruiting bodies appear on green, 1-2 year old needles. Needles turn purple-brown and drop by late fall. Colorado blue spruce is very susceptible and Norway spruce is relatively resistant.

Make first fungicide application in the spring when new shoot growth is ½ to 2 inches in length. Make additional applications at 3- to 4- week intervals (April - July) until conditions no longer favor disease development.

Sycamore (*Platanus*)

Anthracnose (fungal)

Symptoms: Interveneal spots develop on leaves. Shoots may be killed and cankers may develop on branches.

Spray with fungicide at bud swell and follow with applications at 10- to 14-day intervals during cool, moist weather during the spring and early summer. *Platanus X acerifolia* (London Planetree) cultivars resistant to anthracnose include Bloodgood, Columbia and Liberty.

Vinca (*Vinca Minor*)

Phoma Stem Rot (fungal)

Symptoms: Infected plants wilt and die. Stems turn black.

Buy disease free plants. Do not irrigate or fertilize excessively. Spray with fungicide in early spring at 2- week intervals.

Yew (*Taxus*)

Phytophthora Root Rot (fungal)

Symptoms: Needles turn yellow then rust-red. Roots are discolored and decayed. Similar symptoms can develop from overwatering or in waterlogged soils. Yew in waterlogged soils may develop edema-raised, corky tissue on the underside of needles.

Do not plant yew in poorly drained soils of high clay content. Yew is intolerant of flooded, waterlogged soil conditions.

Descriptions of Common Disease Problems and Management Tactics of Common Bedding Plants

Disease and Description

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Common Bedding Plant Diseases

Antracnose Leaf Spot (fungal)

Symptoms: This disease causes sunken, brownish to black lesions on the bean pods, leaves and stems.

Plant certified seeds and plants and spray fungicides as appropriate.

Aster Yellow (virus)

Symptoms: This disease causes chlorosis in the leaves, with the veins remaining green. Leaves may also be small, narrow and curled. Flowers may also be misshapen with tufts of deformed leaves. Flowers may also be misshapen.

Control insects-especially leafhoppers, use resistant plants, remove diseased plants and control weeds.

Botrytis (fungal)

Symptoms: This disease causes brown to black lesions with grayish spores on above ground plant structures.

Use sanitary practices and apply fungicides as appropriate.

Cercopsora Leaf Spot (fungal)

Symptoms: This disease causes narrow, dark brown leaf spots. These spots will eventually enlarge and turn into irregularly shaped lesions with dark tan centers and dark brown to purple margins. This disease may lead to the yellowing and withering of infected plants.

Avoid excess irrigation, fertilize with slow release fertilizers according to the plant's needs and spray fungicides as appropriate.

Phytophthora Root Rot (fungal)

Symptoms: The seeds and roots are the main sights of infection. Infected seeds are soft and discolored. Infected roots are colorless to dark brown and appear water soaked. Plants are stunted and appear wilted.

Use disease free plants, use sanitary practices and apply fungicides as appropriate.

Pythium Root Rot (fungal)

Symptoms: See "Phytophthora Root Rot."

See "Phytophthora Root Rot."

Thielaviopsis Root Rot (fungal)

Symptoms: This disease causes plants to appear stunted and yellow. Roots develop black lesions but do not appear water soaked.

See "Phytophthora Root Rot."

Descriptions of Common Disease Problems and Management Tactics of Fruit Trees

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Apple Diseases

Apple Scab (fungal)

Symptoms: Velvety, olive-green leaf spots that later become metallic black and possibly puckered. Leaves fall from the tree. Fruit have brown, corky lesions and are scabby, deformed and cracked.

Fungus overwinters on fallen leaves and fruit. Rake up and destroy them. Follow spray schedule, with emphasis on early season sprays. Plant scab-immune varieties.

Bitter Rot (fungal)

Symptoms: Small brown spots on the fruit enlarge rapidly, becoming darkened and almost black. Concentric rings of spores are sometimes present. The fruit lesion appears "V-shaped" in a cross-section cut.

Remove mummified fruit, dead wood and fire-blighted twigs. Follow spray schedule, with emphasis on summer sprays. Removing newly infected fruit from trees will aid in control.

Cedar-Apple Rust (fungal)

Symptoms: Small, yellow spots develop on leaves in the spring. These spots gradually enlarge and turn orange. Later, black dots appear in the spots on the upper surface and tube-like protuberances appear on the lower surface. Severe infection results in heavy defoliation. Fruit lesions appear near the calyx end and are similar to the leaf lesions.

Overwinters on cedar trees. Removal of nearby cedar trees lessens the problem, but may not eliminate it. For complete control, all cedars within 4 to 5 miles would have to be removed. Spray with a rust fungicide every 2 weeks from the pink stage of bud development to the third cover spray. Consider resistant varieties.

Collar Rot (fungal)

Symptoms: Dark coloration of wood at or below the ground in the root-crown area, sometimes extending up the trunk. Leaves may be small and yellow in the summer. Symptoms are the same as for other root problems. Isolation of the fungus is often required for positive diagnosis.

Fungus is soil-borne. Select well-drained soil for planting and request rootstocks with resistance if collar rot is anticipated. Avoid the cultivar MM 106.

Fire Blight (bacterial)

Symptoms: Shoots blight from the tip downward. Leaves turn brown (apple) or black (pear). Shoot tip bends, resembling a shepherd's crook. Blossoms wilt suddenly and turn brown. Limb and trunk blight occur when the infection moves downward from the infected shoots or fruit spurs into larger branches on the trunk.

Plant resistant varieties. Avoid excessive nitrogen fertilizer applications. Cankers and blighted shoots should be pruned out before the growing season begins. Apply fungicide every 3 to 5 days during bloom, but not after bloom.

Powdery Mildew (fungal)

Symptoms: On leaves, the fungus appears as whitish, felt-like patches that spread and engulf the entire leaf. Infected leaves are narrower than normal, folded and stiff. Infected fruit have a net-like russetting.

The fungus overwinters on buds infected the previous summer. Many varieties are resistant. On susceptible varieties, use a fungicide in the early sprays, beginning at the tight cluster stage.

Sooty Blotch and Fly Speck (fungal)

Symptoms: Soot blotch appears as superficial, sooty or cloudy blotches on the surface of the fruit. Fly speck appears on the fruit as sharply defined, black, shiny dots in groups of a few to 100 or more.

Both fungi overwinter on the twigs of many woody plants. Apple fruit infections are the most numerous during the summer. Follow spray schedule and good pruning practices to allow air, sunlight and spray penetration of the canopy.

Descriptions of Common Disease Problems and Management Tactics of Fruit Trees

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White Rot or Bot Rot (fungal)

Symptoms: Fruit rots show up late but develop rapidly, beginning as tan or red spots. In cross section, the rot is cylindrically shaped, extending to the core. The rot may involve the entire fruit. On green varieties, the rot is tan with concentric rings. Branch cankers become tan to orange and papery.

Management Strategies

The fungus overwinters in bark and in limb cankers. This fungus can readily colonize fire-blighted branches. Remove and destroy all dead branches and twigs. Follow spray schedule with emphasis on summer sprays. Practice proper pruning.

Peach and Nectarine Diseases

Brown Rot, Blossom Blight (fungal)

Symptoms: The most noticeable phase is the fruit rot phase. Small, circular, brown spots enlarge rapidly and become covered with ash-gray tufts or spores. Fruits shrivel and mummify. Infected blossoms wilt and turn brown. Shoots can sometimes become infected and die.

The fungus overwinters in mummified fruit and in cankers. Remove all mummies and blighted twigs from trees after last picking. Follow spray schedule with emphasis on the 3-week period prior to harvest. Control insects that injure the fruit. Keep fruit cool after picking. To lessen the spread of the disease, remove infected fruits as soon as they are observed.

Bacterial Spot (bacterial)

Symptoms: Leaf spots are small and brown, black or red, and more numerous on leaf tips. The centers of the leaf spots fall out, creating a "shothole" effect. Infected leaves may turn yellow and fall to the ground. Fruit sometimes develops dark pits in the skin.

Use of resistant varieties is the primary method of control. Chemical control is limited. Fixed copper may be used prior to petal fall. Adequate fertility is important in minimizing the effects of this disease.

Peach Leaf Curl (fungal)

Symptoms: Infected leaves are thickened, curled and puckered and often flushed with red or purple. Affected leaves appear in the spring and drop from the tree.

Using the correct material, a single spray will provide nearly perfect control, if it is applied during the period from fall leaf drop until bud swell. After bud swell, the disease cannot be controlled.

Peach Scab (fungal)

Symptoms: Spots on the fruit are small, dark and circular. Spots usually do not begin to appear until the fruit is well grown. They tend to be concentrated at the stem end. The skin may toughen and crack. Forty to 70 days elapse from the time the spore lands on the fruit until the spots appear.

The fungus overwinters in twig lesions. The critical period for control is from the shuck-split stage of development until 40 days before harvest. Fungicide should be applied at shuck split and repeated every 10 to 14 days until 40 days before harvest.

Cherry Diseases

Cherry Leaf Spot (fungal)

Symptoms: Small, circular, purple spots on the leaves. Only a few lesions per leaf can cause the leaves to turn yellow and fall. The fruit on trees severely defoliated by leaf spot fail to mature properly and are soft and watery.

The fungus overwinters in infected leaves on the ground. Rake and destroy fallen leaves. Apply fungicide, beginning at petal fall and repeating at 10 to 14-day intervals until harvest.

Black Knot (fungal)

Symptoms: Elongated swellings or knots on the limbs, twigs or trunk. The swelling may be less than an inch to more than a foot long. Newly formed knots are greenish and soft, but become hard and black with age. Affected limbs die.

The fungus overwinters in the knots. The spores are discharged from the pink stage of bud growth until terminal growth stops. Prune out knots and destroy. Since the fungus may have extended beyond the swelling, make cuts well below visible infection. Apply fungicide beginning at the pink stage of bud growth, and repeat at 10 to 14-day intervals until terminal growth stops.

Descriptions of Common Disease Problems and Management Tactics of Fruit Trees Disease

and Description

Management Strategies

Brown Rot, Blossom Blight

See "Peach."

See "Peach."

Coccomyces Leaf Spot (fungal)

Symptoms: Reddish spots on leaves drop out leaving circular holes. This disease is more severe during mild, wet summer weather.

At bud break, apply fungicide four times at 2-week intervals.

Pear Diseases

Fire Blight

See "Apple."

See "Apple." Avoid planting highly susceptible varieties.

Pear Scab (fungal)

Symptoms: Caused by a different fungus than apple scab fungus. Symptoms are similar, but twig infections can also occur.

Rake and destroy fallen leaves because that is where the fungus overwinters.

Fabraea (Entomosporium) Leaf Spot (fungal)

Symptoms: Spots can occur on leaves, shoots and fruit. Spots are initially purplish-black dots then they become circular, brown lesions that are about 1/8 inch in diameter.

The fungus overwinters on twig cankers and on fallen leaves. See "Pear Scab" for control measures.

Plum Diseases

Black Knot

See "Cherry."

See "Cherry." Avoid planting highly susceptible varieties such as Damson, Stanley, Bluefree and Shropshire.

Brown Rot, Blossom Blight

See "Peach."

See "Peach."

Bacterial Spot (bacterial)

Symptoms: Can be a severe problem on Japanese plums. American and European plums are less susceptible. See "Peach" for symptoms.

See "Peach". Avoid planting highly susceptible varieties such as AU Frontier, AU Rosa, AU Rubrum, Frontier, Methley and Santa Rosa. Some Japanese plum varieties are resistant.

Descriptions of Common Disease Problems and Management Tactics of Small Fruit

Disease and Description

Management Strategies

Blackberry Diseases

Anthracnose (fungal)

Symptoms: This disease can be severe on thorned blackberries grown in Tennessee. Leaf spots are roughly circular, with a light gray center and a reddish-purple margin. On the berry, individual drupelets become purplish brown and sunken after infection. They eventually become dry and scabby. The most damaging phase of anthracnose in Tennessee is the berry phase.

Apply a copper fungicide at 10- to 14-day intervals beginning prior to bloom and continuing through harvest. Destroy nearby wild brambles. Plant in well-drained site and allow good air circulation by thinning plants and controlling weeds. Remove and destroy fruiting canes immediately after harvest.

Cane Blight (fungal)

Symptoms: Cane blight appears only on fruiting canes. Infection occurs on primocanes near the end of the growing season. This disease is most severe when drought stress occurs after widespread infections take place. Cankers form on the cane, often at the nodes, and extend down or encircle it. This causes lateral shoots to wilt and die.

Cultural methods of control are the same as for anthracnose. Chemical control is not recommended. Provide drip irrigation to reduce drought stress. Liquid lime sulfur applied at bud break in early spring may be helpful. Prune out blighted canes.

Crown Gall (bacterial)

Symptoms: Wart-like growths (galls) appear on the roots or crowns of infected plants. Galls range in size from a pinhead to several inches in diameter. Plants produce dry and poorly developed berries. Bacteria present either in the soil or on the planting stock cause galls. The bacteria enter the plant through wounds or growth cracks.

Obtain clean planting stock from a reputable nursery and inspect the roots and crowns for galls. Do not plant in a field with a history of crown gall. Avoid fields previously planted with brambles, tree fruits or other highly susceptible hosts. The practice of mowing blackberry plants after harvest can cause crown gall problems because of damage to the roots and crowns.

Orange Rust (fungal)

Symptoms: Orange rust can be a destructive disease on blackberries and purple and black raspberries. The new leaves on infected plants are weak, spindly and yellowish. Later, the underside of the leaves shows orange, blister-like pustules, which release spores. Canes appear to recover in late summer, but are still diseased and will not bear fruit the following year. Many of the erect blackberry varieties grown in Tennessee are resistant.

Key to control: Remove infected blossom clusters before they open. Apply a copper fungicide at 10 to 14-day intervals beginning prior to bloom and continuing through harvest. Use only roots, not plants, for planting stock. Remove and destroy nearby wild brambles.

Sterility (viral?)

Symptoms: The cause of blackberry sterility is not fully understood, but it may be a virus. Affected plants grow vigorously, but they either fail to set fruit or they produce few-seeded berries.

Remove and destroy plants that fail to set fruit. Plant only certified, disease-free planting stock. Destroy nearby wild brambles.

Blueberry Diseases

Anthracnose (fungal)

Symptoms: This disease is also known as ripe rot. Infected berries remain symptomless until maturity, when the infected area becomes slightly sunken. Masses of salmon-colored spores are exuded to the surface.

The spray schedule used for mummy berry control will help in controlling anthracnose. Prune out and destroy blighted twigs, on which the fungus overwinters.

Mummy Berry (fungal)

Symptoms: As berries approach maturity, they become light pinkish to cream and drop as mummified fruit. Blighting of leaves, shoots and flowers can occur. The fungus overwinters on the ground in mummified berries.

Where mummy berry is a problem, early spring cultivation will aid in control by covering the overwintered berries. Apply a fungicide from green tip through petal fall at 7 to 10-day intervals.

Descriptions of Common Disease Problems and Management Tactics of Small Fruit

Disease and Description

Stem Blight (fungal)

Symptoms: One or more branches exhibit yellowed or reddened leaves, followed by the death of the branch. Stems show brown discoloration of woody tissue, often only on one side of the stem. Penetration into the plant is primarily through wounds.

Management Strategies

Pruning during the coldest and driest winter months may reduce infections because inoculum is at the lowest levels during the winter. Avoid late (early July) fertilizer applications. These encourage the formation of new shoots that do not have time to harden off before winter. Winter-injured shoots are more subject to infection.

Twig Blight (fungal)

Symptoms: Infection occurs in the flower buds and then advances 2- to 6-inches down the stem, causing a dieback of the flower bearing stems. The fungus overwinters in twigs infected the previous year.

Prune and destroy discolored twigs during dormant pruning and summer. Follow the spray schedule recommended for mummy berry.

Grape Diseases

Anthracnose (fungal)

Symptoms: This disease is also known as bird-eye rot because of the dark margin around the gray-colored spot on the fruit. This disease is usually confined to certain highly susceptible varieties such as Vidal blanc. Numerous spots may occur on shoots, leaves, tendrils, petioles and fruit stems.

Control needed only on susceptible varieties. Apply liquid lime sulfur during the late dormant phase, and then follow the spray schedules.

Bitter Rot (fungal)

Symptoms: This disease can be severe on certain varieties, such as Catawba. The fungus enters the berry from the stem and a grayish discoloration of the berry begins on the stem side. The appearance of tiny, black fungal fruiting bodies and a shriveling of the berry into a hard, dry mummy can cause this disease to be mistaken for black rot.

On susceptible varieties, spray a fungicide in the spring and summer.

Black Rot (fungal)

Symptoms: Black rot is the most destructive disease of grapes in Tennessee. Berry symptoms begin as dark, circular spots that expand to discolor the entire berry. The berries shrivel to hard, black and wrinkled mummies. Leaf spots are reddish-brown with dark margins. Dark spots form on the green stems and tendrils.

Follow the spray schedules, beginning when shoots are 2- to 4- inches long. Mix a few drops of dishwashing detergent with the spray solution to improve the coverage of tissues. Good control in the spring lessens the need for summer control. Follow recommended pruning practices to properly thin the canes and avoid overly-dense growth. Destroy pruning and mummified berries.

Crown Gall (bacterial)

Symptoms: Knots form on roots, crowns and sometimes, on canes. These galls may grow to several inches in diameter. The amount of damage to the plant varies from none to the death of the plant. Winter-injured vines frequently become infected.

Plant winter-hardy varieties, avoid sites with a history of crown gall and avoid injuries to the canes.

Eutypa Dieback or "Dean Arm" (fungal)

Symptoms: This disease occurs only in older grapevines because infections develop slowly. Symptoms consist of dying arms and yellowed, cupped leaves on new growth in the spring. Leaves develop small necrotic spots and tattered margins. Infection occurs on the trunk and main branches through pruning wounds. Spores are produced throughout the year.

When pruning, make clean, close cuts to encourage callusing. Identify infected plants in the spring and remove and burn infected canes when weather is not rainy. Avoid pruning during the wet weather.

Descriptions of Common Disease Problems and Management Tactics of Small Fruit

Disease and Description

Management Strategies

Downy Mildew (fungal)

Symptoms: Light yellow spots form on the upper sides of leaves, and a white, moldy growth can be seen on the undersides of leaves. The affected leaves eventually become dry, brown and crumpled. Defoliation can be severe on some varieties during wet seasons.

Use an appropriate fungicide in the spring and summer.

Powdery Mildew (fungal)

Symptoms: This disease usually does not significantly damage the American varieties. However, many of the vinifera varieties show a high degree of susceptibility. It appears as a white powdery growth on the leaves and berry clusters. Severely affected leaves turn brown and fall.

Use a fungicide in the spring according to the label. Continue use in the summer only if the variety is known to be very susceptible to powdery mildew.

Raspberry Diseases

Crown Gall (bacterial)

Symptoms: Refer to crown gall of blackberries.

Same as for blackberry.

Gray Mold (fungal)

Symptoms: In wet seasons, gray mold can cause a significant loss of flowers and fruit. Blossoms show a blasting that may extend down the pedicel. Infected berries become covered with a gray, dusty fungal growth. Mature berries are more susceptible than young ones. Berries sometimes do not show gray mold until after harvest. Berries can quickly become a rotted mass in storage.

Avoid excessive nitrogen fertilizer applications. Pick fruit frequently and early in the day, as soon as plants are dry. Handle berries with care to avoid bruising. Keep the planting properly thinned and control tall weeds.

Late Leaf Rust (fungal)

Symptoms: Small pustules filled with powdery yellow spores form on the underside of leaves, petioles, canes and berries. Badly infected leaves drop prematurely. This disease can be damaging to some varieties of red raspberries, although it occurs late in the season.

The single-crop system of producing ever-bearing varieties should help control this disease because the fungus is thought to overwinter on raspberry canes.

Orange Rust (fungal)

Symptoms: This rust disease occurs on black and purple raspberries, but not on red raspberries. Refer to this disease under "blackberries" for symptoms.

Same as for blackberry.

Septoria Leaf Spot (fungal)

Symptoms: This is one of the most destructive raspberry diseases in Tennessee. Septoria can cause almost total leaf loss, especially on highly susceptible varieties such as Bababerry. Leaf spots have tan to gray centers with tiny, black fruiting bodies. Spots are surrounded by thin, brown to purple borders. The spots are circular and about 1/8 inch in diameter. Leaf spots are similar to anthracnose leaf spots on raspberry or blackberry. Heritage seems to have some tolerance.

Use a copper fungicide on a 10 to 14-day schedule beginning in April. Sprays may need to be continued throughout the growing season, if weather conditions remain favorable for disease (warm, wet). Remove and destroy fruiting canes immediately after harvest. Keep the planting properly thinned and control tall weeds.

Descriptions of Common Disease Problems and Management Tactics of Small Fruit

Disease and Description

Phytophthora Root Rot (fungal)

Symptoms: This disease is usually associated with poorly drained soils. Affected plants may show a general lack of vigor, or they may decline and die. The tissue underneath the epidermis on the main roots and crown is a brick red (later turning brown), rather than a normal white.

Management Strategies

Plant only on well-drained sites. Planting on raised beds is helpful, and is important if drainage is occasionally inadequate. Avoid planting highly susceptible varieties.

Viral Diseases (Tomato Ringspot Virus, Mosaic and Leaf Curl)

Symptoms: Virus diseases are a major problem in raspberries in the northern United States, but are relatively minor in Tennessee. This is presumably because of a lack of the proper vectors. The viruses most often seen in Tennessee are probably mosaic (a virus complex) and tomato ringspot.

Plant only certified, virus-indexed stock. Destroy nearby wild or neglected brambles. Do not plant black or purple raspberries near red raspberries. This is because reds can tolerate mosaic and act as a reservoir of inoculum, which will spread to the black raspberries if the proper aphid species are present.

Strawberry Diseases

Anthraxnose (fungal)

Symptoms: This disease causes the death of blossoms, fruit clusters and young daughter plants. Dark, sunken lesions form on all stems, stolons, petioles, peduncles and pedicels. Fruit lesions are firm, slightly sunken and may be tan, black or natural in color. The fruit rot phase can occur in the absence of other symptoms. Leaves shrivel and die due to petiole infections. Crown infections can result in the wilting and death of older plants.

This disease is difficult to control. The simplest method for home gardeners is to replant with one of the resistant varieties: Delmarvel or Sweet Charlie. On susceptible varieties, spray with a fungicide during dry weather.

Gray Mold (fungal)

Symptoms: This disease can be very destructive in wet seasons. Gray mold often starts as blossom blight and then continues as a rot of green and ripe fruit. Many fruit infections begin when the fungus enters the blossoms and remains latent until the fruit begins to mature. In wet weather, diseased plant parts are covered with fuzzy brown to gray masses of fungal spores. Berries become more susceptible as they mature. Gray mold may continue to develop after harvest, becoming a rotted mass.

Select a well-drained planting site. Renovate planting properly to narrow the rows and thin the plants. Avoid excessive nitrogen fertilizer rates. Mulch to reduce fruit contact with the soil. Pick berries frequently and refrigerate promptly. Apply fungicide every 7- to 10- days, beginning at early bloom. Good protection of the blossoms should eliminate the need for sprays during harvest. Delmarvel and Earliglow have resistance to gray mold. Sweet Charlie is very susceptible.

Leaf Spot (fungal)

Symptoms: Lesions are circular, 1/8 inch in diameter and are purple with a white or tan center.

Most varieties show some leaf spot, but no real damage. Chemical control is not necessary on most varieties. Plant resistant varieties. Use certified plants and select a well-drained site. Renovate properly to avoid overly dense plantings. Do not over-fertilize.

Leaf Scorch (fungal)

Symptoms: Round to irregular, purple spots, up to 1/4 inch in diameter, form on the leaf surface. If the spots become numerous, large areas of the leaf become reddish-purple to brown and the entire leaf may turn brown and die.

Same as leaf spot.

Leaf Scorch (fungal)

Symptoms: Round to irregular, purple spots, up to 1/4 inch in diameter, form on the leaf surface. If the spots become numerous, large areas of the leaf become reddish-purple to brown and the entire leaf may turn brown and die.

Same as leaf spot.

Descriptions of Common Disease Problems and Management Tactics of Small Fruit

Disease and Description

Management Strategies

Leaf Blight (fungal)

Symptoms: Spots begin as circular, purple lesions that develop brown centers as they enlarge. Lesions near leaf margins become V-shaped. Leaf blight develops in hot weather. Older leaves may become blighted and die in large numbers.

Same as leaf spot.

Leather Rot (fungal)

Symptoms: This fruit rot occurs sporadically. Disease development is very dependent on wet weather and puddled water. Infected berries are light to dark brown or lilac in color and become tough and leathery. In the early stages of disease development, the infected ripe fruit are softer than the healthy ripe fruit.

Provide good soil drainage. Straw mulches are particularly effective in controlling this disease. Avoid excessive nitrogen fertilizer applications.

Red Stele (oomycete-fungus-like pathogen)

Symptoms: This disease is most damaging in heavy, wet-natured soils. Plants first appear stunted and dull in color, then wilt and eventually die. Roots decay and show reddish or brown cores (steles). Roots become devoid of fibrous lateral rootlets, giving them a rat-tailed appearance. Red stele is not as common as it once was because many of today's varieties are resistant.

Avoid sites having low-lying clay soils. Plant on raised beds. Purchase certified disease-free plants of resistant varieties. Do not plant in fields with a history of red stele. The casual fungus can remain in the soil up to 13 years.

Verticillium Wilt (fungal)

Symptoms: This disease does not occur frequently on strawberries in Tennessee because it favors cool weather. The symptoms are similar to those for red stele, except Verticillium does not cause red discoloration in the roots.

Adequate control can be obtained without fumigation by planting resistant varieties and avoiding sites next to susceptible crops such as: tomato, potato, eggplant, okra and pepper.

Descriptions of Common Disease Problems and Management Tactics of Vegetables

Disease and Description

Management Strategies

Potato Diseases

Early Blight (fungal)

Symptoms: Initial infection occurs on lower leaves. Lesions appear small and dry and become dark brown and circular. Concentric rings give infected leaves a “bulls-eye” appearance. Leaves turn yellow, brown and then die.

Plant disease-free seeds in well-drained soils. Spray with protectant fungicides. Control weeds around plants. After harvest, plow under all plant debris. Rotate crops and take care to not bruise tubers.

Late Blight (oomycete)

Symptoms: This disease causes pale green spots on the edges of leaves. Spots appear water-soaked. Lesions are circular or irregular and are often surrounded by a yellowish border. Lesions eventually turn purplish to blackish and may be ringed with a grayish fungal growth. Infected tubers have brown, dry and sunken lesions.

Spray appropriate fungicide before infection. Applications should be made early in the season on a weekly or bi-weekly schedule. Destroy and bury infected parts of the plant.

Virus Y (viral)

Symptoms: This disease causes leaves to be necrotic, especially at the terminal end. Leaves may also be wrinkled, distorted or droopy. Stunting and decreased yield may occur.

Plant early in the season. Spray with appropriate fungicide. Destroy infected plants after spraying with a pesticide. Treat for aphids.

Sweet Potato Diseases

Bacterial Soft Rot (bacterial)

Symptoms: Infected roots are light brown with dark brown margins and watery with black streaks, they usually decay. Lesions may also appear on the stems and petioles.

Carefully handle the sweet potatoes, select disease free roots, do not immerse the sweet potatoes in water.

Black rot (fungal)

Symptoms: Initially, this disease causes circular, small, slightly sunken, dark brown spots to appear on the surface of the potato. The rot is usually firm and not deep.

Rotate crops, use healthy plants for propagation, cure roots immediately after harvest, use a post-harvest fungicide dip and sanitize all equipment.

Java Black Rot (fungal)

Symptoms: Affected roots turn yellow, to reddish brown, to black, to mummified. As the disease progresses, dome shaped, black fungal masses appear on the root surfaces.

Plant crops in well-drained soils and store harvested sweet potatoes at 55-60 degrees F and 90% relative humidity. Also, cure sweet potatoes immediately after harvest and properly sanitize all equipment.

Tomato Diseases

Bacterial Wilt (bacterial)

Symptoms: This disease causes plants to wilt and die quickly. Early in the infection, the center of the stem appears water-soaked; later in the disease, it appears brown and may hollow.

Rotate crops, fumigate the soil, remove wilted plants and replace the soil surrounding them.

Buckeye Rot

Symptoms: Initially, lesions are firm, smooth, brownish and water-soaked. They appear near the blossom end of the plant. As the disease progresses, the lesion enlarges and forms into a target pattern.

Maintain adequate soil drainage, avoid soil compaction, rotate crops, minimize contact of fruit with the soil and apply fungicides as appropriate.

Descriptions of Common Disease Problems and Management Tactics of Vegetables

Disease and Description

Management Strategies

Blossom-end Rot (lack of calcium)

Symptoms: This disease causes a brown to black, leathery rot near the blossom end of the fruit. The lesion is initially about a half inch, dry and brown. It gets bigger as the disease worsens. Lesions may be covered with a black mold.

Maintain the soil at a pH of 6.0-6.5, make sure plants are fertilized and watered properly.

Early Blight (fungal)

Symptoms: This disease causes brown target spots that progress to blighted foliage.

Rotate crops, plant disease-free seeds and apply fungicides as appropriate.

Late Blight (oomycete)

Symptoms: This disease causes lesions that are large, irregular and gray with white mold. The fruit will be firm and rotted.

Use disease free plants and seeds and apply fungicides as appropriate.

Pith Necrosis (bacterial)

Symptoms: This disease causes infected plants to yellow and wilt. Younger leaves are affected first. The main stem may be hollow and have black streaks.

Plants usually outgrow this condition. However, avoiding excessive amounts of nitrogen may minimize this disease.

Southern Blight (fungal)

Symptoms: This disease causes the yellowing and wilting of infected leaves. The stems of infected plants look sunken, soft and black.

Rotate crops, bury crop debris at the end of the season, apply appropriate fungicides and fumigate the soil.

Spotted Wilt Virus (viral)

Symptoms: Symptoms of this disease vary, but can include yellow or brown rings, black streaks on stems or petioles, and stunting of the plant. Plants may also have one-sided growth. Fruits may be mottled and discolored.

Sanitize all equipment, remove and destroy infected plants and control insects, especially thrips.

Descriptions of Common Disease Problems and Management Tactics of Beans and Cabbage

Disease and Description

Management Strategies

Bean Diseases

Anthracnose (fungal)

Symptoms: This disease causes sunken, reddish to black lesions on the bean pods, leaves and stems.

Rotate crops, plant certified seeds and plants and spray fungicides as appropriate.

Bacterial Blights (bacterial)

Symptoms: This disease causes large, brown, circular spots on the leaves and bean pods. Lesions may be surrounded by a yellow halo.

Rotate crops, plant certified seeds and plants and spray fungicides as appropriate.

Downy Mildew (fungal)

Symptoms: This disease causes white, cottony growth on the bean pods. Infected tissue may be surrounded by a dark red to purple border.

Plant resistant varieties, seed with disease-free seed, rotate crops and spray fungicides as appropriate.

Fusarium Root Rot (fungal)

Symptoms: This disease causes stunted and uneven plants. However, it does not cause seeds to rot or seedlings to dampen-off. Initial symptoms are long, narrow dark red streaks on taproots and hypocotyls.

Use resistant varieties, plant in well-drained, well-maintained soils and avoid soil compaction.

Powdery Mildew (fungal)

Symptoms: This disease causes small, round and whitish spots on the lower leaves.

Spray with a fungicide, use resistant varieties and provide adequate plant nutrition.

Pythium Root Rot (fungal)

Symptoms: The seeds and roots are the main sights of infection. Infected seeds are soft and discolored. Infected roots are colorless to dark brown and appear water soaked.

Provide adequate plant nutrition and spray fungicides as appropriate.

Rhizoctonia Root Rot (fungal)

Symptoms: Infected roots and hypocotyls have small, narrow, sunken, dark reddish to brown lesions. Plants may be stunted.

Plant in a shallow, well-drained soil, rotate crops and spray fungicides as appropriate.

Rust (fungal)

Symptoms: This disease causes powdery, rust colored lesions to appear on the leaves. Eventually, infected leaves turn yellow, dry-out and drop.

Rotate crops, control weeds, use resistant varieties and spray fungicides as appropriate.

Bean Common Mosaic Virus (BCMV) and Bean Yellow Mosaic Virus (BYMV) (viral)

Symptoms: These viruses cause plants to be stunted, bushy and produce decreased yields. Infected leaves are mottled or mosaic and may be puckered.

Use resistant varieties, control aphids and use virus-free seed.

Cabbage Diseases

Black Rot (bacterial)

Symptoms: This disease causes necrotic, V-shaped areas on the leaf edges.

Rotate crops, plant certified seeds and resistant plants in well-drained soils.

Plant resistant varieties, rotate crops and fumigate the soil.

Descriptions of Common Disease Problems and Management Tactics of Cucurbits

Disease and Description

Management Strategies

Cucumber (Squash) Diseases

Alternaria Leaf Spot (fungal)

Symptoms: This disease causes tan to brown leaf spots with concentric, dark rings.

Rotate crops, plant disease-free seeds and resistant varieties in fertile soil. Spray fungicides as appropriate.

Angular Leaf Spot (bacterial)

Symptoms: Lesions are angular and grayish brown. Fruit has small, water-soaked spots.

Rotate crops, plant disease-free seeds and resistant varieties in fertile soil. Spray fungicides as appropriate.

Anthracnose

Symptoms: This disease causes brown, angular leaf spots and sunken spots on fruit.

Rotate crops, plant resistant varieties and disease-free seeds. Spray fungicides as appropriate.

Bacterial Wilt (bacterial)

Symptoms: This disease causes individual runners to quickly wilt and die.

Control cucumber beetles.

Downey Mildew

Symptoms: This disease causes yellow to brown spots on the upper surfaces of leaves. Infected leaves may die.

Rotate crops, plant disease-free seeds and resistant varieties in fertile soil. Spray fungicides as appropriate.

Fusarium Wilt

Symptoms: Plants wilt and then die. Vascular tissue is light brown.

Plant resistant varieties and rotate crops.

Gummy Stem Blight (fungal)

Symptoms: This disease causes brown spots on the leaves. Stems have cracks with a gummy ooze.

Rotate crops and spray fungicides as appropriate.

Mosaic Virus

Symptoms: This disease causes leaf blades to become long and skinny. Leaves may be mottled.

Control aphids.

Powdery Mildew (fungal)

Symptoms: This disease causes a white, powdery mold to appear on leaf and stem surfaces.

Plant resistant varieties and spray fungicides as appropriate.

Descriptions of Common Disease Problems and Management Tactics of Turfgrass and Grains

Disease and Description

Management Strategies

Turfgrass Diseases

Brown Patch (fungal)

Symptoms: This disease causes small, circular, 1 to 3 inches lesions to develop on short cut grasses. Grass may be killed to the soil surface. On taller cut grasses, larger patches of bleached grass occur. Lesions are light tan and often have a dark margin at the edge.

Provide adequate nitrogen fertilization and soil moisture levels. Spray fungicides as appropriate.

Dollar Spot (fungal)

Symptoms: This disease causes brown patches, up to 3 feet in diameter, to develop during hot, wet weather. Brown patch is the most serious disease during the summer on tall fescue in Tennessee. Some green leaves are usually present in the brown patches.

Provide proper good soil drainage and soil pH. Low levels of nitrogen will help reduce the severity of brown patch on cool season grasses. Spray fungicides as appropriate.

Fairy Rings (fungal)

Symptoms: Fairy rings may appear as small to large rings of very green grass, dead grass, mushrooms or puffballs, with little effect on the grass. The soil in the rings may become very dry and difficult to wet during the summer and fall. Rings can vary in size from 1 foot up to more than 100 feet in diameter. Some fairy rings continue to enlarge for many years with an increase in diameter of 1 to 2 feet per year.

Remove large sources of organic matter, such as stumps, before planting. The removal of excess thatch may help prevent development in established turf. Aerification and extra watering of the rings may help the grasses outgrow the damage. Soil fumigation, soil removal or turf renovation by rototilling can also help control fairy ring. Some fungicides may also help control fairy rings.

Fusarium Patch/Pink Snow Mold (fungal)

Symptoms: This disease causes circular patches to develop during cold, wet weather. Patches are rarely greater than 6 inches without snow cover and up to 2 feet with snow cover. The grass in the patches appears to be gray or light tan. Patches become pink to salmon after exposure to light.

Avoid heavy applications of fertilizer before cold, wet weather or before the first expected prolonged snow cover. Mow the grass until growth stops; this will prevent a build-up of excess foliage. Remove fallen leaves during the autumn and winter. Fungicides must be applied before snow cover to prevent disease development under snow. In areas that snow cover is not a problem, certain fungicides can be applied when the disease is first observed.

Helminthosporium Diseases (fungal)

Symptoms: These pathogens cause leaf, crown and root diseases. Dark, circular lesions that enlarge and girdle the leaves usually characterize these diseases. Thinning-out and fading-out symptoms usually occur during stress periods. These pathogens may also cause seedling blights on recently planted turfgrasses.

Apply fertilizer to encourage uniform growth while avoiding excess growth, especially in the spring and summer. Turf should be irrigated as infrequently as possible, without causing drought stress. Plant resistant cultivars. Spray appropriate fungicides at the early form of development.

Powdery Mildew (fungal)

Symptoms: This disease causes a white to gray, powdery growth of fungus mycelium on infected leaves. Heavily infected leaves turn yellow and die slowly. Lower leaves are generally affected more than upper leaves. This disease is also common on grains.

Provide adequate light intensity and air movement. Select the most shade tolerant cultivars and apply appropriate fungicides. Properly fertilizing to avoid lush growth, increasing the mowing height and irrigating to prevent drought stress will help infected plants overcome this disease.

Descriptions of Common Disease Problems and Management Tactics of Turfgrass and Grains

Disease and Description

Management Strategies

Pythium Blight (fungal)

Symptoms: Pythium blight first appears as small, circular patches from 1 to 12 inches in diameter. Patches often resemble the early stages of dry wilt. This disease spreads rapidly in streaks along drainage patterns. Gray, cottony mycelium may be seen in the affected areas during very humid weather. Root rot type diseases that are caused by several Pythium species may develop during hot or cold, wet weather. These diseases can result in a thinning, or a decline, of turf.

Select proper fungicides and use them in a preventative program during favorable weather conditions for Pythium blight. Planting cool season grasses in the fall will help prevent severe seedling blight. Good soil and air drainage and low levels of nitrogen will help reduce the severity of this disease.

Rust (fungal)

Symptoms: This disease causes small, yellow flecks to develop on the leaves and stems. Eventually, spots on the leaves become larger and the yellow areas develop raised centers. Infected plants become yellow and weakened and may die during stress periods. This results in thin and weak turfs. This disease is also common on grains.

Some cultivars are resistant to rust and should be used when available. Several fungicides can be used to control this disease. Proper fertilization and irrigation will help reduce damage from rust. Leaves should be kept free of water as long as possible by watering in the morning, by improving air drainage and by removing excess shade.

Spring Dead Spot (fungal)

Symptoms: This disease first appears as dead spots in 3- to 5-year-old turf in the spring, as bermudagrass resumes growth from winter dormancy. The spots expand for 3 to 4 years. After the second or third year, the disease often appears as rings of dead grass and then disappears after 3 to 4 years. Bermudagrass usually grows over the spots slowly during the summer. The infected areas often remain lower than the surrounding grass. Weeds frequently invade these spots.

A fungicide may be used for control. Reduced levels of nitrogen and thatch removal may reduce the severity of this disease. Practices that increase winter hardiness, such as applications of potassium fertilizer in late summer and higher mowing heights, will help reduce the severity of the disease.
