

Crop: Grape

Disease: Grape Isariopsis Leaf Blight

Symptoms: Lesions on the grape leaf surface are irregularly shaped (2 to 25 mm in diameter), initially dull red to brown and turning black later. Severe cases may see lesions coalesce. Grape berries show symptoms similar to black rot, and entire clusters may collapse.

Cause: The cause of Isariopsis Leaf Blight in grapes is the fungus (*Pseudocercospora vitis*).

Comments: Leaf Blight is common in tropical and subtropical grapes and appears late in the season. Grape varieties such as Cynthiana and Cabernet Sauvignon are susceptible to this pathogen.

Management: Fungicides sprayed for other diseases in the season may help reduce the incidence of Leaf Blight (Isariopsis Leaf Spot) in grapes.

Disease: Esca (Black Measles)

Symptoms: Symptoms of Esca in grapes appear on grape leaves, trunk, canes, and berries. Leaves show intervenal striping, appearing as chlorotic and necrotic strips in white cultivars and red areas with necrotic strips in red cultivars. Grape berries may show superficial spots that coalesce to make them appear black. Dark brown to black vascular streaking in the trunk, arms, or cordons, and dark sap oozing from cut trunks.

Cause: The cause of Esca in grapes is the fungi (*Phaeomoniella aleophilum*, *Phaeomoniella chlamydospora*).

Comments: Symptoms of Esca may appear together or only in one part of the grapevine. Severe infestation can kill a grapevine in a single year (apoplexy). This disease is common in 5 to 7-year-old vineyards. Pruning wounds help in the pathogen's entrance and establishment in grapes.

Management: Currently, no effective control method exists for Esca in grapes. It is recommended to remove and destroy infected grape berries, leaves, and trunks. Protect pruning wounds in grapevines to minimize fungal infection using wound sealants (5% boric acid in acrylic paint), essential oils, or suitable fungicides.

Disease: Black Rot

Symptoms: Brown lesions on grape leaves develop black dots (pycnidia); grape berries have light spots that eventually form pycnidia; grapes harden and turn black, remaining on the vine.

Cause: The cause of Black Rot in grapes is the fungus (*Guignardia bidwellii*).

Comments: Black Rot disease in grapes favors rainy weather; spores may ooze out during rain.

Management: To manage Black Rot in grapes, remove all mummified grape fruit from vines during dormant pruning; cultivate soil during bud break to bury mummies and reduce inoculant; apply appropriate fungicides to control the disease.

Crop: Apple

Disease: Apple Scab

Symptoms: Yellow or chlorotic spots on apple leaves; dark olive green spots on leaves and fruit; may be a velvety growth on spots on the undersides of leaves; twisting and distortion of leaves; severely infected apple leaves turn yellow and drop from the tree.

Cause: The cause of Apple Scab is the fungus (*Venturia inaequalis*).

Comments: The fungus that causes Apple Scab overwinters on dead apple foliage on the ground; spores are dispersed by wind, and high moisture encourages fungal growth.

Management: To manage Apple Scab, remove all leaves dropped from the apple tree in the fall and compost them to prevent the disease from surviving in debris. Apply zinc and fertilizer-grade urea in the Fall to speed leaf drop, then add lime to fallen leaves. Fungicide application may be necessary in areas where apple leaves remain wet for periods in excess of 9 hours; fungicides such as copper soaps and Bordeaux mixture should be applied if there is a chance of wet periods as soon as leaf tips emerge.

Disease: Cedar Apple Rust

Symptoms: Bright orange or yellow patches on the topside of apple leaves surrounded by a red band and small black spots in the center; by mid-summer, cup-like structures called aecia form on the leaf undersides, covered in tubular structures from which spores are released.

Cause: The cause of Cedar Apple Rust in apples is the fungus (*Gymnosporangium juniperi-virginianae*).

Comments: The fungus causing Cedar Apple Rust requires two hosts (apple and Eastern red cedar) to complete its lifecycle; it forms galls on Eastern red cedar, and spores are carried by wind to apple trees. Caution is needed when planting apple trees close to red cedar.

Management: To manage Cedar Apple Rust in apples, plant resistant varieties where possible; remove nearby red cedar; if growing susceptible apple varieties in proximity to red cedar, follow a fungicide program.

Crop: Corn (Maize)

Disease: Northern Leaf Blight

Symptoms: Elliptical gray-green lesions on corn leaves that become pale gray to tan in color; lesions have long, narrow shapes unrestricted by veins and become dirty due to dark gray spores, particularly under the lower leaf surface.

Cause: The cause of Northern Leaf Blight in corn is the fungus (*Exserohilum turcicum*).

Comments: The disease spreads through rain splash and wind, affecting corn crops.

Management: To manage Northern Leaf Blight in corn, follow proper tillage to reduce fungus inoculum from crop debris; practice crop rotation with non-host crops; grow resistant corn varieties; apply suitable fungicides in severe cases.

Disease: Common Rust

Symptoms: Oval or elongated cinnamon-brown pustules on the upper and lower surfaces of corn leaves; pustules rupture and release powdery red spores, turning dark brown-black as they mature.

Cause: The cause of Common Rust in corn is the fungus (*Puccinia sorghi*).

Comments: The disease is spread by wind-borne spores; many sweet corn varieties have little resistance to Common Rust.

Management: To manage Common Rust in corn, plant resistant hybrids; fungicides may provide some control and are most effective when the amount of secondary inoculum is low.

Disease: Cercospora Leaf Spot (Gray Leaf Spot)

Symptoms: Small necrotic spots with chlorotic halos on corn leaves that expand to rectangular lesions; lesions mature to tan and finally gray with sharp, parallel edges.

Cause: The cause of Cercospora Leaf Spot in corn is the fungus (*Cercospora zeae-maydis*).

Comments: Disease emergence is favored in areas where continuous corn cropping with minimum tillage is practiced.

Management: To manage Cercospora Leaf Spot in corn, plant resistant hybrids; crop rotation and plowing debris may help reduce inoculum but may not provide full control; foliar fungicides may be necessary for high-yielding susceptible hybrids.

Crop: Cherry (including sour)

Disease: Bacterial Canker

Symptoms: Cankers on cherry twigs at the bases of flower and leaf buds, pruning wounds, or at the base of spurs that exude amber-colored gum; cankers spread upwards and form sunken areas in winter; if the pathogen enters dormant cherry buds, they may be killed or open normally in spring before collapsing in early summer.

Cause: The cause of Bacterial Canker in cherries is the bacterium (*Pseudomonas syringae*).

Comments: Disease emergence favors high moisture and low temperatures in the spring; young cherry trees and those grown in poorly draining sandy soils are particularly susceptible.

Management: To manage Bacterial Canker in cherries, choose suitable cherry varieties and rootstocks to prevent stress; apply protective copper sprays before flowering; prune cherry trees in early summer to reduce infection likelihood.

Disease: Black Knot

Symptoms: Elongated swellings (knots) on woody parts of the cherry tree, which can reach up to 30 cm (12 in) long; knots initially appear olive green with a corky texture, turning black, hard, and brittle over time; knots grow in length each year.

Cause: The cause of Black Knot in cherries is the fungus (*Apiosporina morbosa*).

Comments: Infections occur on new shoots of cherry trees after rainfall; knots develop rapidly in the second year.

Management: To manage Black Knot in cherries, prune knots on twigs and branches 8-10 cm (3-4 in) below the swelling and remove pruned branches; apply fungicides during shoot elongation.

Disease: Brown Rot

Symptoms: Brown discoloration of cherry fruit skin and inner tissue; wrinkled fruit skin; collapsed flowers exuding sap; tan cankers with dark edges on twigs; gray-brown spore masses may be present on cankers.

Cause: The cause of Brown Rot in cherries is the fungus (*Monilinia fructicola*).

Comments: The fungus survives in mummified cherry fruit, blighted blossoms, cankers, and infected twigs; promoted by wet weather.

Management: To manage Brown Rot in cherries, apply protective fungicides during flowering or after wet periods; avoid sprinkler irrigation; remove mummified fruit and prune infected twigs.

Crop: Squash

Disease: Powdery Mildew

Symptoms: White powdery growth on the upper surfaces of squash leaves and stems; infected areas may become stunted and distorted.

Cause: The cause of Powdery Mildew in squash is fungi (*Erysiphe cichoracearum*, *Sphaerotheca fuliginea*, *Podosphaera xanthii*).

Comments: Disease emergence in squash is favored by dry weather and high relative humidity.

Management: To manage Powdery Mildew in squash, plant in sites with good air circulation and sun exposure; do not overcrowd squash plants; sanitize equipment regularly to prevent the spread of the fungi.

Crop: Potato

Disease: Late Blight

Symptoms: Water-soaked lesions on potato leaves that quickly turn brown to black; white fungal growth on the undersides of leaves in humid conditions; stems can also develop dark, necrotic lesions; potato tubers develop firm, brown, dry rot that starts at the surface and extends inward.

Cause: The cause of Late Blight in potatoes is the oomycete (*Phytophthora infestans*).

Comments: The disease thrives in cool, wet conditions and can cause rapid defoliation of potatoes; the pathogen spreads via airborne spores and infected seed tubers.

Management: To manage Late Blight in potatoes, use certified disease-free seed potatoes; remove all infected potato plants and tubers; practice crop rotation; apply fungicides such as chlorothalonil or mancozeb regularly in areas prone to late blight.

Disease: Early Blight

Symptoms: Dark, concentric ring lesions on older potato leaves, usually beginning at the bottom of the plant; leaves may yellow and die, leading to reduced yield; dark brown or black lesions may appear on potato stems and tubers.

Cause: The cause of Early Blight in potatoes is the fungus (*Alternaria solani*).

Comments: Disease development is favored by warm, wet weather; the pathogen survives on crop debris and infected tubers.

Management: To manage Early Blight in potatoes, remove and destroy infected plant material; use resistant varieties; apply fungicides such as chlorothalonil or mancozeb at regular intervals, especially in areas with a history of early blight; practice crop rotation.

Crop: Bell Pepper

Disease: Bacterial Spot

Symptoms: Water-soaked lesions that dry out and turn brown, forming on the underside of bell pepper leaves; raised brown cankers on stems; cracked brown lesions on fruit.

Cause: The cause of Bacterial Spot in bell peppers is bacteria (*Xanthomonas campestris*, *X. euvesicatoria*, *X. perforans*, *X. vesicatoria*, *X. gardneri*). Comments: Disease emergence in bell peppers is favored by warm, wet conditions; the pathogen can enter a field on seed and transplants and can be spread within a field by wind-driven rain, clipping plants, and aerosols. Management: To manage Bacterial Spot in bell peppers, use disease-free planting material; remove and destroy all crop debris after harvest, or plow material deeply under the soil.

Crop: Peach

Disease: Bacterial Spot

Symptoms: Water-soaked, angular gray lesions on the underside of peach leaves, which turn purple and necrotic in the center and cause a shot hole appearance if the lesion center drops out. In severe infection years, the entire fruit crop may be lost. Lesions on fruit begin as small brown, water-soaked spots that may exude gum.

Cause: The cause of Bacterial Spot in peaches is the bacterium (*Xanthomonas campestris*).

Comments: Periods of frequent rainfall during late bloom and early petal drop increase the likelihood of fruit and leaf infection in peaches; infection is rare during hot, dry weather.

Management: To manage Bacterial Spot in peaches, avoid planting susceptible varieties in areas where the disease is known; protective copper applications in the Fall before leaf drop and/or early in the growing season may help prevent the disease; care should be taken as peach trees are very sensitive to copper.

Crop: Orange

Disease: Huanglongbing (Citrus Greening)

Symptoms: Yellowing of one limb or one area of the orange tree canopy; yellowing of leaf veins; blotchy mottling and/or green islands (spots) surrounded by completely yellow leaf tissue; twig and limb dieback; fruits may drop prematurely and are often misshapen and lopsided; fruit has a bitter, salty taste.

Cause: The cause of Huanglongbing in oranges is bacteria (Candidatus *Liberibacter asiaticus*, Candidatus *Liberibacter africanus*, Candidatus *Liberibacter americanus*).

Comments: Huanglongbing was first reported in Southern China in 1919 and has since spread across Asia, Africa, and the Americas. The disease is transmitted primarily by citrus psyllids (*Diaphorina citri* in Asia and the Americas, *Trioza erytreae* in Africa and Madagascar) or through grafting.

Management: To manage Huanglongbing in oranges, remove and destroy infected trees promptly, and conduct frequent scouting to identify infected trees early. Use chemical sprays to control citrus psyllid populations, and implement large-scale spraying where necessary.

Crop: Tomato

Disease: Tomato Yellow Leaf Curl Virus (TYLCV)

Symptoms: Severe stunting of the tomato plant; upward curling and yellowing of the leaf margins; reduction in leaf size; flower drop; severely infected tomato plants produce little or no fruit.

Cause: The cause of Tomato Yellow Leaf Curl Virus in tomatoes is the virus (TYLCV).

Comments: TYLCV is transmitted by whiteflies (*Bemisia tabaci*) and is prevalent in warm, dry conditions.

Management: To manage Tomato Yellow Leaf Curl Virus, use resistant tomato varieties; control whitefly populations using insecticides; use reflective mulches to deter whiteflies; remove and destroy infected tomato plants.

Disease: Tomato Mosaic Virus (ToMV)

Symptoms: Mosaic-like mottling of tomato leaves; yellowing; curling; reduced leaf size; stunted growth; fruit may have brown streaks or mottling.

Cause: The cause of Tomato Mosaic Virus in tomatoes is the virus (ToMV). **Comments:** The virus spreads through contaminated tools, hands, and infected plant material; survives in crop debris and contaminated soil.

Management: To manage Tomato Mosaic Virus, use certified disease-free tomato seeds and transplants; sanitize tools and hands; avoid planting tomatoes in the same area for several years.