

Holly Diseases & Insect Pests

Diseases

Black Root Rot: Black root rot is caused by the fungus *Thielaviopsis basicola*. This fungus primarily affects the root system and reduces plant vigor. Aboveground symptoms may include stunting of terminal growth, shortening of internodes and interveinal chlorosis. Infected roots are dark brown to black, usually starting at the root tips. Plants with extensive root rot damage will usually decline and die during dry periods.



Damaged Japanese holly (*Ilex crenata*) roots infected with black root rot.

Division of Plant Industry Archive, Florida Department of Agriculture and Consumer Services, www.forestryimages.org

Prevention & Treatment: The fungus has the ability to persist in the soil for many years, even in the absence of susceptible plants. High soil moisture and low soil temperatures favor development of black root rot. Fungicide drenches are not generally recommended for landscape use since infected plants cannot be cured. Remove infected plants and replace with other shrubs or resistant holly species, such as Chinese holly (*Ilex cornuta*). Yaupon holly (*I. vomitoria*) and American holly (*I. opaca*) are moderately resistant, while Japanese hollies (*I. crenata*) are very susceptible to black root rot. Use

raised beds in landscape plantings to provide good drainage.

Phytophthora Root Rot: The water mold fungus, *Phytophthora cinnamomi*, causes root rot on hollies growing in very poorly drained sites or wet areas. Planting too deeply and over-mulching may also contribute to disease development. The symptoms of this disease and black root rot are similar. Typically, yellowing of the leaves (particularly at the shoot tips), early leaf drop, slowed plant growth and twig dieback are seen at early stages of the disease. Later, one or more limbs may wilt and die back to the main trunk, and a brown to black streak of dead tissue may extend from one area of rotted roots to the damaged limb. Often, the root system will continue to disintegrate until the plant dies.

Prevention & Treatment: Hollies grown under stress are much more sensitive to root rot disease than are well-maintained, vigorous plants. Always select hollies that are adapted to the local climate and soil conditions. Root rot pathogens are often introduced into the landscape on diseased container plants. To avoid introducing these pathogens, purchase hollies with healthy roots and good foliage color. Good cultural practices, such as proper fertilization, control of soil moisture and providing good drainage (raised beds) will reduce the disease. Japanese hollies (*I. crenata*) are very intolerant of poorly drained soils and are especially prone to root rot.

The fungus thrives in areas with poor drainage and warm soils. Always choose locations that have good drainage for planting. The drainage of existing areas can be improved by using raised beds. Fungicides can be effective on a preventative basis only, and repeat applications are required. Fungicides containing mefenoxam can be applied in the home

landscape, but will not cure an infected plant. See Table 1 for examples of products containing the active ingredient. Due to product cost and for accurate application, homeowners may want to hire a licensed landscaper to apply products containing these fungicides. Apply all chemicals according to directions on the label.

Tar Spot: This disease is caused by the fungus *Phacidium curtisii*. Yellow spots appear on the leaves of American and English hollies in May. These turn reddish-brown and finally black by fall. In years of heavy rainfall berries as well as leaves are spotted.

Prevention & Treatment: Remove and destroy badly spotted leaves, prune to improve air circulation and overcrowding, and clean up and destroy fallen leaves.

Nematodes: Root-knot (*Meloidogyne*), ring (*Criconeimoides*), stunt (*Tylenchorhynchus*), sting (*Belonolaimus*) and spiral (*Helicotylenchus*) nematodes are seldom seen due to their microscopic size. They live in organic matter in the soil or on roots and other parts of living plants. Most parasitic nematodes feed by a stylet, sucking juices from plant cells. They injure plants by direct feeding or wounding tissue, making an entrance for other disease organisms. Plant decline is often the only symptom, followed by gradual stunting, chlorosis, and leaf drop.

Prevention & Treatment: Presently there are no effective chemicals registered for control of nematodes in existing landscape plants. Remove infected plant material and surrounding soil. Plant resistant varieties into nematode-free soils. Chinese holly cultivar 'Burford' and Yaupon holly cultivar 'Nana' are tolerant to root-knot, stunt and ring nematodes.

Insects & Mites

Southern Red Mite: Southern red mite (*Oligonychus ilicis*) is an important pest of hollies, especially *I. crenata* 'Convexa', a Japanese holly. Mites are not insects, but are more closely related to spiders. Southern red mite adults are reddish brown and less than 1/50-inch long. Using sucking mouthparts, they feed on the undersides of leaves, where fine webbing is often seen. Symptoms of

feeding include light yellow speckling on leaves. Leaves may turn a bronze color and then drop. With severe infestations, webs may cover both leaf surfaces and branch tips. Populations of southern red mites usually peak in spring and fall. They are almost inactive during the heat of midsummer. Check for mites by looking at the undersurface of leaves in early spring or by shaking a branch over white paper.



Adults, eggs, and cast skins (white) of southern red mite (*Oligonychus ilicis*).
John A. Weidhass, Virginia Polytechnic Institute and State University, www.forestryimages.org

Control: Naturally occurring predators of mites include various predatory mites, ladybird beetles and other insects. Mites can be removed with a strong spray of water, if applied on a regular basis. Insecticidal soap sprays can provide control when applied before population numbers get too high. The following pesticides are labeled for use by homeowners against southern red mite: horticultural oil, bifenthrin, and acephate. See Table 1 for examples of products containing these active ingredients. These products should be applied when mites are present and again in seven to 10 days. Horticulture oil may be sprayed when temperatures are between 45 and 90 degrees. As with all pesticides, read and follow all label instructions and precautions.

Leafminers: Leafminers (*Phytomyza* species) are common pests of hollies. In South Carolina, the native holly leafminer (*Phytomyza ilicicola*) is the most common. Leafminers are the larvae (immature forms) of small (about 1/8-inch in length) black and gray flies. The larvae are about 1/16-inch long. The adult female inserts eggs into young leaves through puncture wounds made by her ovipositor. The

presence of many punctures can result in deformed leaves. The eggs hatch in about four days. The larvae then tunnel through the leaf between the upper and lower surfaces. The paths they follow turn yellowish brown and typically broaden into a blotch. Their presence inside the leaf protects them from many insecticides. Parasitic wasps and birds are natural predators of these pests. American holly (*I. opaca*) cultivars are particularly susceptible to leafminer damage.



Leafminer damage on American holly (*Ilex opaca*).
Daniel Herms, The Ohio State University,
www.forestryimages.org

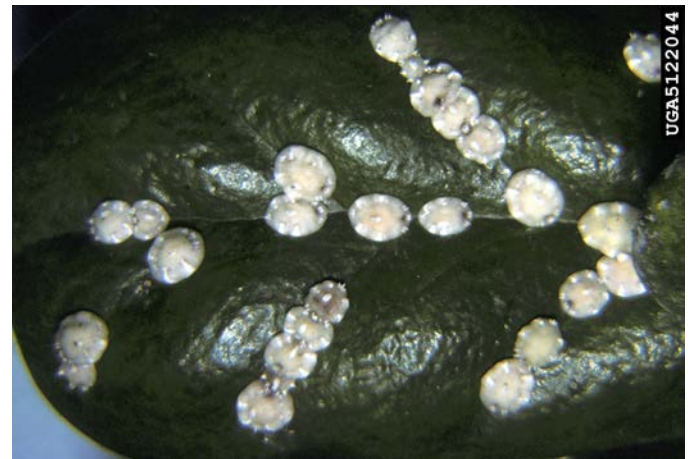
Control: With a light infestation, homeowners can handpick and destroy infested leaves. Foliar insecticides labeled for use by the homeowner include foliar systemic insecticides, such as acephate or spinosad for larvae within mines during May. As an alternative, a soil application of dinotefuran or imidacloprid is effective in controlling the larvae within the leaves. Treat shrubs with dinotefuran or imidacloprid in the early spring for season-long protection. Dinotefuran may move into shrubs more quickly than imidacloprid for faster pest control. Read and follow all label instructions and precautions.

Scale: Many scale species are pests of holly, especially Chinese holly cultivars (*I. cornuta*). Scales are unusual insects in appearance. They are small and immobile, with no visible legs. Scales vary in appearance depending on age, sex and species. They feed on sap by piercing the leaf or stem with their mouthparts and sucking. They are typically found on the undersurfaces of leaves and look like small brownish or grayish bumps. Some species may be found on the branches as well. Adults are relatively protected from insecticides by

their waxy covering. Their immature forms, called crawlers, are susceptible, however.

Greedy scale (*Hemiberlesia rapax*) is an armored scale that has been reported on 'East Palatka' holly. Indian wax scale (*Ceroplastes ceriferus*) is a soft scale that may infest Chinese and Yaupon hollies. **Holly pit scale** (*Asterolecanium puteanum*) is may be a pest on American, 'Burford', Japanese and Yaupon hollies.

Plants may appear water-stressed, and there may be a yellowing of foliage followed by leaf drop. On extensively infested hosts, there is a general decline in plant health, with limb or branch death, and possibly plant death. Check other nearby woody plants for infestations.



Florida wax scale (*Ceroplastes floridensis*) on Chinese holly (*Ilex cornuta*).

United States National Collection of Scale Insects
Photographs Archive, USDA Agricultural Research Service,
www.forestryimages.org

Control: Light infestations of scale can be scraped off by hand or infested branches pruned out. Promptly dispose of prunings. For heavier infestations, spray with a horticultural oil in the early spring to kill adults. Oil should be applied before new growth begins to kill both overwintering adults and eggs. Horticultural oil sprays kill by suffocation and can provide excellent control of all scales. More than one spray may be required.

Monitor the crawler emergence with sticky cards, double-faced tape wrapped around a branch, or by putting an infested shoot or leaf into a baggie and watching for crawler movement. Crawler activity often coincides with the flush of new plant growth in the spring. However, some scale species may

have overlapping generations with an extended crawler emergence period, such as along the coast. Spray with horticultural oil in the spring after the plants have begun growing and the danger of cold weather has passed. Repeat this application after 10 days to better control the crawlers, adults and eggs by smothering them. Horticulture oil may be sprayed when temperatures are between 45 and 90 degrees.

Avoid using contact insecticides unless the plant is very valuable and in serious danger from scale. Insecticides will often kill the naturally occurring predators of scale. If insecticides are going to be used, spray when crawlers are observed.

Insecticides labeled for homeowner use against scale crawlers include acephate, malathion, cyfluthrin, lambda- cyhalothrin, permethrin, bifenthrin, and carbaryl. A soil drench with imidacloprid will control soft scales only, whereas dinotefuran applied to the soil will control both soft and armored scales. See Table 1 for examples of products containing these active ingredients. As with all pesticides, read and follow all label instructions and precautions.

Two-lined Spittlebug: Two-lined Spittlebug (*Prosapia bicincta*) is primarily an insect pest of Southern turfgrasses, especially centipedegrass and St. Augustinegrass, but also of certain trees and shrubs. ‘Savannah’, ‘East Palatka’ and ‘Foster’ hollies may be significantly damaged by adult spittlebug feeding in the late summer and early fall. The adult is about a 1/3-inch long and brown with 2 orangish-red stripes on the wings. The nymph (immature stage) is white or yellowish and without wings. Nymphs create the white, frothy spittlemass which helps keep them moist and protects them from predators and parasites.

There are 2 generations of two-lined spittlebugs in South Carolina, and this insect over-winters as eggs (generally laid in turfgrass). The eggs hatch in late-March or April and the nymphs suck leaf sap from turfgrass. After approximately a month, the nymphs become winged adults, which also feed upon turfgrass sap. A second generation of eggs is laid, again in turfgrass, where the nymphs will feed. However, it is the resulting second generation of adults that cause the most damage, both in lawns, but also in nearby ornamentals, such as on certain types of hollies. Holly leaf damage from adult

feeding can be leaf distortion, wilting, discoloration of younger leaves, blotches on older leaves, and leaf-drop.

Control: In late summer or early fall when damage occurs, apply an insecticidal spray to control the adult feeding. Sprays will last about 10 – 14 days. An insecticidal spray containing one of the following active ingredients will reduce damage by adult spittlebugs: acephate, bifenthrin, cyfluthrin, lambda-cyhalothrin or permethrin.

In anticipation of adult spittlebug damage the next year, another means of control is to use a soil-applied insecticide in the spring as new growth appears on the shrubs. These products contain imidacloprid, which will move up and throughout the shrub and protect the holly from most insect damage for a year. These products are either granules or liquids that are applied around the base of the hollies. Follow the product label for rate and application directions. See Table 1 for examples of products containing these active ingredients.

Disorders

Purple Leaf Scorch: The most common leaf discoloration is a purplish blotch due to the environment rather than a fungus. This leaf scorching is caused by the presence of water or ice on the leaves at the time the sun is shining brightly. This causes a scalding, followed by invasion of secondary organisms and finally by scorching.

Spine Spot: Small, gray spots with purple halos are caused by the puncturing of the leaves by the spines of adjacent holly leaves. This "spine spot" is often confused with the slits made by the holly leafminer. Leafminer damage has neither a gray center nor a purple halo.

Winter Damage: Symptoms of winter damage may be browning of leaves, marginal leaf scorch, defoliation, twig and limb death, and death of entire plants.

Drought Damage: Holly leaves often turn yellow or brown during a sudden drought period. Japanese hollies, particularly ‘Helleri’, are not very tolerant to low soil moisture, particularly for the first several years after planting. Keep plants watered during periods of drought.

Table 1. Fungicides, Insecticides & Miticides to Control Diseases & Pests of Hollies.

Active Ingredient	Examples of Brands and Products
Acephate	Bonide Systemic Insect Control Concentrate
Bifenthrin	Ortho Bug-B-Gon Insect Killer for Lawns & Gardens Concentrate; & RTS ¹ Hi-Yield Bug Blaster Bifenthrin 2.4 Concentrate; & RTS ¹
Carbaryl	Garden Tech Sevin Concentrate Bug Killer Concentrate; & RTS ¹
Cyfluthrin	Bayer Advanced Vegetable & Garden Insect Spray Concentrate; & RTS ¹
Cyhalothrin, lambda or gamma	Spectracide Triazicide Insect Killer - Lawns & Landscapes Concentrate; & RTS ¹ Bonide Beetle Killer RTS ¹ Bonide Caterpillar Killer RTS ¹ Martin's Lawn & Garden RTS ¹
Dinotefuran	Valent Brand Safari 2G Insecticide (2%, granules) Valent Brand Safari 20SG Insecticide (20%, drench ²) Gordon's Zylam Liquid Systemic Insecticide Concentrate (10%, drench ²) Gordon's Zylam 20SG Systemic Turf Insecticide (20%, drench ²) Ortho Tree & Shrub Insect Control Ready to Use Granules (2%)
Horticultural oil ³	Ferti-lome Horticultural Oil Spray Concentrate Bonide All Seasons Spray Oil Concentrate Southern Ag ParaFine Horticultural Oil Concentrate Espoma Earth-tone Horticultural Oil Concentrate; & RTS ¹ Monterey Horticultural Oil Concentrate
Imidacloprid	Bayer Advanced Garden 12 Month Tree & Shrub Insect Control Concentrate Landscape Formula (2.94%, drench ²) Bayer Advanced 12 Month Tree & Shrub Insect Control Protect & Feed 2-1-1 (1.1%; granules) Bonide Annual Tree & Shrub Insect Control w/ Systemaxx Concentrate (1.47%, drench ²) Ferti-lome Tree & Shrub Systemic Insect Drench ² (1.47%) Ferti-lome Tree & Shrub Systemic Insect Granules (2.5%) Ortho Tree & Shrub Insect Control RTS (drench ² , 12 month control) Ortho Tree & Shrub Insect Control Granules (12 month control) Gordon's ImidiPro Systemic Insecticide (drench ² 21.4%) Gordon's Tree & Shrub Insect Killer Concentrate (1.47%, drench ² 12 mo. control) Monterey Once A Year Insect Control II Concentrate (1.47%, drench ²) Bonide Systemic Insect Control Granules (0.22%; 8 weeks control) Hi-Yield Systemic Insect Granules (0.22%; 8 weeks control) Ortho MAX Tree & Shrub Insect Control RTS (drench ²); & Granules Ortho Bug B Gon Year Long Tree & Shrub Insect Control Concentrate (1.47%, drench ²) Merit 2 Granular (2%)
Malathion	Spectracide Malathion Insect Spray Concentrate Southern Ag Malathion 50% EC Hi-Yield 55% Malathion Insect Spray Concentrate Tiger Brand 50% Malathion Concentrate Gordon's Malathion 50% Spray Concentrate Bonide Malathion Insect Control 50% Concentrate Martin's Malathion 50% Concentrate Ortho MAX Malathion Insect Spray Concentrate
Mefenoxam	Subdue GR

Permethrin	Bonide Eight Insect Control Vegetable, Fruit & Flower Concentrate Bonide Total Pest Control Outdoor Concentrate Hi-Yield Indoor/Outdoor Broad Use Insecticide Concentrate Bonide Eight Yard & Garden RTS ¹ Tiger Brand Super 10 Concentrate Martin's Vegetable Plus Concentrate
Spinosad	Southern Ag Conserve Naturalyte Insect Control Concentrate Bonide Colorado Potato Beetle Beater Concentrate Bonide Captain Jack's Deadbug Brew Concentrate; & RTS ¹ Ferti-lome Borer, Bagworm & Leafminer Spray Concentrate Monterey Garden Insect Spray Concentrate Natural Guard Spinosad Landscape & Garden Insecticide RTS ¹
<ol style="list-style-type: none"> 1. RTS = Ready to Spray (hose-end applicator) 2. Drench = Add to water and pour around base of plant. 3. Do not apply horticultural oil sprays when the temperature is above 90 °F or to drought-stressed plants. Spray late in the day and when no rainfall is expected within 24 hours. <p>With all pesticides, read and follow all label instructions and precautions.</p>	

Caution: Pollinating insects, such as honey bees and bumblebees, can be adversely affected by the use of pesticides. Avoid the use of spray pesticides (both insecticides and fungicides), as well as soil-applied, systemic insecticides unless absolutely necessary. If spraying is required, always spray late in the evening to reduce the direct impact on pollinating insects. Always try less toxic alternative sprays first for the control of insect pests and diseases. For example, sprays with insecticidal soap, horticultural oil, neem oil extract, spinosad, *Bacillus thuringiensis* (*B.t.*), or botanical oils can help control many small insect pests and mites that affect garden and landscape plants. Neem oil extract or botanical oil sprays may also reduce plant damage by repelling many insect pests. Practice cultural techniques to prevent or reduce the incidence of plant diseases, including pre-plant soil improvement, proper plant spacing, crop rotation, applying mulch, applying lime and fertilizer based on soil test results, and avoiding over-head irrigation and frequent watering of established plants. Additionally, there are less toxic spray fungicides that contain sulfur or copper soap, and biological control sprays for plant diseases that contain *Bacillus subtilis*. However, it is very important to always read and follow the label directions on each product. For more information, contact the Clemson Extension Home & Garden Information Center.

Pesticides updated by Joey Williamson, HGIC Horticulture Extension Agent, Clemson University, 10/16. Revised by Joey Williamson, HGIC Horticulture Extension Agent, Clemson University. Originally prepared by Marjan Kluepfel HGIC Horticulture Information Specialist; J. McLeod Scott, HGIC Horticulture Extension Agent; James H. Blake, Extension Plant Pathologist; and Clyde S. Gorsuch, Extension Entomologist, Clemson University. New 04/01. Revised 09/14. Images added 11/09.

This information is supplied with the understanding that no discrimination is intended and no endorsement of brand names or registered trademarks by the Clemson University Cooperative Extension Service is implied, nor is any discrimination intended by the exclusion of products or manufacturers not named. All recommendations are for South Carolina conditions and may not apply to other areas. Use pesticides only according to the directions on the label. All recommendations for pesticide use are for South Carolina only and were legal at the time of publication, but the status of registration and use patterns are subject to change by action of state and federal regulatory agencies. Follow all directions, precautions and restrictions that are listed.