

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 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 overmulching 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 etridiazole (Banrot 8G or Truban 5G)

and mefenoxam (Subdue GR) can be applied in the home landscape, but will not cure an infected plant. 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

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 $\frac{1}{50}$ 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. 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 (such as Green Light Horticultural Oil Spray, SunSpray Horticultural Oil, Bonide All Seasons Spray Oil, and Southern Ag Parafine Horticultural Oil), bifenthrin (Ortho Bug-B-Gon MAX Lawn & Garden Insect Killer, and Hi-Yield Bug Blaster II), and acephate (Ortho Japanese Beetle Killer). 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 40 and 85 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 $\frac{1}{8}$ -inch in length) black and gray flies. The larvae are about $\frac{1}{16}$ 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.
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 systemic insecticides, such as acephate (Ortho Japanese Beetle Killer) for larvae in mines in May. As an alternative, a soil application of dinotefuran (Green Light Tree & Shrub Insect Control) or imidacloprid (Bayer Advanced Garden Tree & Shrub Insect Control Concentrate, Ferti-lome Tree & Shrub Systemic Insect Drench, and Bonide Tree & Shrub Insect Control with Systemaxx) 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. Horticulture oil may be sprayed when temperatures are between 40 and 85 degrees. 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.

Control: Light infestations of scale can be scraped off by hand or branches pruned out. For heavier infestations, spray with a horticultural oil (such as Bonide All Season Spray Oil, Ferti-lome Scalecide, Green Light Horticultural Oil Spray, or Ortho Volck Oil Spray) in the early spring to kill adults. Oil should be applied before new growth begins to kill adults and eggs.



Florida wax scale on Chinese holly.
United States National Collection of Scale Insects
Photographs Archive, USDA Agricultural Research Service,
www.forestryimages.org

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 40 and 85 degrees.

Avoid using 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 (Ortho Japanese Beetle Killer), malathion (such as Bonide Malathion, Southern Ag Malathion, Spectracide Malathion Insect Spray, or Ortho Malathion Insect Spray), cyfluthrin (Bayer Advanced Garden Power Force Multi-Insect Killer), permethrin (Bonide Eight Insect Control Vegetable Fruit & Flower Concentrate), bifenthrin (Ortho Bug-B-Gon MAX Lawn & Garden Insect Killer or Hi-Yield Bug Blaster II), and carbaryl (Garden Tech Sevin or Ferti-lome Liquid Carbaryl Spray). As with all pesticides, read and follow all label instructions and precautions.

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. The latter have 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.

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. Revised by Joey Williamson, HGIC Horticulture Extension Agent, Clemson University. (New 04/01. Revised 11/09. Images added 11/09.)

This information is supplied with the understanding that no discrimination is intended and no endorsement by the Clemson University Cooperative Extension Service is implied. 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.