



“HELMINTHOSPORIUM” LEAF, CROWN, AND ROOT DISEASES OF TURFGRASSES

Helminthosporium leaf, crown, and root rots are a common and serious group of diseases attacking turfgrasses in the United States, including Illinois. The causal fungi attack essentially all turfgrasses as well as numerous pasture, wild and weed grasses, and small grains.

These diseases reduce vigor and can be very destructive during wet, humid weather, where the turf is sprinkled frequently, especially in late afternoon and early evening, in poorly drained areas, and where it is shady. The more often and longer grass remains wet, the greater the chance of disease.



Figure 1. Melting-out in a home lawn.

Dry periods alternating with prolonged cloudy, moist weather and moderate temperatures, in addition to close mowing, slow growth of grass, low fertility, or excessive shade and nitrogen fertilization, all favor *Helminthosporium* diseases. Other factors that may add to disease severity include thatch buildup, frequent light sprinklings, compaction from excessive traffic, nematode damage, the use of susceptible grass cultivars, allowing piles of clippings to remain in place, and applications of certain postemergence herbicides such as 2,4-D, mecoprop (MCP), and dicamba.

Helminthosporium fungi (now generally referred to as species within the genera *Bipolaris*, *Drechslera* and *Exosporium*) may be responsible for the gradual browning and thinning (melting-out) of susceptible Kentucky bluegrass cultivars and other susceptible grasses. As the disease progresses, large, irregular turf areas may turn yellow, then brown to straw colored, and subsequently die. In some instances, the entire turf is lost. Bermudagrass may be severely attacked by a number of these fungi, causing leaf, crown and root rots.

The turf may be thinned, or diseased plants may appear in irregular patches. Fescues, ryegrasses, and bentgrasses may be similarly affected, especially when maintained under high levels of nitrogen. Once one or more of these fungi become established in a turfgrass stand, they remain an ever-present problem. It is not unusual to find two or more species of these fungi infecting a single plant or even the same leaf.

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Symptoms

This group of diseases produces a variety of symptoms, depending on the cultivar and species of grass, cultural management program, season (primarily day length and temperature), weather conditions, and the fungus or fungi that are present.

LEAF SPOTS OR BLIGHTS

Small spots or lesions, which vary in color from reddish brown to purplish black, appear on the leaves from early spring to late fall. These lesions may increase rapidly in size and become round to oval, oblong, elongate, or irregular.

Their centers often fade from an ash-white to pale tan or straw color. The spots are commonly surrounded by a narrow, dark reddish brown to purplish black border (Figure 2), often described as “eye-spots.” Under moist conditions, one or more lesions may merge and girdle a leaf blade, causing it to turn yellow to straw-colored, tan, or reddish brown and die back from the tip. When leaf spots are numerous, leaves may be completely blighted, wither, and die. Older leaves are much more susceptible to attack than younger leaves. Depending upon the species of fungus, lesions may or may not occur on the leaf sheaths and stems. However, diseased leaf sheaths will turn from reddish to purple or brown. Leaf sheath infection is often so severe that the entire leaf or tiller is girdled and drops prematurely. If the moisture continues, the disease often progresses inward from leaf sheath to leaf sheath on a single plant until the plant is killed above ground and may eventually involve the crown, rhizomes, stolons, and roots, killing the entire plant. In severe cases nearly all the leaves and tillers die, resulting in a severe thinning of turf; hence the name melting-out.

In hot, humid weather, closely clipped bentgrass leaves easily are girdled, turn reddish brown or dark gray, giving a smoky-blue cast to infected, irregularly shaped areas in golf or bowling greens. Such turf appears drought-stressed.

CROWN AND ROOT ROTS (MELTING-OUT)

This phase of the disease usually appears first in warm to hot, dry weather as a reddish brown or purplish black decay of the stem, crown, rhizome, stolon, and root tissues (Figure 3), sometimes turning reddish brown to chocolate brown or black when invaded by secondary bacteria and fungi. The feeding roots on diseased plants are shallow, few in number, or even absent. Such plants lack vigor and often wilt during midday, even when soil moisture is abundant. Diseased turf may have a yellow then brown or drought-injured appearance (Figure 1). The damaged areas may be small and circular to large and irregular with entire stands of bluegrasses, fescues, ryegrasses, bermudagrasses, or bentgrasses thinned out or completely destroyed by severe crown and root rot. This phase occurs most readily when plant vigor is suppressed by one cause or another, particularly during hot weather.

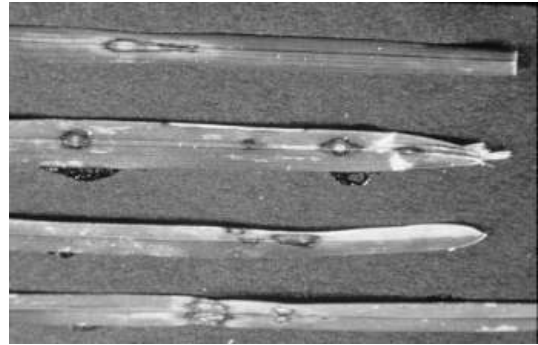


Figure 2. *Helminthosporium* leaf spot on Kentucky bluegrass leaves.

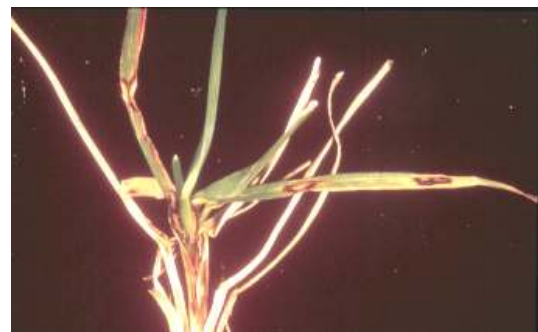


Figure 3. *Helminthosporium* crown and root rot.

Disease Cycle

The disease cycle for all species of fungi is essentially the same. The fungi survive from year to year (in periods of very hot or cold weather) as spores called “conidia” (Figure 4) and as dormant mycelium in dead grass tissues or in infected leaves, crowns, roots, and rhizomes or stolons. During periods of cool, moist weather, tremendous numbers of conidia are produced on debris, mostly at temperatures ranging from 38° to 82°F or 3° to 27°C (optimum range is 60° to 66° or 15° to 18°C) and are carried to healthy leaves and leaf sheaths by mowers and other turf equipment, air currents, flowing or splashing water, foot traffic, dragging hoses, animals, and infected grass clippings.

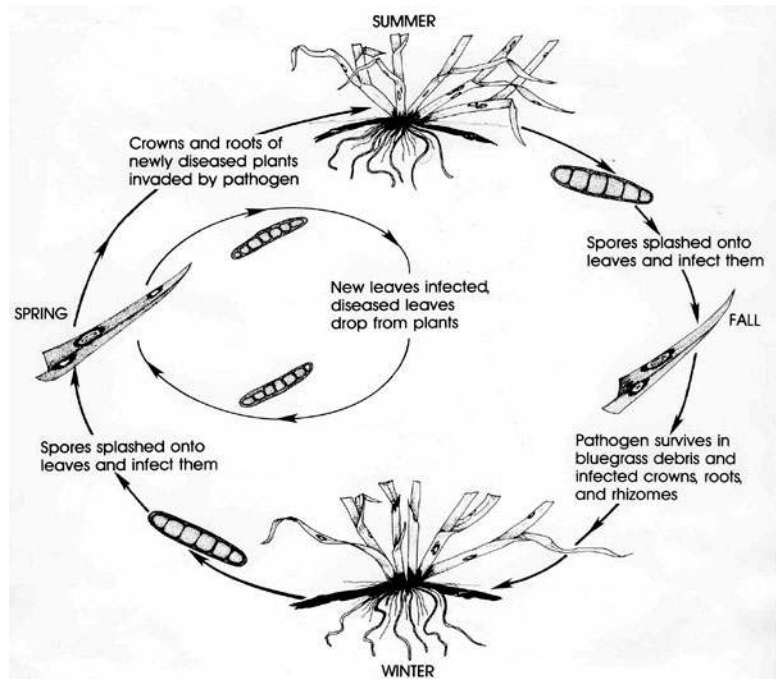


Figure 4. Disease cycle of *Helminthosporium* fungi that cause leaf, crown, and root diseases of turfgrasses (drawing by Lenore Gray).

The conidia germinate in a film of moisture and infect the leaves either directly or through stomates. Spore germination and infection of leaves can take place within two hours if the weather is favorable. These fungi are also capable of saprophytically colonizing plant debris at or above the soil surface. The fungi produce fresh “crops” of spores in profusion when dry grass debris is repeatedly rewetted. The conidia, along with mycelial fragments, spread to new leaf parts and neighboring plants; thus, the cycle is repeated. New leaf and leaf sheath infections can occur as long as the weather remains moist and temperature are favorable. Peak disease development varies from early- or mid-spring to late September or October, depending upon the areas and the species of fungus. Some species (for example, *Drechslera poae*, *D. dictyoides*, *D. siccans*, and *Bipolaris cynodontis*), are favored by the cool temperatures of early spring and fall, while other species such as *Bipolaris sorokiniana*, *D. erythrospila*, and *D. gigantea* are destructive primarily only in warm and wet overcast weather in summer. *B. sorokiniana* is also very active on old leaves during cool, wet weather in the fall and early spring.

During warm, dry weather, the leaf lesion phase decreases (except for *B. sorokiniana*, *D. erythrospila* and *D. gigantea*) and fungal activity may be restricted to crown, roots, rhizomes and stolons of diseased plants, killing round to irregular turf areas (melting-out or crown and root rot). With the return of cooler, moist weather, leaf infection typically becomes a problem as the fungi can be seedborne causing seedling blights on new turfgrass areas.

Disease susceptibility is increased when light intensity is decreased by shading of trees, shrubs, or buildings; when the mowing height is lower than that recommended for the grass or grasses being grown; when turf is fertilized excessively with nitrogen; and when hormonal-type fungicides or herbicides have been applied to control other diseases and broadleaf weeds.

Control

1. Mow all turfgrasses at the recommended maximum height for satisfactory turf use. Avoid close clipping (scalping) at all times. Mow the grass frequently so that no more than one-fourth to one-third of the leaf surface is removed at one time. Mow throughout the fall until the grass stops growing.
2. If a dense mat or thatch has formed (more than 1/4 to 1/2 inch thick), reduce or remove this accumulation by using a vertical mower, power rake, core aerifier, or a similar machine designed for this purpose. This operation should be confined to periods of cool weather in spring and early fall so that turf can recover rapidly. These machines may be rented at many garden supply centers and tool rental stores.
3. Severely diseased turf will recover more rapidly if the soil has an adequate supply of nitrogen. However over fertilizing may accentuate disease development. Fertilize on a regular basis to maintain vigor and steady growth based on a soil test and local recommendations. Avoid heavy applications of soluble nitrogen fertilizers in hot weather. Follow a recommended fertilizer program for the grass or grasses being grown and for their use. Fertilize to maintain as uniform a level of soil nutrients as possible in the root zone. The three major nutrients—nitrogen (N), phosphorus (P), and potassium (K)—should be present in sufficient but not excessive amounts.
4. In dry weather, before the turf area is under stress, apply enough water each time to soak the soil to the depth of the root system. Repeat as needed, usually every 7 to 10 days, if the weather remains dry. Where possible, water in the morning so leaf surfaces will dry before dusk. Apply supplemental water immediately after a light shower during a dry period. Avoid frequent light sprinkling or water-logging of the soil.
5. Sow only high-quality, disease-free seed, sod, sprigs, or plugs from a reputable dealer. Grow locally adapted, leaf spot-resistant grasses or combinations (blends and mixtures) whenever possible. Kentucky bluegrass cultivars that are resistant to leaf spot include: Admiral, America, Aspen, Banff, Bono, Bristol, Challenger, Columbia, Eclipse, Midnight, Mona, Somerset, and Trenton.

Perennial ryegrasses rated as resistant to leaf spot or brown blight include: Birdie II, Citation II, Delray, Diplomat, Manhattan II, Omega II, Palmer, Prelude, and Repell. Tall fescues with some leaf spot resistance include Adventure, Apache, Falcon, Jaguar, Mustang, and Olympic. The resistance to disease breaks down somewhat when turfgrass is subject to stress.

Resistant turfgrass cultivars listed above should not be considered all inclusive—many new and valuable cultivars are introduced each year. When deciding which grasses to buy, check with either your nearest Extension office or an Extension turfgrass specialist at the University of Illinois (Urbana) for suggested grass species and cultivars.

6. Where shade is dense and air movement is restricted, prune or remove dense trees and shrubs that border the turfgrass areas. Doing so will help the grass dry sooner and reduce disease potential. Space landscape plants properly for allowing adequate air movement and avoiding excessive shade.
7. When establishing a new turfgrass area, provide for both adequate surface and subsurface drainage. Grade for a slope of 2 to 4 percent and fill in depressions to achieve a smooth, uniform surface.

8. Aerify compacted areas with a power machine. Aerification is a form of cultivation involving the use of hollow tines, or spoons, to remove soil cores that leave holes of 1/2 to 3/4 of an inch in the soil to a depth of 2 1/2 to 3 inches. These machines may be rented at many garden supply and tool rental stores. Aerification should be done in the spring or fall.
9. Follow suggested insect and weed control programs both for your area and the grasses grown there.
10. If the various *Helminthosporium* diseases cannot be controlled adequately by cultural practices, fungicide sprays may be needed on a preventative schedule. See the current Illinois Commercial Landscape and Turfgrass Pest Management Handbook or Illinois Homeowner's Guide to Pest Management for the latest fungicide recommendations.

Carefully follow the manufacturer's directions regarding dosage, timing of application, safety, and other factors. None of the recommended fungicides will completely control these diseases. Sprays applied at weekly intervals give better control than those sprayed at two- or three-week intervals.