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Turfgrass Diseases

and Their Control

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Turfgrass Diseases and Their Control

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Many diseases occur on the different turfgrasses that are used throughout Tennessee. Most of the diseases are caused by fungi and nematodes. Some problems such as wilt, cold damage, heat, high soluble salts, soil compaction or chemical damage that resemble diseases are caused by environmental or management factors. Careful identification of the cause of the problem is important when selecting proper control methods. The information presented in this publication should help you identify the most important diseases of turfgrasses and select proper management practices and chemicals for their control.

Susceptible plants, a favorable environment and a pathogen are required for a disease to develop. Disease will not develop unless these factors are present at the same time over a certain length of time. Free water on leaves and optimum temperatures for a certain number of hours are required for most fungi to cause disease.

Nematodes cause the most damage when plants are grown under low water and nutrient conditions. Many of the pathogens are always present in a turf and can cause disease under favorable conditions.

Many of the suggested management practices for turfgrasses produce the best turfs by creating environments that are more favorable for the turfgrass plants and less favorable for the pathogens. Proper management is one of the most important disease control methods. Selection of resistant plants can also be used to control diseases. Some cultivars are more susceptible to diseases than others. Intensively managed turf, such as bentgrass golf greens, often require chemical control of diseases. The system of using all available disease control methods usually results in the best turf.

Fungicides and nematicides can be used in preventative or curative disease control programs. Chemicals are applied before disease is evident when weather conditions are favorable for disease development in a preventative program. This method is best for some rapidly spreading diseases such as Pythium blight. Some of the newer chemicals that control diseases for longer periods work well as preventatives.

Chemicals are applied in a curative program after some disease is present. This method requires rapid identification of the disease, selection of proper chemicals and usually higher rates of the chemicals for control. Nematicides can be used as a curative if nematode assay results indicate nematodes are a problem, or as a preventative if nematodes have been a continual problem.

Algae

Algae are single-celled plants that grow on the surface of wet soils or in water. Algae may become a problem in thin turf areas where the grass has been killed by disease or winter injury. Often a dark scum may appear on the soil surface. This scum may crack and curl during dry weather.

Control: Algae can be controlled by coring or spiking to improve soil drainage. Also copper sulfate and some fungicides may be used to control algae growth.

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Brown Patch

Cause: *Rhizoctonia* species

Hosts: Bentgrass, ryegrasses, tall fescue and sometimes hybrid bermudagrass

Symptoms: Brown patches up to 3 feet in diameter develop during hot, wet weather on cool season grasses. Brown patch is the most serious disease during the summer on tall fescue in Tennessee. Smoke rings that are composed of grayish mycelium and dying grass often develop at the margin of the patch when the disease is developing rapidly. Some green leaves usually are present in the brown patches. *Rhizoctonia solani* causes this disease. Brown patches up to 20 feet in diameter may develop on hybrid bermudagrasses during cool, wet weather in the spring at the time of or soon after green-up. Strains of *Rhizoctonia solani* have been associated with this disease. A brown patch-like disease, called yellow patch, develops as yellow rings during cold, wet weather in the winter on bentgrass greens. This disease is caused by *Rhizoctonia cerealis*. Brown patch has also been observed on bentgrass in hot, dry weather from which *Rhizoctonia zeae* has been isolated.

Factors Affecting Disease Development: Hot, wet weather, excess irrigation, poor soil drainage and excess nitrogen fertilization during the spring and summer increase the severity of warm weather type brown patch on cool season grasses. Cool, wet weather in late spring increases the severity of brown patch on bermudagrass and cold, wet weather increases the severity of winter type brown patch.

Control: Good soil drainage, proper amounts of irrigation to maintain adequate soil moisture, proper soil pH and low levels of nitrogen fertilization will help reduce the severity of brown patch diseases on cool season grasses. Management practices with emphasis on lower levels of nitrogen in the summer are the only economical ways of controlling this disease in tall fescue lawns. Applications of effective fungicides when the first disease symptoms appear will give good control of brown patch on highly maintained turf except on hybrid bermudagrass. Good fertilization and herbicide programs will help the bermudagrass recover during hot weather.

Dollar Spot

Cause: *Sclerotinia homoeocarpa* (now considered species of *Lanzia* and *Mollerodiscus*)

Hosts: Bentgrass, ryegrasses, bluegrass, zoysiagrass and bermudagrass

Symptoms: Small, circular spots 1 to 3 inches in diameter develop over several days on short cut grasses. The grass in the spots may be killed to the soil surface and the spots become depressed if the disease continues to develop. Larger patches of bleached grass usually develop on taller cut turf. Lesions on leaves are light tan and often have a dark margin at the edge when the disease is spreading. Leaves are usually girdled by the lesions and the upper part of the leaves die slowly on taller cut grasses. Short fuzzy white mycelium is often present on the lesions when dew is present. The mycelium has often been confused with the fluffy mycelium associated with Pythium blight. Spots on sod-forming grasses usually recover once the disease is controlled; however, spots on bunch grasses such as ryegrass do not recover if the plants are killed to the soil surface.

Factors Affecting Disease Development: The disease develops most rapidly during warm, moist weather in the spring and fall when heavy dews occur. It continues to develop during humid weather throughout the summer. Plants growing at low nitrogen levels and in dry soil conditions with high moisture levels around the leaves from dew are more susceptible to the disease. The disease often develops earlier in the spring in areas in which the disease was not controlled adequately the previous fall.

Control: Adequate nitrogen fertilization and soil moisture levels will help prevent the development of dollar spot. Proper air drainage will help reduce the length of time dew remains on the grass. Many fungicides are available that will control dollar spot.

Fairy Rings

Cause: Several basidiomycete type fungi (many produce mushrooms or puffballs in association with the fairy rings) *Marasmius* sp., *Lepiota* sp., *Psalliota* sp.

Hosts: All types of turfgrasses

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 or as combinations of these symptoms. The soil in the rings may become very dry and is difficult to wet during the summer and fall. Symptoms in a particular fairy ring may change throughout the year. Mushrooms or puffballs are present more often in the late summer and fall in many fairy rings. These fruiting bodies may never appear, or may appear only in certain years. 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. Arcs or irregular circles are usually formed where fairy rings come together .

Factors Affecting Disease Development: Fungi that cause fairy rings are common inhabitants of forested areas. These fungi begin growing on a source of organic matter such as an old stump in the soil or excess thatch in the turf. More damage is usually observed in turf with low fertility and in soil that becomes very dry.

The fungi produce the green rings by releasing nitrogen as organic matter is decomposed. Soil may become hydrophobic from the large amount of mycelium in the soil, and once the soil dries it is difficult to wet again. Grass may be killed by lethal levels of ammonia, toxic levels of chemicals such as hydrogen cyanide, invasion of the roots by the fungi or by weakening the plants which are then killed by other diseases or stresses.

Control: Removal of large sources of organic matter, such as stumps, before areas are planted will help prevent the development of some fairy rings. The removal of excess thatch and the use of management practices to prevent excess thatch accumulation may help prevent them from developing in established turf. Irrigation to keep the soil moist may prevent the development or severe damage from fairy rings. Aerification and extra watering of the rings may help the grasses outgrow the damage. More drastic methods of control involve soil fumigation, soil removal or turf renovation by rototilling and mixing the soil and replanting. Some fungicides drenched into the soil may help control fairy rings.

Fusarium Patch (Pink Snow Mold)

Cause: *Fusarium nivale (*now *Microdochium nivale)*

Hosts: Bentgrass, bluegrass, fescue and ryegrass

Symptoms: Circular patches develop during cold, wet weather, beginning as small areas that continue to enlarge during favorable weather conditions. Patches are rarely greater than 6 inches without snow cover and up to 2 feet in diameter with snow. The grass in the patches appears to be gray or light tan in color. Patches become pink to salmon in color after exposure to light.

Factors Affecting Disease Development: Fusarium patch often develops under tree leaves that remain on the turf for long periods of time during cold, wet weather. Disease activity is most severe when snow falls on unfrozen ground; however, activity can occur in the absence of snow cover any time maximum temperatures are below 60 F. Restricted air movement, poor soil drainage and lush succulent tissue can enhance disease development. The fungus becomes inactive as the turf canopy dries and air temperature rises.

Control: Avoid heavy applications of fertilizer before cold, wet weather or before the first expected prolonged snow cover. Mow the grass until growth stops, to prevent a build-up of excess foliage. Remove fallen leaves during autumn and winter from turf that is not covered with snow. 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

Cause: *Helminthosporium* species (now known as *Bipolaris, Drechslera* and *Exserohilum* species)

Hosts: Nearly all turfgrass species

Symptoms: These fungi can cause leaf, crown and root diseases. Leaf spot diseases are usually characterized by dark circular lesions in early stages. The lesions may enlarge and girdle the leaves resulting in a light brown or tan turf. Many of these diseases may infect the root and crowns and cause thinning-out and fading-out symptoms during stress periods. These fungi may also cause seedling blights on recently planted turfgrasses.

Factors Affecting Disease Development: Some of these diseases can develop during all times of the year. Fungi survive, during unfavorable periods for disease development, as spores on dead tissue or as mycelium in infected tissue. Many of the diseases cause leaf spot symptoms during periods of cool, moist weather when the spores are spread to leaves by wind, rain or irrigation. The fungi may spread into the crowns and roots and cause the plants to decline during periods of drought stress. Excessive rates of nitrogen fertilization, wet conditions in the spring and fall, drought stress and lower than normal mowing heights are factors that encourage the development of Helminthosporium diseases. Several growth regulator type herbicides have been shown to increase the susceptibility of some turfgrasses to these diseases. Areas with poor air drainage near trees, shrubs or structures that result in shade and extended periods of leaf wetness provide favorable conditions for disease development.

Control: Fertilizer should be applied in amounts to encourage uniform growth and avoid excess growth especially in the spring and summer. The turf should be irrigated as infrequently as possible without causing drought stress. Application of irrigation water is recommended during the early part of the day so that leaves do not remain wet for long periods of time. Cultivars of turfgrasses with resistance to these diseases should be used when available. Some fungicides can be used to control these diseases and are often needed on golf greens. Control is usually more effective when fungicides are applied during the early stages of disease development.

Moss

Moss occurs in lawns growing in acid soils having low fertility and poor drainage. Shading, overwatering, compacting or a combination of these can lead to moss problems.

Control: Moss can be controlled by raking, improving fertility and reducing the amount of shade.

Nematodes

Cause: Several different nematode species, primarily sting (*Belonolaimus* species), stubby-root (*Trichodorus* species), lance (*Hoplolaimus* species) and lesion (*Pratylenchus* species)

Hosts: All types of turfgrasses

Symptoms: Damage to roots is the most important effect of nematodes on turfgrasses in the Southeast. Roots may be killed or stunted, resulting in poorly developed, shallow root systems. The above ground symptoms are slow growth, thinning of the turf, poor response to adequate fertilization and irrigation, rapid wilting during dry weather and weed invasion. Nematode assay of soil samples is the only sure way of determining if nematodes are a problem since other diseases or nutritional problems may produce similar symptoms.

Factors Affecting Disease Development: Nematodes are most damaging in light, sandy soils which are low in nutrients and water-holding capacity. Proper fertilization and irrigation practices will often overcome the effect of some types of nematodes. The type and number of nematodes present in the soil must be determined before nematodes can be identified as a problem. Nematode levels are usually lowest in the spring and increase to the highest levels in the fall. Fall is a good time to have soil samples assayed for nematodes.

Control: Selection of the most tolerant types of

grasses and good management practices will help overcome the effect of many nematodes and are the only practical means of control on low maintenance areas. When the sting nematode is present, nematicides are usually needed on highly maintained areas such as tees and greens.

Powdery Mildew

Cause: *Erysiphe graminis*

Hosts: Bluegrass

Symptoms: A white to gray powdery growth of fungus mycelium develops on infected leaves. Heavily infected leaves turn yellow and die slowly, resulting in weakened plants that may be killed by environmental stresses. Lower leaves are generally affected more than younger leaves.

Factors Affecting Disease Development: The fungus survives the winter in living plant tissue. Spores produced in the spring are spread to healthy tissue by wind. The spores germinate and infect leaves during cool, humid conditions in the spring and fall. Unlike many other fungi, free water on leaves is not required for infection by *Erysiphe* species. The disease is usually more severe in shaded areas with poor air circulation on turf that has been fertilized heavily with nitrogen.

Control: Proper fertilization to avoid lush growth, higher mowing height and irrigation to prevent drought stress will help infected plants overcome the disease. Pruning, removal or careful placement of trees and shrubs to improve light intensities and air movement will help control powdery mildew. Selection of the most shade tolerant cultivars will aid in control. Several fungicides can be used to control this disease.

Pythium Blight

Cause: *Pythium* species

Hosts: Bentgrass and ryegrasses

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

Factors Affecting Disease Development: Excess soil moisture for long periods of time and excess nitrogen fertilizer favor the development of diseases caused by Pythium species. Pythium blight and the root rot disease is likely to develop during extended periods of wet weather. Young seedlings are very susceptible to these diseases.

Control: Good soil and air drainage and low levels of nitrogen fertilizer will help reduce the severity of these diseases. Proper fungicides must be selected since many fungicides that control other diseases will not control these diseases. Using fungicides in a preventative program during favorable weather conditions for Pythium blight will usually give the best control. Planting cool season grasses in the fall when the weather is cooler will help prevent severe seedling blight from Pythium species.

Red Thread

Cause: *Corticium fuciforme* (now called *Laetisaria fuciformis*)

Hosts: Bentgrass, bluegrass, fescues and ryegrasses

Symptoms: Circular or irregularly shaped patches of grass die rapidly during cool-moist weather. Patches may have a bleached or reddish color and resemble dollar spot. Large areas of turf may be affected if many patches are present and join together. The disease usually develops from the tip of the leaf downward. Leaves may be covered with the reddish mycelium and small red ''threads'' may develop from the tip of dead leaves.

Factors Affecting Disease Development: The disease develops during prolonged periods of cool

weather when leaves are wet from dew, fog or frequent light irrigations. It develops best when the grass is growing slowly from inadequate fertilization, lack of water, cool weather or even other diseases. The disease occurs most often during the spring and early summer.

Control: Fertilization to maintain adequate levels of nutrients will help overcome this disease. Irrigate the turf as needed to prevent moisture stress, but avoid long periods of excess water on the leaves. The collection of infected clippings during ideal conditions for disease development may help slow the spread of this disease. Some fungicides will control red thread.

Rust

Cause: *Puccinia* species

Hosts: Bluegrass, ryegrass, tall fescue and zoysiagrass

Symptoms: Small yellow flecks are the early symptoms that develop on the leaves and stems. Infected spots on leaves become larger yellow areas with raised centers. The raised areas may rupture exposing masses of yellow, orange, red or dark brown microscopic spores. These spores can infect more tissue and plants until the turf has the color of the spores. Infected plants become yellow and weakened and may die during stress periods resulting in thin and weak turfs.

Factors Affecting Disease Development: The fungus survives the winter in living plant tissue from which new spores are produced in the spring. Spores produced in the spring, summer and fall are spread by the wind, germinate on the leaves and infect new tissue. Many cycles of spores may be produced during a year. Free water on the leaves is required for certain periods of time for the spores to germinate and for the disease to develop rapidly. Plants growing under stress conditions from drought, shade or low nutrition are usually damaged more by rust diseases .

Control: Proper management practices including 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. Some cultivars are resistant to rust and should be used when available. Several fungicides can be used to control this disease .

Slime Molds

Cause: *Mucilago crustacea, Physarum* species and *Fuligo* species

Hosts: Nearly all turfgrasses

Symptoms: Many small white, gray or several other color fruiting bodies of these fungi may suddenly appear on leaves of turfgrasses in small patches. Slime molds usually appear during or after extended periods of warm-wet weather. These fungi grow on the surface of leaves and do not kill the leaves, but may cause some yellowing by shading the affected leaves. Slime molds are unsightly, but are not considered harmful.

Factors Affecting Disease Development: Spores survive in the soil and on thatch. The spores germinate and develop into a colorless slimy mass that grows over the soil and nearby plant parts during wet weather. Reproductive structures are the small colored bodies that develop on leaves during the warm, wet weather.

Control: The slime molds may be removed by brushing, mowing or washing the turf. Although fungicides are not needed, some can be used to control these fungi.

Spring Dead Spot

Cause: Unknown (*Leptosphaeria narmari* and *L. korrae* are given as the causal fungus in Australia and California, respectively)

Hosts: Bermudagrass

Symptoms: Dead spots first appear in 3 to 5 year-old turf in the spring, as bermudagrass resumes growth from winter dormancy. The spots appear in the same places and 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. The symptoms on overseeded bermudagrass greens may resemble brown patch in the spring. In this case, the dead bermudagrass is visible through the overseeded grasses. Bermudagrass usually grows over the spots slowly during the summer. The infected areas often remain lower than the surrounding grass and weeds frequently invade the spots.

Factors Affecting Disease Development: Accumulation of excess thatch and high rates of nitrogen fertilizer have been associated with severe cases of spring dead spot. Cold weather is also a factor since the disease occurs in the northern range of adaptation of bermudagrass and is usually more severe following extremely cold winters.

Control: Reduced levels of nitrogen and thatch removal may reduce the severity of spring dead spot. 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. A fungicide may be used for control.

Stripe Smut

Cause: *Ustilago striiformis*

Hosts: Bluegrass and tall fescue

Symptoms: Stripe smut can be a serious disease of Kentucky bluegrass and tall fescue. Infected plants are most noticeable in the fall and spring when they appear pale green to slightly yellow or brown. They are stunted, root growth is reduced and leaves become stiff and erect. Inspection of individual plants reveals leaves that are split and curled. These plants often die during periods of drought.

Factors Affecting Disease Development: The smut fungus grows rapidly in plants during cool weather (around 70 F), although plant death is hastened by temperatures of 85 to 95 F. High moisture favors spread of the fungus, but drought stress on plants causes them to die. Low fertility and acid soils favor disease development.

Control: Proper fertilization and infrequent but deep watering help diseased plants. Several Kentucky bluegrass cultivars are resistant to stripe smut including "Adelphi, Bonnieblue, Fylking and Pennstar." Also, several systemic fungicides may be used to control stripe smut.

White Patch

Cause: *Melanotus* spp.

Hosts: Tall fescue

Symptoms: White patch of tall fescue appears as blighted patches 1-2 feet in diameter. Patches are distinctly white with small white mushrooms developing on leaf blades of the grass. The leaf blades are killed first at the tips and later down the leaf to the sheath. Tall fescue may become thin in spots due to the disease, but enough plants survive to fill in affected area.

Factors Affecting Disease Development: Hot, humid weather usually favors this disease. White patch usually occurs on immature grass in newly established lawns less than 2 years old.

Control: Proper management practices and proper soil pH help to overcome this disease.

Chemical Control of Diseases of Lawn and Turf

Fungicide/Formulation	Amount of Formulation (oz./1000 sq ft)*	Application Interval (days)**
Fusarium Patch (Pink Snow Mold)		
Banner MAXX	4	Late fall
Bayleton 25WP (triadimefon)	2 to 4	late fall before first snow fall
Chipco 26019 FLO (iprodione)	4 to 8	14 to 21
Chipco 26019 50WP (iprodione)	2 to 4	14 to 21
Cleary's 3336F (thiophanate methyl)	1 to 2	Apply late fall
Cleary's 3336G (thiophanate methyl)	3 to 6 lbs.	Apply late fall
Daconil Ultrex (chlorothalonil)	5 to 8.8	21 to 28 days
Daconil 2787 F (chlorothalonil)	8 to 14	21 to 28 days
Duosan WP (thiophanate methyl + mancozeb)	4 to 6	5 to 28 days
Fungo FLO (thiophanate methyl)	1 to 2	5 to 14
Rubigan AS (fenarimol)	8.0	1 or 2 applications
Sentinel 40WG (cyproconazole)	0.33	Apply late fall
Curalan 50DF (vinclozolin)	2 to 4	10 to 21
Curalan F (vinclozolin)	2 to 4	10 to 21
Thalonil 90DF (chlorothalonil)	4.5 to 8	21 to 28
Vorlan FLO (vinclozolin)	2 to 4	10 to 21
Leaf Spots (Helminthosporium)		
Banner MAXX (propiconazole)	2 to 4	14
Chipco 26019 50 WP (iprodione)	1.5 to 2	14 to 21
Chipco 26019 FLO (iprodione)	4 to 8	14to 21
Daconil Ultrex (chlorothalonil)	1.8 to 7.3	7 to 10
Daconil 2787 F (chlorothalonil)	3 to 11	7 to 14
Dithane T/O 75WP (mancozeb)	4	7 to 14
Dithane WF (mancozeb)	6.4	7 to 14
Curalan 50 DF or F (vinclozolin)	1 to 2	14 to 28
Duosan WP (thiophanate methyl + mancozeb)	4 to 6	5 to 14
Eagle WSP (myclobutanil)	0.6	14
Fore 80WP (mancozeb)	4	7 to 14
Fore Flowable (mancozeb)	6.4	7 to 14

Chemical Control of Diseases of Lawn and Turf

Fungicide/Formulation	Amount of Formulation (oz./1000 sq ft)*	Application Interval (days)**
Leaf Spots (Helminthosporium) (continued)		
Thalonil 90DF (chlorothalonil)	1.8 to 6.5	7 to 10
Vorlan FLO (vinclozolin)	1 to 2	14 to 28
Summer decline of Bentgrass (Pythium & Rhizoctonia)		
Aliette WDG + Fore 80 WP	4 to 8 + 4 to 8	14
Pythium Blight		
Aliette WDG (aluminum phosphonate)	4 to 8	late fall before first snow fall
Banol 66.5L (propamocarb)	1 to 4	14 to 21
Koban 30WP (etridiazole)	2 to 4.5	7 to 21
Pace 77WP (metalaxyl + mancozeb)	6.4	5 to 10
Subdue 2E (metalaxyl)	1 to 2	7 to 14
Teremec SP 65WP (chloroneb)	4	10 to 21
Red Thread		
Banner MAXX (propiconazole)	2	5 to 10
Bayleton 25WP (triadimefon)	1 to 2	14 to 21
Chipco 26019 FLO (iprodione)	4	15 to 30
Chipco 26019 50WP (iprodione)	2.0	14
Cleary's 3336 F (thiophanate methyl)	1 to 2	14
Curalan 50 DF (vinclozolin)	1 to 2	5 to 14
Daconil Ultrex (chlorothalonil)	1.8 to 7.3	14 to 28
Daconil 2787 F (chlorothalonil)	3 to 11	7 to 10
Duosan WP (thiophanate methyl + mancozeb)	4 to 6	7 to 10
Eagle WSP (myclobutanil)	0.6	5 to 14
Fungo FLO (thiophanate methyl)	1 to 2	14
Rubigan AS (fenarimol)	8	5 to 1(to 28
Prostar 50WP (flutolanil)	2	21 to 28
Sentinel 40WG (cyproconazole)	0.25 to 0.33	7 to 10
Thalonil 90DF (chlorothalonil)	1.8 to 6.5	14 to 28
Vorlan FLO (vinclozolin)	1 to 2	7 to 14

Chemical Control of Diseases of Lawn and Turf

Fungicide/Formulation	Amount of Formulation (oz./1000 sq ft)*	Application Interval (days)**
Rhizoctonia Brown Patch		
Banner MAXX (propiconazole)	2 to 4	10 to 21
Bayleton 25WP (triadimefon)	1 to 2	15 to 30
Chipco 26019 50WP (iprodione)	1.5 to 2	14 to 21
Chipco 26019 FLO (iprodione)	3 to 4	14 to 21
Cleary's 3336F (thiophanate methyl)	1 to 2	5 to 14
Cleary's 3336G (thiophanate methyl)	1.5 to 3.0 lbs.	7 to 14
Daconil Ultrex (chlorothalonil)	1.8 to 7.3	14 to 28
Daconil 2787 F (chlorothalonil)	3 to 11	7 to 10
Duosan WP (thiophanate methyl + mancozeb)	4 to 6	5 to 14
Eagle WSP (myclobutanil)	0.6	14
Fore 80WP (mancozeb)	4	7
Fore Flowable (mancozeb)	6.4	7
Fungo FLO (thiophanate methyl)	1 to 2	5 to 14
Prostar 50WP (flutolanil)	2 to 3	14 to 21
Rubigan AS (fenarimol)	1.5	7 to 14
Sentinel 40 WG (cyproconazole)	0.25 to 0.33	21 to 28
Thalonil 90DF (chlorothalonil)	1.8 to 6.5	7 to 10

Chemical Control of Diseases of Lawn and Turf

Fungicide/Formulation	Amount of Formulation (oz./1000 sq ft)*	Application Interval (days)**
Rust		
Banner MAXX (propiconazole)	1 to 2	14 to 28
Bayleton 25WP (triadimefon)	1 to 2	7 to 21
Daconil Ultrex (chlorothalonil)	3.6 to 7.3	7 to 14
Daconil 2787 F (chlorothalonil)	6 to 11	7 to 14
Dithane T/O 75WP (mancozeb)	4	7 to 14
Dithane WF (mancozeb)	6.4	7 to 14
Duosan WP (thiophanate methyl + mancozeb)	4 to 6	5 to 14
Eagle WSP (myclobutanil)	0.6	14
Fore 80WP (mancozeb)	4	7 to 14
Fore Flowable (mancozeb)	6.4	7 to 14
Sentinel 40WG (cyproconazole)	0.16	28
Thalonil 90DF (chlorothalonil)	3.5 to 6.5	7 to 14
Dollar Spot		
Banner MAXX (propiconazole)	.5 to 2	7 to 28
Bayleton 25WP (triadimefon)	1 to 2	30
Chipco 26019 50WP (iprodione)	1.5 to 2	14 to 21
Chipco 26019 FLO (iprodione)	3 to 4	14 to 21
Curalan 50 DF (vinclozolin)	1 to 2	14 to 28
Cleary's 3336F (thiophanate methyl)	1 to 2	10 to 14
Cleary's 3336G (thiophanate methy)	1.5 to 3 lbs	7 to 14
Daconil Ultrex (chlorothalonil)	0.9 to 7.3	7 to 14
Daconil 2787 F (chlorothalonil)	3 to 11	7 to 14
Duosan WP (thiophanate methyl + mancozeb)	3	5 to 14
Eagle WSP (myclobutanil)	0.6	14
Fungo FLO (thiophanate methyl)	1 to 2	10 to 14
Sentinel 40WG (cyproconazole)	0.16	21 to 28
Thalonil 90DF (chlorothalonil)	1.8 to 6.5	7 to 14
Vorlan FLO (vinclozolin)	1 to 2	21 to 28

Chemical Control of Diseases of Lawn and Turf

	Fungicide/Formulation	Amount of Formulation (oz./1000 sq ft)*	Application Interval (days)**
Spring Dead Spot			
	Banner MAXX (propiconazole)	4	3 applications beginning in August
	Eagle WSP (myclobutanil)	0.6	Apply in mid September
	Rubigan AS (fenarimol)	4 to 6	
Stripe Smut			
	Banner MAXX (propiconazole)	1 to 2	Apply in Spring and October
	Bayleton 25WP (triadimefon)	2	
	Eagle WSP (myclobutanil)	0.6	
	Fungo FLO (thiophanate methyl)	5 to 10	
	Rubigan AS (fenarimol)	15	
	Sentinel 40WG (cyproconazole)	0.33	
Slime Mold			
	Dithane T/O 75WP (mancozeb)	4 to 8	Apply as needed
	Dithane WF (mancozeb)	6.4 to 12.8	
	Fore 80WP (mancozeb)	4 to 8	
	Fore Flowable (mancozeb)	6.4 to 12.	
Algae			
	Algaen-X (dimethyl benzyl ammonium chloride)	1.6	Apply as needed on 7 to 14 day schedule
	Daconil Ultrex (chlorothalonil)	1.8 to 7.3	
	Dithane T/O 75WP (mancozeb)	6	
	Dithane WF (mancozeb)	9.6	
	Fore 80WP (mancozeb)	6	
	Fore Flowable (mancozeb)	9.6	
Fairy Ring			
	Prostar 50WP (flutolanil)	6	30

Chemical Control of Diseases of Lawn and Turf

Fungicide/Formulation	Amount of Formulation (oz./1000 sq ft)*	Application Interval (days)**
Yellow Patch (Cool Season Brown Patch)		
Prostar 50WP (flutolanil)	2	21 to 28
Anthracnose		
Banner MAXX (propiconazole)	1 to 2	14 to 28
Cleary's 3336F (thiophanate methyl)	4 to 8	7 to 14
Cleary's 3336G (thiophanate methyl)	3 to 9 lbs	7 to 14
Daconil Ultrex (chlorothalonil)	2.8 to 8.3	7 to 14
Daconil 2787 F (chlorothalonil)	5 to 9	7 to 14
Bayleton 25 WP (triadimefon)	2	30 to 45
Rubigan AS (fenarimol)	1.75 to 3.5	30
Fungo FLO (thiophanate methyl)	1 to 2	10 to 14
Duosan WP (thiophanate methyl + mancozeb)	4 to 6	5 to 14
Sentinel 40WG (cyproconazole)	0.25 to 0.33	21 to 28
Thalonil 90DF (chlorothalonil)	2.5 to 5	7 to 14
Take-All-Patch		
Banner MAXX	2 to 4	Spring and Fall
Bayleton 25 WP (triadimefon)	2 to 4	21 to 28
Rubigan AS (fenarimol)	4.0	30

* Apply fungicides in 3 to 5 gallons of water per 1000 square feet. Use lower rates for preventative and higher rates for curative applications.

** Use shorter intervals when conditions are very favorable for disease.

Turf Disease Calendar

Time Disease Occurs

Disease Name	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Factors Favoring Disease
Brown Patch				▲	▲	▲	▲	▲	▲				Warm-Wet Weather High N Rates
Dollar Spot					▲	▲	▲	▲	▲				Wet Weather, Heavy Dew, Low N Levels
Fairy Rings	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	Mushrooms Appear in Wet Weather
Helminthosporium Leafspot					▲	▲	▲	▲	▲	▲			Wet Weather
Powdery Mildew			▲	▲	▲	▲	▲	▲	▲				Cool-Moist Weather
Nematodes						▲	▲	▲	▲				More Damage in Dry Weather
Pythium Blight				▲	▲	▲	▲	▲	▲				Hot-Wet Weather, High N, Poorly Drained Soils
Rusts					▲	▲	▲	▲	▲				Humid Weather and Shade
Spring Dead Spot				▲	▲								More Severe Following Cold Winter and High N Fertilization
Stripe Smut			▲	▲					▲	▲	▲		Cool-Wet Weather

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Agricultural Extension Service
Billy G. Hicks, Dean