

Lawn Diseases

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Overview

There are many diseases that occur on turfgrasses throughout the world. However, there are only a few diseases that consistently cause major concerns on lawns in Virginia. Diseases of lawn grasses are typically most common in the summertime for cool-season grasses, such as tall fescue or Kentucky bluegrass, or in the spring and fall for warm-season grasses, such as bermudagrass or zoysiagrass. This is largely due to the shift in growth habits of the grasses from active growth to survival, giving a competitive advantage to the pathogens responsible for diseases.

Tall fescue is the most common turfgrass species used in home lawns in Virginia. The most common and troublesome disease for tall fescue is brown patch. Brown patch occurs most frequently during warm and wet weather, but the lawn typically recovers in the fall when managed properly. However, heavy brown patch infestation in conjunction with drought or heat stress can cause total plant loss.

Spring dead spot is the most common disease for bermudagrass. Symptoms include dead patches in the turf that appear in the spring as the turf emerges from winter dormancy. The pathogen responsible for this disease is most active in the root zone during the fall and winter. This disease is often unpredictable, but is usually found in high traffic or compacted areas and after severe winters.

General Cultural Controls

- **Fertility:** Turfgrass plants are healthier when steady supplies of nutrients are available, as opposed to spikes in nutrient levels that may result in rapid growth. The ideal time to fertilize is when conditions are optimal for root growth. Optimal conditions are usually in the fall for cool-season grasses and during the summer for warm-season grasses. A good fertilizer has nitrogen sources with around 30% water-insoluble nitrogen. Have the soil tested and only apply other nutrients based on soil testing recommendations.
- **Irrigation:** It is impossible to control rainfall, but homeowners do have control over the frequency and duration of lawn irrigation. The ideal time to irrigate for minimizing disease, is around sunrise. This decreases the leaf wetness period, which is critical for disease development, and rinses the leaves of dew and guttation water rich in sugars that attract fungi. Watering in the late morning or early evening prolongs leaf wetness and increases the likelihood of disease development.
- **Mowing height:** In most cases, turfgrass that is cut too short is more susceptible to disease. Taller cut grasses can withstand more stress and recover faster after disease pressure subsides than turfgrass cut too short. Tall fescue lawns should be between three and four inches, especially during periods of heat and drought stress. Bermudagrass and zoysiagrass should be mowed around an inch and a half to two inches.
- **Air Movement:** Areas with poor air circulation have more turf diseases. Strategic pruning of trees and shrubs is a good way to improve air movement and allow additional sunlight into trouble areas.
- **Sanitation:** Wash mowing equipment to remove infested leaf clippings following each use. Many pathogens can survive on living and non-living plant debris and are later transported to new locations.

General Biological Controls

- **Disease resistant varieties:** Different varieties of turfgrass are susceptible to different kinds of diseases. Choose a variety of turfgrass that has performed well in the National Turfgrass Evaluation Program. Current varieties recommended in Virginia are available at the following link: <http://www.pubs.ext.vt.edu/3008/3008-1456/3008-1456.html>.
- **Friendly insects, animals, and organisms:** There are a number of commercially available biological fungicides that may reduce the severity of turfgrass diseases. The majority of these products contain beneficial bacteria or fungi. No biological fungicides tested in Virginia provide complete control of turfgrass diseases. However, several fungicides suppressed diseases, such as brown patch and dollar spot, and aided in turfgrass recovery.

When to call a professional

It is difficult to determine when turfgrass diseases can be handled at home or if a professional consultation is needed. In most cases, lawns recover with limited damage from disease if the above-mentioned practices are followed. However, when conditions remain favorable for a disease for long periods of time, damage can be quite extensive. Any subsequent stress that prevents the turf from recovering makes the problems worse. For example, if weather conditions remain warm and wet for several

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days or longer, brown patch can become more severe. In many cases, the turf dies if drought and heat stress follow the warm, wet weather. It is impossible to predict the weather accurately over a long period of time, and it is hard to know, season by season, what weather conditions the turfgrass will endure. Calling a professional may be the right thing to do if weather conditions make turfgrass diseases worse, especially if losing the turf is unacceptable.

Additionally, there are many more fungicides available to control common lawn diseases than what are listed. However, many of these fungicides can only be used by a certified applicator, or are not packaged in small enough quantities for a single homeowner's lawn. If listed chemicals do not provide adequate control or are difficult to find, additional products may be used by turf professionals.

The following table shows the most common active ingredients that can be found by end users at several common retail centers. Efficacy of each chemical is highly dependent on product formulation, active ingredient use rate, reapplication interval, and environmental conditions.

Table 5.1 - Common Active Ingredients

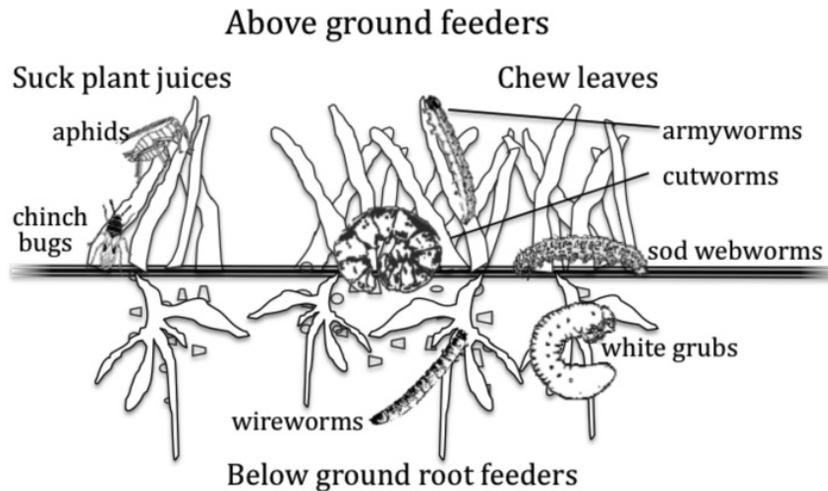
	azoxystrobin	fluoxastrobin	myclobutanil	propiconazole	thiophanate-methyl
Brown patch	+	+	+	+	+
Dollar spot	-	+	+	+	+
Fairy ring	+	-	-	-	-
Gray leaf spot	+	+	-	+	+
Large patch	+	+	+	+	+
Melting-out/leaf spot	+	+	+	+	+
Microdochium patch (pink snow mold)	+	+	+	+	+
Pythium blight	+	+	-	-	-
Red thread	+	+	+	+	+
Rust	-	-	+	+	+
Spring dead spot	+	+	+	+	-
Summer patch	+	+	+	+	+

- Active ingredient is (+) or is not (-) labeled for control of disease.
- If control level is not satisfactory, additional products are available to certified professional applicators. Refer to PMG Horticulture and Forest Crops.

Timing of chemical applications: For optimal control, most fungicides should be applied preventatively when conditions become favorable for disease development. As noted above, most common diseases of cool-season lawns occur during the summer months; most common diseases of warm-season lawns occur during the spring and fall. When to reapply chemicals depends on active ingredients, product formulation, target pests, and environmental conditions. Systemic fungicides that move acropetally within the plant typically provide control for longer than contact fungicides.

Insects

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Overview

The best way to minimize insect pests is to maintain a healthy, dense, stress-free lawn. The occurrence of insect pests usually is sporadic. The damage to turfgrass caused by insect pests is affected in two ways by weather conditions. First, the species of pests found in damaging numbers are dictated to some extent by weather; hot, dry summer conditions favor outbreaks of chinch bugs or sod webworm, while these same conditions during July may significantly reduce white grub populations. Second, the number of pests necessary to cause visible damage depends on the growth rate and general health of the turfgrass; a lawn in good health can tolerate higher numbers of insect pests than one that is water-stressed. Local weather conditions also influence the type of management practices that will be effective against turfgrass pests. For many biological control agents, exposure to hot temperatures or direct sunlight is detrimental, so special considerations must be met when using these methods.

Proper identification and monitoring of pest populations in your lawn is the best way to avoid unnecessary or ineffective pest management practices. Keeping detailed records of materials and the level of satisfaction with their results can aid a homeowner in year to-year choices of pest management tactics. By following the steps outlined below, homeowners will be able to make informed decisions about pest management that will decrease pest populations and be safe, cost-effective, and environmentally sound:

1. Make sure that the damage is caused by an arthropod pest and not drought, disease, poor soil fertility, or another cultural problem.
2. Identify the pest and learn its life cycle.
3. Monitor for pests to make sure that control measures are necessary. Often, a pest population will not be high enough to justify control measures.

The drench test described here is for monitoring cutworms, sod webworms, and armyworms. In table 5.1, a flotation sample is described for monitoring chinch bugs, and a digging method is described for monitoring white grubs.

Drench test for cutworms, sod webworms, and armyworms: Mix 3-4 tablespoons of dishwashing liquid in 2 gallons of water. Pour evenly over 1 square yard of turf. Watch the area for 10 minutes, counting the caterpillars as they rise to the surface.

4. Determine optimum timing of management practices. Make sure that a management tactic will suppress the pest population to an acceptable level, and that suppression is necessary to limit further damage.
5. Consider several management strategies, including biological and cultural methods. Match the management strategy to the pest species. If the pest feeds on grass leaves (black cutworm, for example), any material should be applied to the above ground portion of the turf and not followed by watering. For white grubs that reside beneath the surface, any material used must be applied by injection or the application should be followed by watering.

General Cultural Controls

- When mowing, only cut one-third of the height of the lawn at a time.
- Turf more than 2.5 inches in height seldom requires treatment for cutworms or sod webworms. Also, when mowing remove clippings (adult cutworm moths lay eggs at the tip of grass blades).

General Biological Controls

- The seed of many cultivars of fescue and perennial ryegrass contains a beneficial fungus. This “endophyte enhanced” seed helps reduce the likelihood of attack by many insect and disease pests.
- Insect pathogenic bacteria, fungi and nematodes are available for some lawn pests. When using a biological control product, be aware of the conditions under which the product will work properly.
- There are a number of natural enemies, among them ground beetles, lady beetles, parasitic wasps and flies, spiders, and predatory mites that feed on lawn pests.

General Mechanical Controls

- Dethatch in spring or early fall if thatch (the brown layer between the grass blades and the soil surface) is greater than ½ inch deep.

General Chemical Controls

- Use narrow spectrum, less persistent pesticides whenever possible.
- Implement the management tactic as required by label instructions. For formulated insecticides, this is the law.
- Record pertinent information for future management decisions, including: date of application, material applied, pre-treatment pest population levels, weather conditions during and following application, pest population levels following treatment, level of satisfaction with results.

Precautions

- Read the label and follow all safety precautions, application rates, and pesticide disposal instructions.
- Keep pesticides in their original containers and store them out of reach of children and pets.
- Pesticides applied to your lawn can drift or leach and contaminate neighboring property and water sources. To avoid this, avoid applying pesticides when it is windy or if rain is forecast, and never let pesticide runoff flow into storm drains.

When to call a professional

- Hire a licensed pest control service if the problem is beyond your limitations. A pest control professional who practices integrated pest management can provide you with the safest and most effective management strategies.

Special Considerations

- **Fire Ant** has recently spread to Virginia. Refer to the Insects in Recreation Areas and Nursery Crops: Insects sections of the Pest Management Guide for current information on fire ant management. Virginia Cooperative Extension (VCE) Red Imported Fire Ant Factsheet: <http://pubs.ext.vt.edu/444/444-284/444-284.html>

Guidance on How to Find Specific Recommendations

- See Table 5.1 for specific recommendations

Links to Useful Sources of Information

- VCE Turf and Garden Tips: <http://www.anr.ext.vt.edu/lawnandgarden/turfandgardentips/>
- VCE Spring and Summer Lawn Management Considerations for Cool-Season Turfgrasses (includes a section on common lawn insect pests): <http://pubs.ext.vt.edu/430/430-532/430-532.html>
- VCE Japanese Beetle Factsheet: <http://pubs.ext.vt.edu/2902/2902-1101/2902-1101.html>
- VCE Pest Monitoring Calendar for Home Lawns in Virginia (PDF file): <http://pubs.ext.vt.edu/430/430-524/430-524.pdf>.

Table 5.2 - Specific Insect Recommendations

Insect Pest	Labeled Pesticides	Recommendation
Ants	Beta-cyfluthrin	<p>Chemical Controls Use as localized treatments to nesting area according to label directions. A general area application may not be necessary. Use of some other lawn insect controls will also control ants. Apply during daylight.</p> <p>Related Fact Sheet Imported Fire Ant Factsheet: http://pubs.ext.vt.edu/444/444-284/444-284.html</p>
	Bifenthrin	
	Carbaryl	
	Clothianidin	
	Cyfluthrin	
	Deltamethrin	
	Esfenvalerate	
	Imidacloprid	
	Lambda-cyhalothrin	
Permethrin		
Chinch Bugs	Azadirachtin	<p>Sample using flotation: A cylinder with open ends is driven into the turf, and about 1 inch of water is maintained in the cylinder for 5-10 minutes. Chinch bugs will float to the top of the water. Chinch bugs can cause significant damage to turf when found in densities of 15-20 immature bugs/sq ft. Damage usually occurs to turf in sunny areas with a thick thatch layer. Two generations per year occur in Virginia. Insecticide treatment is often effective, but since the bugs are highly mobile, the area can be quickly recolonized. Therefore, an application in April-May, followed by 1 or 2 more applications at 2- to 3-week intervals is recommended for the first generation. Early treatment may provide season-long control. Do not mow or water turf for 2-3 days after treatment.</p> <p>Cultural Controls Reduce the use of fine (red) fescue in sunny areas, avoid spring fertilization with high nitrogen.</p> <p>Biological Controls If the insect-pathogenic fungus <i>Beauveria bassiana</i> is used as a control measure, do not apply fungicides immediately before or after application.</p> <p>Related Fact Sheet Chinch Bugs in Turfgrass: ohioline.osu.edu/hyg-fact/2000/pdf/2503.pdf</p>
	<i>Beauveria bassiana</i> (insect pathogenic fungus)	
	Beta-cyfluthrin	
	Bifenthrin	
	Carbaryl	
	Chlorantraniliprole	
	Clothianidin	
	Cyfluthrin	
	Dinotefurin	
	Esfenvalerate	
	Imidacloprid	
	Lambda-cyhalothrin	
	Permethrin	
Trichlorfon		
Cutworms	Azadirachtin	<p>Sample using drench test as described above. Cutworm populations of 3-8 worms/sq yd may warrant treatment. Two generations can occur in Virginia.</p> <p>Biological Controls Not all species of nematodes available commercially will provide adequate control. The species of nematode is provided on the product label under the "Active Ingredients" section. <i>Steinernema carpocapsae</i> is effective against black cutworms.</p> <p>Chemical Controls Apply materials in the early evening. Most insecticides used for cutworm control are stomach poisons, and the larvae feed at night. Do not water the treatment in unless specified on the label and do not mow for several days after treatment. Cutworms are highly mobile, so treated areas are likely to become reinfested from surrounding areas.</p>
	<i>Bacillus thuringiensis</i> var. kurstaki (Bt)	
	Beta-cyfluthrin	
	Bifenthrin	
	Carbaryl	
	Chlorantraniliprole	
	Clothianidin	
	Cyfluthrin	
	Deltamethrin	
	Dinotefurin	
	Entomopathogenic nematodes	
	Esfenvalerate	
	Halofenozide	
	Imidacloprid	
	Indoxacarb	
	Lambda-cyhalothrin	
	Permethrin	
Spinosad		
Trichlorfon		

Table 5.2 - Specific Insect Recommendations (cont.)

Insect Pest	Labeled Pesticides	Recommendation
Mites (Clover mite)	Azadirachtin Diatomaceous earth Esfenvalerate Lambda-cyhalothrin	Clover mites are more nuisances than pests, though they may build up populations near building foundations that can cause silvering of turf. As their name suggests, they are not primarily feeding on grasses. The nuisance they cause occurs when they invade houses. When crushed they cause a red stain on the area. Populations high enough to warrant treatment occur in late winter or early spring, and occasionally in the fall. Control is usually only needed around the perimeter of structures – often only on the south side. Mechanical Controls Bare ground within 5 feet of the structure can be effective.
Sod Webworms	Azadirachtin <i>Bacillus thuringiensis</i> var. kurstaki (Bt) Beta-cyfluthrin Bifenthrin Carbaryl Chlorantraniliprole Clothianidin Cyfluthrin Deltamethrin Dinotefuron Entomopathogenic nematodes Esfenvalerate Halofenozide Imidacloprid Indoxacarb Lambda-cyhalothrin Permethrin Spinosad Trichlorfon	Sample using drench test as described above. Webworm densities of 15/sq yd warrant treatment. Sod webworm problems on turf are most noticeable in high maintenance conditions where grass is kept short. Two generations per year occur in Virginia. Young larvae, which are most susceptible to treatment, can be expected in turf about 2 weeks after adults are present, late June and again in early September. Biological Controls Unfortunately, by the time damage is noticeable, the larvae are not susceptible to Bt products because they are too old. Spring and early summer treatments may be effective against the larvae that have overwintered. Do not mow for 1-3 days after treatment. Related Fact Sheet Sod Webworm Management in Lawns (Ohio State University) http://ohioline.osu.edu/hyg-fact/2000/2011.html

Table 5.2 - Specific Insect Recommendations (cont.)

Insect Pest	Labeled Pesticides	Recommendation
White Grubs (Japanese beetle, masked chafer, Asiatic garden beetle, etc.)	Azadirachtin	<p>Sample by digging: Use a shovel to cut several 1 ft x 1 ft squares, 2-3 inches deep. Peel up the turf and count the white grubs. Population high enough to warrant treatment is 6-10 grubs/sq ft. White grubs are actually several species of scarab beetle larvae.</p> <p>Biological Controls</p> <p>When using these products, be aware that control is not immediate. Milky spore is a slow-acting disease agent; grubs will take up to 30 days to die. However, when the disease is established, control can be effective for years without further application. After application, the disease perpetuates and spreads by infecting and being transported by grubs. If another insecticide is applied to an area treated with milky spore, this will slow the spread of the disease and is therefore not desirable. Be patient. If the insect-pathogenic fungus <i>Beauveria bassiana</i> is used as a control measure, do not apply fungicides immediately before or after application. White grubs can also be controlled by entomopathogenic nematodes. Not all species of nematodes available commercially will provide adequate control. The species of nematode is provided on the product label under the "Active Ingredients" section. Products with <i>Steinernema riobrave</i> or <i>Heterorhabditis</i> as active ingredient.</p> <p>When using these products, be aware that control is not immediate. Milky spore is a slow-acting disease agent; grubs will take up to 30 days to die. However, when the disease is established, control can be effective for years without further application. After application, the disease perpetuates and spreads by infecting and being transported by grubs. If another insecticide is applied to an area treated with milky spore, this will slow the spread of the disease and is therefore not desirable. Be patient. If the insect-pathogenic fungus <i>Beauveria bassiana</i> is used as a control measure, do not apply fungicides immediately before or after application. White grubs can also be controlled by entomopathogenic nematodes. Not all species of nematodes available commercially will provide adequate control. The species of nematode is provided on the product label under the "Active Ingredients" section. Products with <i>Steinernema carpocapsae</i> in this section should not be used for grub control. These products should be applied only when the pest is present. Nematodes should be applied late in the day to avoid exposure to UV light damage, and soil temperature should be at least 60°. Early spring treatments are usually not effective because soil temperatures are too cold. Watering before and after application provides the best results.</p> <p>Chemical Controls</p> <p>These products should be applied at the labeled rate and watered in with 1/2 inch of water. Timing is important; make sure the grubs are present. Most insecticides provide the best control when used against young grubs.</p> <p>Related Fact Sheet</p> <p>Beetlemania—White Grub Control in Lawns (VCE)</p> <p>http://www.anr.ext.vt.edu/lawnandgarden/turfandgardentips/tips/beetlemania.html</p>
	<i>Bacillus popilliae</i> (Milky Spore disease) for Japanese beetle only; not effective on other grub species	
	<i>Beauveria bassiana</i> (insect pathogenic fungus)	
	Bifenthrin	
	Carbaryl	
	Chlorantraniliprole	
	Clothianidin	
	Dinotefuron	
	Entomopathogenic nematodes: Products with <i>Steinernema riobrave</i> or <i>Heterorhabditis</i> as active ingredient.	
	Halofenozide	
	Imidacloprid	
	Lambda-cyhalothrin	
	Permethrin	
Trichlorfon		