

Module 6: Management of Turfgrass Diseases and Insects

*Content adapted from:
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Chapter 10 of the INLA ICNP Training Manual*



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Welcome to the Iowa Certified Nursery Professional Training program Module 6:
Management of Turfgrass Diseases and Insects.

Module Objectives

1. Be able to recognize important turfgrass insects.
2. Be able to recognize important turfgrass diseases.
3. Describe appropriate method to control these pests.

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After completing this module you should:

1. Be able to recognize important turfgrass insects;
2. Be able to recognize important turfgrass diseases;
3. Describe appropriate method to control these pests.

Common Turfgrass Diseases

1. Snow Molds
2. Red Thread
3. Leaf Spot and Melting Out
4. Stripe and Flag Smuts
5. Necrotic Ring Spot
6. Brown Patch
7. Dollar Spot
8. Powdery Mildew
9. Rust

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Turfgrass in Iowa can be susceptible to a number of different diseases. Most turf diseases are caused by fungi.

This module will cover nine of the most common disease problems including how to identify the disease and general control measures.

1. Snow Molds

- Description
 - Pink or gray in color
 - Visible as snow melts
- Control
 - Continue to mow turf well into the Fall
 - Keep leaves and debris off turf
 - Preventive fungicide applications are effective



Gray Snow Mold

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Two snow mold diseases, pink snow mold and gray snow mold, are common on turf during cold weather conditions.

The pink snow mold forms blighted areas on the turf that generally measure 6 to 12 in. in diameter. The blighted area may have a pinkish mycelia growing around its edge. Pink snow mold will develop when the turf is wet and temperatures cool below 45°F. It does not require snow cover, but may be very destructive under snow.

Gray snow mold is also known as Typhula blight. It is usually associated with snow cover, but can develop in the absence of snow if conditions are right. The blighted areas range from a few inches to up to 2 ft in diameter. They have a white to grayish mycelial mass on the surface of the turf. Gray snow mold generally occurs under cooler conditions than the pink and is usually associated with cool-season grasses.

Damage from both pink and gray snow mold will usually recover as temperatures increase and growth resumes. Raking the area and removing the debris may speed the recovery process. Avoid excess nitrogen fertilizer as the grass is hardening off in the fall. Early snowfall on unfrozen ground provides ideal conditions for the development of snow mold diseases.

2. Red Thread

- Description
 - Large red threadlike structures attached to upper part of leaf blade
- Control
 - Provide adequate nitrogen to the turf



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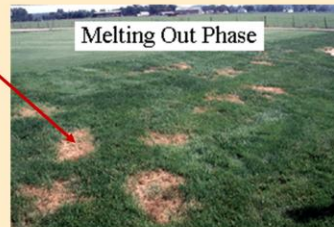
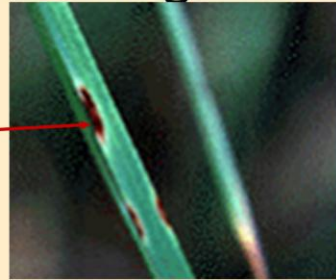
Red thread gets its name comes from a red threadlike structure that grows from the upper portion of infected grass blades. These are large structures and are easily observed with the naked eye.

Perennial ryegrass is one of the most susceptible grass species, but the disease is also commonly found on the fine fescues and on Kentucky bluegrass.

This is a low-nitrogen disease, and grass that is under stress due to nitrogen deficiency will be most likely to develop red thread. Fertilizing with nitrogen can reduce infestation. Turf that is deficient in K may also be more susceptible, and increasing K fertilization may be helpful.

3. Leaf Spot and Melting Out

- Description
 - Stem lesions with dark center and lighter border
 - Progresses to entire leaf creating large patches
- Control
 - Mow at appropriate height (particularly bluegrass)
 - Irrigate deeply and infrequently



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The term leaf spot refers to a series of fungal diseases that attack most lawn grasses. They generally form lesions (spots) on the infected blades.

The lesions begin as elongated spots with dark centers and a tan border. As the disease progresses, entire leaves and sheaths may become blighted. Symptoms generally develop in spring and fall, but may be observed anytime through the growing season.

Cultural steps to reduce leaf spot include mowing the turf at the proper height, the control of excess thatch layers, and irrigation to avoid stress. Excess nitrogen fertilization should be avoided, particularly in the spring. Common cultivars of Kentucky bluegrass tend to be quite susceptible to leaf spot, whereas many improved cultivars have resistance to it.

4. Stripe and Flag Smuts

- Description
 - Stripelike appearance on leaf blades
- Control
 - Minimize thatch, water and fertilize at appropriate rates



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Stripe smut gets its name from the stripelike appearance of the leaf blades that develops as the spores of the organism breaks through the outer cuticle of the plant from the inside. In advanced stages, the entire blade may become shredded. Stripe smut may occur in small spots or may blight larger areas of the lawn. It generally occurs in spring and fall. Stripe smut is primarily a disease of Kentucky bluegrass, but it may occasionally be found on the fine fescues and on perennial ryegrass. Flag smut has also been observed causing similar symptoms in cool-season grasses.

Controlling thatch and maintaining a balanced fertility program may help reduce infestations of this disease.

5. Necrotic Ring Spot

- Description
 - Tan ring with green center in turf
 - If severe, whole ring will turn brown
- Control
 - Minimize thatch
 - Water and fertilize properly
 - Select resistant varieties



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Necrotic ring spot often shows up in turf during cool, wet conditions in spring and fall. This disease often begins with the standard frog-eye pattern. In later stages, the patches may grow together to blight large sections of the lawn. It is most common on Kentucky bluegrass, fescue, and perennial ryegrass, but may attack other species if conditions are right. The symptoms generally subside as the weather warms.

The use of core aeration to control thatch may help prevent the development of this disease. Prevention of drought damage during dry conditions with proper irrigation may help prevent the disease.

6. Brown Patch

- Description
 - Tan blotches on leaves; starting at the tip and moving down
- Control
 - Don't water in evening
 - Use moderate amount of nitrogen



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Brown patch may also be referred to as Rhizoctonia blight. The disease blights the leaf blade from the tip down, and may damage sheaths and crowns as it progresses. Blighted areas in the lawn may range from a few inches to several feet in diameter. A gray to black mycelia often forms a halo around the outer edge of the infested area during the night that persists into the early morning hours. This disease generally occurs during periods of high temperature and humidity. Brown patch can attack most cool-season and warm-season lawn grasses and is a common problem on Kentucky bluegrass in the Midwest.

Cultural methods of reducing brown patch include a moderate N program, particularly during the spring and early summer on cool-season grass. Excessive thatch can also contribute to the disease, and thatch control measures should be taken.

7. Dollar Spot

- Description
 - Blades have hourglass shaped lesion
 - Cottony mycelia appears in early morning
- Control
 - Adequate nitrogen
 - Limit thatch

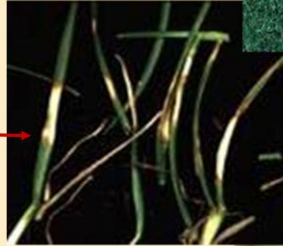


Photo courtesy of David Gardner

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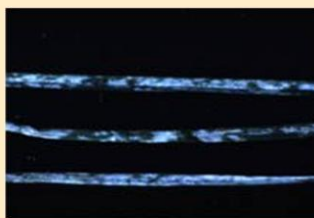
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Dollar spot gets its name from the silver-dollar-sized blighted areas that appear on closely mown creeping bentgrass on golf course greens. On Kentucky bluegrass turf, dollar spot generally appears as blighted areas about the size of a softball. Blighted areas may expand to several feet wide. Individual blades have an hourglass-shaped lesion that girdles the middle of the leaf blade. The lesion is tan in the middle with a brown halo above and below. The leaf tip may remain green. The entire leaf may be blighted as the disease progresses. A cottony mycelia may appear on the leaves early in the morning.

Dollar spot is more prevalent on grass that is deficient in N, and fertilizing is one of the cultural practices that can reduce its severity. Excess thatch may also be a contributing factor, as can drought stress. Thus, cultivation to reduce thatch and proper irrigation will also be helpful. This disease generally occurs in spring and fall, but spring infestations may linger through the summer months.

8. Powdery Mildew

- Description
 - White powdery substance on leaves
- Control
 - Use resistant cultivars
 - Moderate fertilizer and irrigation in shaded areas



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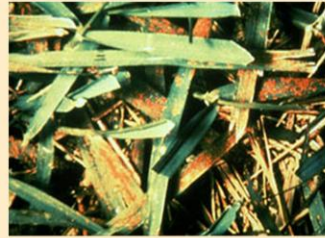
Powdery mildew causes a white, powdery growth that is visible on the outer surface of the leaf. It is commonly found in shaded areas, although it may be observed in open areas during extended wet, overcast conditions. Powdery mildew is often observed on Kentucky bluegrass and on the fescues.

The disease does little damage to most grasses; however, some cultivars are highly susceptible to it and may be severely thinned in shaded conditions.

Cultural practices that may affect powdery mildew infestation include the use of moderate fertilization and irrigation in shaded areas. Removing lower branches from trees and any other method that can be used to improve sunlight penetration will reduce infestation. If the lawn is badly thinned by powdery mildew in shaded areas, reseed the area with species and cultivars better adapted to shaded conditions.

9. Rust

- Description
 - Orangey-brown powdery substance on leaves
- Control
 - Apply adequate nitrogen



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Rust is caused by a number of fungi. The disease causes a rustlike growth on the surface of grass blades. The spores may easily rub off and may turn white tennis shoes a rusty-brown color. Rust is a common problem on most cool- season and warm- season grasses. It is often associated with Kentucky bluegrass turf in cool-season regions. It develops in summer and persists into fall.

Rust is a low-nitrogen disease, and the application of nitrogen may help the grass recover from damage.

Common Turfgrass Insects

Soil Inhabiting Insects

1. White Grubs
2. Bluegrass Billbug

Thatch/Stem Inhabiting Insects

1. Sod Webworm

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Insect control is very important in the overall care and maintenance of turfgrass. In order to effectively control the insect pests it is important to be able to identify both the pest and the type of damage it does, as well as the insect's life cycle and when the damage occurs, and the timing of appropriate control measures.

In Iowa, turfgrass insects can be divided into two categories: soil inhabiting insects including white grubs and the bluegrass billbug; and thatch/stem inhabiting insects such as the sod webworm.

Soil Inhabiting Insects:

1. White Grubs

- ID
 - C-shaped, cream colored, soft bodied, brown head and six legs
- Control
 - In August peel back turf to look for grubs
 - If >3-5 grubs /ft² treat with appropriate insecticide



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The term white grub refers to a group of insects with a larval stage that damages turf. The term “C-shaped grub” is also used to describe their larvae because they tend to curl into a C when exposed to light. The adult stage of these insects does not feed on the grass, although some adults may feed on trees and shrubs. It is the larval stage that damages the turf by feeding on the root system below the plant’s crown. The damage is best diagnosed by grasping the blades of the grass and lifting. The grass will break away at the roots. If the damage is recent, the grubs will still be visible on the soil surface, but they may have burrowed deeper into the soil and may not be visible.

Grub damage will be most apparent during dry periods, and it may not be readily apparent in wet years. Watering the lawn is a cultural technique that can reduce the damage from grubs.

The species of white grubs that attack turf vary by location. In the midwestern states west of the Mississippi river, masked chafers are the predominant species. The adult chafers lay eggs in the spring. The eggs hatch in summer, and larvae begin to feed on the root systems of lawns in August. The feeding continues into October, when the larvae burrow 6 in. or more into the soil to overwinter. They begin feeding on the roots under the crown in spring, but quickly pupate and then turn into adults.

Soil Inhabiting Insects: 2. Bluegrass Billbug

- ID
 - Weevil insect with a bill protruding from the head
- Control
 - Apply insecticides in late April before adults begin laying eggs
 - Control in June or July before larvae move to the soil



Bluegrass billbug adult with larvae

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Billbugs get their name from the distinctive bill, or snout, protruding from the head. The female billbug burrows into the sheath tissue just above the crown of the grass to lay her eggs. The billbug larvae feed on the crown killing it, and then fall onto the soil, where they pupate and then form an adult.

Billbug damage occurs in midsummer when the grass is often under stress from heat and drought. The damage does not become apparent until later when surrounding lawns begin to recover from summer stress. The billbug-damaged lawns fail to recover. The damage is diagnosed by grasping the grass and pulling. If the damage is caused by billbugs, the dead grass will break away at the crown. The hollow stems will have a sawdust-like material at the severed tips caused by the feeding of larvae.

The bluegrass billbug is common throughout the cool-season grass region. Its preferred target is Kentucky bluegrass, but it will lay its eggs in perennial ryegrass and some of the other cool-season grasses. It overwinters as an adult weevil and then lays its eggs in spring. Its damage is apparent in July and August, but at that time it is too late to apply an insecticide. Treatments must be applied in the spring to kill adults before eggs are laid.

Thatch/Stem Inhabiting Insects:

1. Sod Webworm

- ID
 - Larvae $\frac{3}{4}$ inch at maturity
 - Beige color with 4 rows of dark brown squares along length of body
- Control
 - Treat when damage is noticed (May & July)



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Webworms get their name from the web-lined tunnels in which the larvae live. The larvae live in the tunnels during the day and emerge at night to feed on the grass. The larvae damage the grass by chewing on the grass just above the crown. This is not necessarily fatal to the plant because the crown stays alive, but in stress conditions the plant may die. The larvae can be identified by rows of spots on their body segments. The larvae are generally green or light brown. Flocks of birds are often observed feeding on lawns with high larvae populations.

The adult stage of the sod webworm is a white to tan moth with a snout like projection from its head. The wings will wrap around the body and form a tube like appearance from the rear when the wings are folded. In northern regions, webworms overwinter as larvae. In the spring, there may be thousands of webworm moths flying over the lawn. They lay their eggs in flight. Eggs hatch in a few weeks, and larvae begin to feed. There are two egg-laying peaks to the life cycle in most parts of the northern region. These peaks will occur somewhere around June and August, depending on location.

Webworms are surface feeders and are easy to kill with insecticides if the problem is diagnosed early enough. However, the problem often goes unrecognized until considerable damage has occurred.

Test Your Knowledge

Match the image of the disease or insect with the proper name.

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Match the image of the disease or insect with the proper name.

That concludes this module.

References

Iowa Certified Nursery Professional Training Manual,
Chapter 10

Christians, N.E. 2006. Fundamentals of Turfgrass
Management. 3rd Edition. John Wiley & Sons. Hoboken,
NJ.

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This concludes the management of turfgrass insects and diseases module.