

Turfgrass Management

At this time of year, your thoughts may be turning to the potential effects of winter conditions on your turf. "Winterkill" is the general term describing turf loss that may occur as a result of winter conditions. This issue will discuss the actual causes of winterkill and how they may be prevented.

News/What to Watch For

During winter, most turfgrass diseases and insects are relatively inactive. However, one disease complex, the snow molds, may be at work despite current low temperatures.

Focus on: Winterkill

When turfgrasses die over the winter months, it may generally be described as "winterkill" (Figs. 1 and 2). The term covers a multitude of actual causes of turfgrass death in the winter, which may include snow mold, low temperatures, ice sheets, desiccation and crown hydration.

Crown Hydration

Crown hydration is of most concern during the warmer days of late winter or early spring when there is the potential for a day or two of warm daytime temperatures followed by a hard freeze. Turfgrass plants may start to take up water as temperatures warm and then re-freeze rapidly. As a result, ice crystals may form in the crown of the plant, rupturing cells and causing death.

Of the commonly-used cool-season turfgrass species, annual bluegrass and creeping bentgrass are most susceptible to crown hydration problems, though annual bluegrass is the more susceptible of the two because it emerges from dormancy earlier.

Desiccation

During the winter when turfgrass plants are dormant or semi-dormant, drying of the leaves or plants (desiccation) may cause death. Desiccation is typically only a factor on elevated or extremely exposed or windy sites, and areas where surface runoff is rapid.



Figure 1. Winterkill symptoms in turfgrass.

Low-Temperature Kill

Different turfgrass species are naturally more or less hardy in cold temperatures. In addition, the rates of freezing and thawing, the number of times frozen, and post-thawing treatment of the turf also affect low-temperature injury to grasses. Of greater concern than air temperature for low-temperature kill of turf is soil temperature, since the crowns of the plants reside within the soil.

Ice Sheets

Ice sheets may be identified as the cause of winterkill in turf. However, it is more often the cycle of crown hydration and refreezing that actually kills turf. This is an understandable mistake, since ice sheets may be created as snow melts and refreezes and they are very visible. Oftentimes, ice sheets will occur in low-lying or poorly drained areas where crown hydration may be facilitated because of the standing water. The damage closely aligns with the location of the ice sheet, causing confusion as to the actual cause of death (Fig. 3).

Recovery from Winterkill

Confirmation of winterkill is necessary before going to the trouble and expense of reestablishment. If you suspect winterkill, take samples of the damaged area and place them in a warm area to see if the turf greens up. Allow two weeks of recovery time before deciding on reestablishment practices.

If reestablishment is indeed warranted, seeding or sodding may be necessary to facilitate recovery. Well-defined areas of damage may be stripped of dead turf and re-sodded. Areas of more scattered damage may be more easily reestablished by seeding. It will also be critical to divert traffic from newly seeded or sodded areas, and to provide light fertilizer applications to stimulate growth. Appropriate irrigation during the reestablishment period will also ensure that the seedbed or sod stays moist.



Figure 2. Winterkill on a golf course putting green exacerbated by cross-country skiing.



Figure 3. Areas prone to collecting water may form ice sheets.

Low-Temperature Hardiness	Turfgrass Species
Excellent	Rough bluegrass
	Creeping bentgrass
Good	Kentucky bluegrass
	Colonial bentgrass
Medium	Annual bluegrass
	Tall fescue
	Red fescue
Poor	Perennial ryegrass

-Adapted from Michigan State University's Fact Sheet Winterkill of Turfgrass (E0019TURF) by Dr. Kevin Frank

Turfgrass Entomology 101

Insects are arguably the most successful life form on the planet in terms of diversity. Four out of every five organisms on Earth is an insect, and as individuals, they collectively outweigh every other life form on the planet! Insects have been found in nearly every ecosystem, including glaciers and even the ocean. Given this huge diversity and ability to fill almost any habitat niche, it is not surprising that insects play a huge role in human life. In fact, turfgrass areas are home to many types of insects—some are pests, but others are beneficial predators, and most are just minding their own business.

Insects are animals in the phylum Arthropoda, meaning they have a hardened external skeleton and jointed appendages. Within Arthropoda, insects are classified as hexapods, or as having six legs. This classification differentiates insects from other arthropods, such as spiders (Arachnida), which have eight legs, or millipedes and centipedes (Myriapoda), which, as their name indicates, have *myriad* (many) legs.

It's easy to dismiss insects as annoying or problematic when you are dealing with them purely in a pest management context. Considering *why* insects are so often pests, being able to distinguish damage caused by different pests, and being able to differentiate between pests and beneficial arthropods dwelling in turfgrass are all important steps to bringing a holistic and sustainable viewpoint to turfgrass management.

Why are insects so often pests?

The vast majority of insects are herbivorous, meaning they feed on plants. Some of these insects have evolved right along with plants we have grown for food and ornamentals. Not only are these plants highly nutritious by nature (otherwise, why would humans grow them?), but management practices like irrigation and fertilization make them even more so, and they are grown as monocultures over large areas of land. This is a recipe for a feast for insect herbivores, and many species have become

specialized on plants that humans commonly grow. These species are considered pests—one type of insect herbivore that turfgrass is no stranger to.

Turfgrass insect pests come in many shapes and sizes—they can be beetles, bugs, or even moths and flies. When we think of a beetle, we usually think of the adult stage—a hard-bodied, six-legged creature with a head, thorax, and abdomen (Figure 4). However, it's often the juvenile stages of insects—commonly known as larvae, grubs, or caterpillars—that are pests in turf. These are the juvenile stages of insects with a complete metamorphosis life cycle (egg, larva, pupa, adult). In general, juvenile stages exist to feed and grow, while adults exist to disperse and reproduce. Just as human teenagers have seemingly bottomless stomachs, juvenile insects have similarly voracious appetites. This is why the grub of a beetle or the caterpillar of a moth is the stage we often think of as a pest—because it is the stage that is feeding in order to continue development into adulthood.

Some groups of insects go through gradual, or incomplete, metamorphosis, where juveniles appear as smaller, wingless versions of adults and perform similar biological functions (except for reproduction). Often both adults and juveniles of these insects may be considered pests.

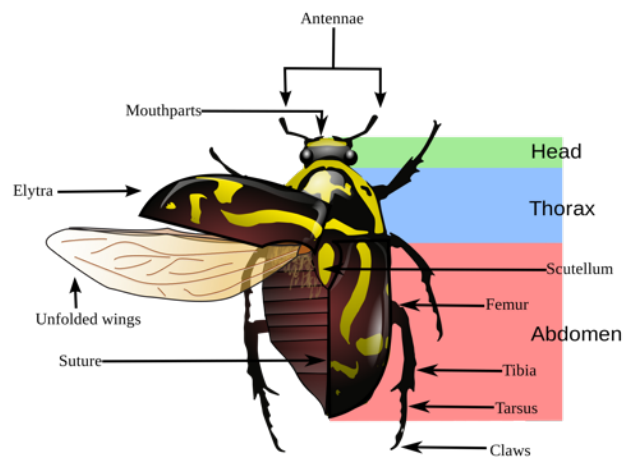


Figure 4. Diagram of typical beetle morphology, with fiddler beetle as an example species, showing the head, thorax, and abdominal segmentation that is common to all insects.

Turfgrass Entomology 101 (cont'd)

Common turf pests and their damage

Turfgrass is grown widely in the Intermountain West, making the region an ideal locale for many insect herbivores that have evolved along with grasses that humans have cultivated for turf use. Common turfgrass insect pests in the region include billbugs (Figure 5), white grubs (Figure 6), sod webworms (Figure 7), and chinch bugs (Figure 8), each with their own unique biology (refer to figure captions for a physical description of the pest). Often, when the pest itself is hard to find, the damage it leaves behind can be a good identifier of its creator. Thus, it is important to know how to not only recognize the pest itself, but also its damage.



Figure 5. Three species of billbug are commonly found in the Intermountain West (clockwise from left): bluegrass billbug, hunting billbug, and Rocky Mountain billbug. Billbugs are a type of beetle in the weevil family (Curculionidae). Adults have elbowed antennae, long snouts, and hard wing covers and range in size from 6-12mm.

Billbugs. Billbugs are a type of beetle called a weevil. Billbug damage is one of the most commonly misdiagnosed problems in turfgrass (Figure 9). It is often mistaken for drought stress, damage from other insect pests, delayed spring greening, or disease. Adults lay eggs in stems of turfgrass, and larvae (Figure 10) emerge and burrow down stems to the crown and roots of the plant where they feed, resulting in patchy areas of dead grass. Billbug damage can be diagnosed using a simple "tug test". Stems that have been damaged by billbug feeding will pull away easily, and hollow stems will contain a saw dust-like material (frass, or insect feces).



Figure 6. A white grub is the larva of a beetle in the scarab family (Scarabaeidae). White grubs are c-shaped with three distinct pairs of legs. (Photo by David Cappaert, Michigan State University, bugwood.org).

White Grubs. The name "white grub" refers to the larvae of several species of beetle in the scarab family. Common scarab adults in turfgrass include Japanese beetles (Figure 11), May-June beetles, masked chafers, and black turfgrass atenioides. The larvae of these beetles damage turfgrass by chewing on the roots near the soil surface or just beneath the thatch layer, sometimes entirely severing roots. Early signs of damage include wilting and yellowing. In late summer when grubs are nearly fully developed, brown patches will begin to appear. Contrary to billbugs, white grubs do not feed on the crown of the turf, meaning that turf can survive damage even if the roots are completely severed. Because of this, and because they do not feed within stems, turf damaged by white grubs does not pull away as easily as turf damaged by billbugs. Healthy turfgrass can mask the presence of white grubs when infestations are light.

Sod Webworms and Cutworms. In turf, most damage from sod webworms and cutworms is seen on short-cut grasses of putting greens. New sod fields and newly established lawns with high fertility may also be preferred feeding sites for sod webworms. Young sod webworm caterpillars chew on tender tissues of plant leaves and stems. Damage becomes evident when small, brown

Turfgrass Entomology 101 (cont'd)

patches of closely cropped grass appear, which can often be mistaken for disease. Cutworms are semi-subterranean pests that clip stems at the ground level, and damage appears as circular spots of dead grass or depressed spots resembling ball marks. These pests rarely cause problems in high cut turf or home lawns, though it is possible.



Figure 7. The life stages of a sod webworm, a moth pest of turfgrass in the family Crambidae. The caterpillars are the stage that feeds on and damages turf. (Photo by David Shetlar, The Ohio State University, bugwood.org).

Chinch Bugs. Billbugs, white grubs, and webworms all go through complete metamorphosis, and the juveniles are considered the damaging life stage. Chinch bugs, on the other hand, have gradual metamorphosis and several overlapping generations throughout a season (Figure 8). Both chinch bug nymphs and adults damage turfgrass by sucking sap from the crown. While feeding, they inject a salivary toxin that damages plant tissues and inhibits movement of water and nutrients throughout the plant. This initially results in a reddish-purplish discoloration of leaves, and advances to yellow, dry patchy areas as feeding continues. Severe infestations can result in extreme thinning or even death of the turfgrass stand.



Figure 8. Hairy chinch bug life stages from nymphs to adult. Chinch bugs have incomplete metamorphosis, and both adults and nymphs from overlapping generations may damage turf simultaneously. Chinch bug juveniles—called nymphs—appear as smaller, wingless adults. Chinch bugs are “true bugs” (order Hemiptera) in the family Blissidae (Photo by David Shetlar, The Ohio State University, bugwood.org).

Beneficial turfgrass arthropods

Not all insects inhabiting turfgrass are herbivorous. Many species feed on herbivores, helping to keep potentially damaging herbivore populations at levels where damage is reduced or even unnoticeable. Some common predatory turfgrass insects include ground beetles (Figure 12), rove beetles (Figure 13), and ants. Wolf spiders are a non-insect arthropod predator abundant in Intermountain West turf. Other turfgrass arthropods perform different ecosystem roles, like decomposing organic matter. Spring-tails (Collembola) and pillbugs (AKA roly-polies, sowbugs, or woodlice are not arthropods but are terrestrial crustaceans) are two major groups of decomposers that may help manage turfgrass thatch layers. Other decomposers in turf feed on carrion, such as carrion beetles and burying beetles (Figure 14). Carrion beetles are often found in turf near unmanaged, wooded areas where rodents and other vertebrates reside.

As an informed turfgrass manager, it is important to know the difference between herbivorous species and beneficial insects you may find in your turf. Not all insect and arthropod activity means you should spray insecticides—some insects should be encouraged! There is no catch-all secret to telling if any given insect is an herbivore, predator, or decomposer except to become familiar with the turfgrass insects in this area.

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Figure 9. Billbug damage at a golf course in Logan, UT (July 2013) very much resembles drought stress.

Turfgrass Entomology 101 (cont'd)



Figure 10. Juvenile billbug life stages from egg (left) to pupa (right). Billbugs have 5 larval stages per generation that damage turf. Billbug larvae are legless and more robust than white grubs.



Figure 11. Two species of scarab—European chafer and Japanese beetle—whose larvae can be found damaging Intermountain West turf. Scarabs are a very diverse family whose members have a wide range of size and appearance. In turf, scarab adults may range in length from a couple of millimeters (black turfgrass ataenius) to a centimeter or more (masked chafers). (Photo by Bruce Watt, bugwood.org).



Figure 12. One type of predatory ground beetle you may commonly see in your lawn. Ground beetles are in the family Carabidae, a very diverse family whose members range in size from a couple of millimeters to a couple of centimeters. Ground beetles always have filiform antennae and a bean-shaped appendage—called a trochanter—where their hind legs meet the underside of their abdomen. Several species of ground beetle can be commonly found in turf. (Photo by Ken Chamberlain, The Ohio State University, bugwood.org).



Figure 13. Rove beetles are not your typical-looking beetle, but they are easily identified by their shortened wing covers that leave a good deal of their long, tapered abdomen hanging out. Rove beetles belong to the family Staphylinidae, another diverse family whose members broadly range in size and are commonly found in turf. Rove beetles can feed on both carrion and live prey. (Photo by Joseph Berger, bugwood.org).



Figure 14. A carrion-feeding burying beetle of the family Silphidae. Most carrion beetles you find in turf will have this general appearance—the pointed abdomen extends slightly beyond the black and orange wing covers. Others you may find will appear disk-like with ruffled, black wing covers and a cream-colored thorax, often with a dark spot in the center. (Photo by Susan Ellis, USDA APHIS PPQ, bugwood.org).

Upcoming Spring Management Practices

Seeding/Over-seeding

Spring provides the opportunity to seed new turfgrass areas or to over-seed areas that may have been damaged over the winter. The cool temperatures will promote germination and growth of cool season turf species such as Kentucky bluegrass, tall and fine fescues, and perennial ryegrass. Be aware, that there will be also be annual weed pressure at this time of year and consider your weed control options. Choose pest resistant or recommended turfgrass cultivars when possible.

Fertilization

Nitrogen is of primary concern in turfgrass fertilization. In the spring, apply 1 pound of slow release nitrogen (N) fertilizer per one thousand square feet of lawn area. This will help the grass to recover from winter damage and any stress that may have occurred. It will also be especially helpful for areas that have suffered damage due to diseases such as pink and gray snow mold. In a slow-release form, N fertilizer will provide a consistent source of nutrients as the growing season begins.

Aeration/Cultivation

Spring is also an ideal time to aerate your lawn if the soil is compacted or there is a significant layer of thatch beneath the grass. If the thatch underneath your lawn is more than 1/2 in. thick, consider core aeration to stimulate the natural decomposition process. Likewise, if you have a very fine-textured soil, compaction may occur, particularly in high traffic areas. Core aeration will help to alleviate compaction and will encourage turfgrass growth and recovery.

Relevant USU Fact Sheets

[Basic Turfgrass Care](#)

- Mowing, fertilization, and irrigation

[Turfgrass Cultivars for Utah](#)

- Appropriate species and varieties for Utah

[Billbugs](#)

- Damage, diagnosis, and control options

[Snow Mold in Turfgrass](#)

- Symptoms, diagnosis, and management

[Chinch Bugs](#)

- Damage, diagnosis, and control options

[Sod Webworms](#)

- Damage, diagnosis, and control options

***Precautionary Statement:** All pesticides have benefits and risks, however, following the label instructions will minimize the risk and maximize the benefit. Pay attention to the directions for use and follow precautionary statements. Pesticide labels are considered legal documents containing instructions and limitations. Inconsistent use of the product or disregarding the label is a violation of both federal and state laws. The pesticide applicator is legally responsible for proper use.

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click here <http://utahpests.usu.edu/ipm/htm/advisories/turf> for archived advisories.

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