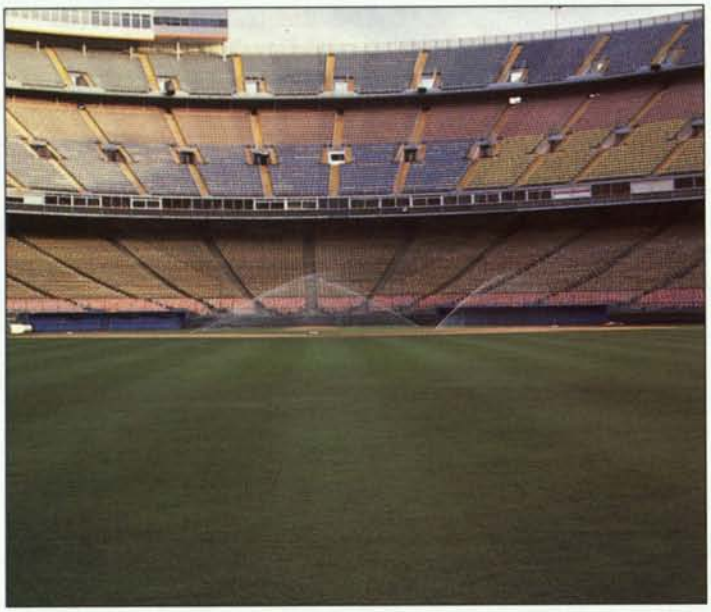
Preventing Insect Outbreaks From The Ground Up

By Mary Owen



Timing of irrigation can make a difference in disease potential and stress on turfgrass plants. Turf under disease pressure is less able to withstand insect injury. Photo of irrigation at Mile High Stadium, Denver, CO, courtesy Hunter Industries.

Compaction poses not only a physical problem, but also a physiological impediment to turfgrass growth, which weakens turf and makes it more susceptible to insect infestation. Photo courtesy: Ransomes America Corporation.

Insect invasion and infestation are unpleasant facts in turf management, especially in the management of athletic fields. A good defense will make the impact of infestation less severe.

Though attacks on turfgrass by insects can seldom be controlled by management techniques alone, some management strategies may manipulate the growth of turfgrass plants so that they become vigorous and hardy, and thus will be less likely to succumb to attack.

What does it take to mount a staunch defense against insect infestation? It takes the knowledge and skill of the athletic field manager working to develop turf with sturdy top growth and a healthy, extensive root system.

Develop A Knowledge Base

The first step in any defense against insect attack is the accumulation of data and development of a knowledge base. What insect pests are likely to attack the grasses growing on the fields? When are these pests likely to appear? When are they likely to do damage? When will they be most vulnerable to control? What is the past history of the fields relative to specific insect infestation, tolerance, or injury?

Assess the present condition of the turf. How dense is it? Has the growth rate been adequate or excessive? How deep and extensive is the root system? Is the turf healthy enough to withstand a low level of insect infestation?

Which turfgrasses are present? How will they withstand an insect attack? Fine-leaved fescues under chinch bug attack are more likely to lose leaf area more quickly than the more wide-bladed Kentucky bluegrasses, perennial ryegrasses, or tall fescues.

How intense is the upcoming schedule of use and play? Will the field be under heavy traffic stress at a time which coincides with a potential insect problem?

Once the situation has been assessed, proceed with the good management practices that make turfgrass plants strong and tough, both above and below ground.

Maintain A Vigorous Root System

Do all you can to stimulate root growth. A sturdy and extensive root system has the ability to pull a stressed turf through a mild infestation, especially of root-damaging insects such as white grubs.

Remember, roots have several functions:

- They absorb mineral nutrients, water, and oxygen.
- They provide anchorage and stability for the turf.
- They serve as a storage sink for carbohydrates, which the leaves and growing points can draw upon for growth and development.

Roots are consumers, not producers. They rely on the green parts of the plant to produce, through photosynthesis, the carbohydrates with which they are nourished, and with which they are able to do work. If top growth is overstimulated through heavy nitrogen fertilization and vigorous watering during periods unfavorable for root growth, the photosynthates will first go to the above-ground growth areas, not to the roots. Root growth will slow, root mass will degenerate, and the result will be green, lush above-ground growth with very little root system. This type of situation makes

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the turf more vulnerable not only to insect damage at a low insect population level, but also to cold, heat, drought and wear injury.

High soil heat weakens roots. Maximum root growth for most cool season turfgrasses occurs in the range of 50 to 65 degrees F. The range for warm season grasses is approximately 75 to 80 degrees F. Above those temperatures, root growth slows dramatically. Roots become brown and spindly, and while many senesce and die, few will be replaced until soil temperatures cool. Spring and fall, when soil temperatures are cool, are optimum times for root growth.

Minimize stress from traffic and wear. Distribute traffic on a field, or from field to field, whenever possible to alleviate stress on grass plants, including the crown and the roots.

Correct compaction by core aeration. This provides the benefits of increased rooting, improved air and water penetration, and stimulation of microorganisms, which help decompose thatch.

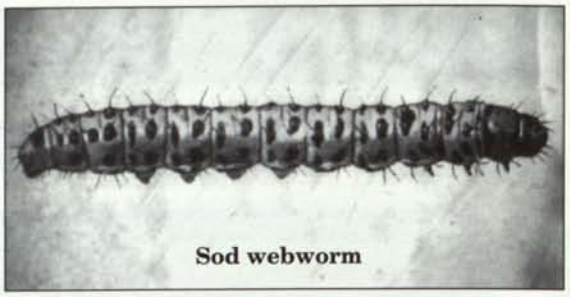
Compacted soil is a physically hostile place for root growth. When soil is compacted, the amount of soil solids per unit volume increases, the amount of water present remains the same and the amount of pore space — air space — is reduced. This limits oxygen uptake by the plant, as most oxygen is absorbed via the roots. When compacted soils are irrigated, the oxygen level in the soil can take up to 10 times as long to return to normal as in non-compacted soil.

When soil oxygen levels are reduced, nitrogen, phosphorous, and potassium uptake are likewise reduced. Therefore, compaction poses not only a physical, but also a physiological impediment to turfgrass growth.

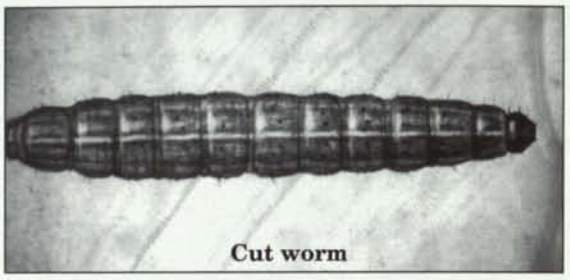
Keep Fertility Balanced

A properly nourished plant will be able to withstand a heavier infestation than a poorly nourished or overstimulated one. Provide for adequate fertility based on soil testing. Make applications at a rate and frequency to maintain quality and encourage recovery from stress, but not to push above-ground growth excessively. When fertilization after stress, especially during hot weather, is necessary, use a fertilizer containing a high percent of water insoluble nitrogen, so that the nutrient will be slowly available to the plant.

Chinch bug



Sod webworm



Cut worm

Pay particular attention to balanced pH and to potassium nutrition. Potassium not only encourages rooting, but also increases drought, cold, heat, and wear tolerance.

Irrigate With Care

Water properly and judiciously. Improper watering, whether inadequate or excessive, can restrict root growth and development.

Timing of irrigation can make a difference in disease potential and stress on turfgrass plants. Fungal diseases are intensified by extended periods of leaf wetness. Irrigation should be timed so as not to extend leaf wetness. Except in periods of very hot, humid weather, water in the late evening or very early (pre-dawn) morning. If turf is under disease pressure, then it will be less able to withstand insect injury.

Turf experiencing a grub problem of low- to medium-intensity can be pulled through in some cases by watering and low levels of fertilization. If roots are encouraged, and the root system is replacing roots at a rapid pace, then the level of grub population will have less adverse impact.

Manage Thatch

While a small amount of thatch provides resiliency to a turf surface, too much will impede rooting. Besides restricting water and pesticide movement, thatch provides a hiding place for insects such as chinch bugs or sod webworm. Though thatch itself will not cause an insect outbreak, it provides them with a competitive advantage.

Mow Precisely

Mow at the highest height possible for the grass present and the intended use. Raising the mowing height and decreasing the frequency of cut will reduce stress on the plant, conserve carbohydrates, and minimize damage to roots. Do not mow, or mow as little as possible, when turf is under heat stress.

Overseeding Helps

If leaf-damaging insects have been a problem, overseed with an endophytic cultivar of a turfgrass suitable to the site. There several cultivars of perennial ryegrasses, tall fescues, and fine fescues which contain these beneficial fungi. Endophytes impart resistance to leaf-feeding insects such as billbug, chinch bug, sod webworm, and aphid.

Vigilance Pays

Establish a regular scouting program to watch for potential problems. Key in on areas that have historically had problems. Begin to look for soil-inhabiting and crown- and leaf-damaging insects before their expected appearance. If the weather "throws a curve," you'll be ready. Weather extremes can affect pest emergence, egg laying and hatch, larval and nymphal development, as well as feeding behavior. Keep records of weather data, pest occurrence, and other observations.

Train a crew member or two who are on the fields regularly in simple scouting techniques. Build time for scouting into your weekly routine. Learn to recognize damage early, before turf is damaged beyond repair.

Determine the threshold of damage the

fields in danger can withstand. Fields in danger of late summer/early fall white grub damage and facing a heavy play schedule may not be able to withstand as high a level of infestation as a less heavily used field. Root damage to any significant extent will not be repaired because the plants will be under so much traffic stress. Poor rooting can lead to poor recuperative ability, poor playability and footing, and liability problems.

The strong defense of a sturdy and vigorous turf, including the root system, will not eliminate infestations or the need to strike back with a pesticide when necessary. But it will improve its ability to withstand them. Pesticide applications should be based on assessment of a particular infestation, and should not be made as a preventative measure.

If all else fails, and an infestation causes severe damage, control the infestation if the timing is appropriate to the insect's life cycle. Make repairs if necessary.

A successful pest management defense begins well before any pests show up to damage turf. Attention to plant health, root growth and development, and soil conditions conducive to turfgrass growth is critical. ❑

Editor's Note: Mary Owen is a turf specialist with the University of Massachusetts Cooperative Extension. This is her first article for sportsTURF.

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