Getting a Jump on Spring

Plants treated with triazole compounds exhibited reduced transpiration, increased yields under moisture stress, delayed senescence, and increased chlorophyll as well as carbohydrate content.

Three to five light irrigations a day provide good conditions for grass seed germination. Photo courtesy: Hunter Irrigation.

By Daniel Ingham

The first days of spring mean many things to many people. To sports turf managers, it means a race against time to get grass to grow in time for the playing season. It's the pre-game show that few ever see or even hear about.

As the weather warms, athletic-field managers have little time to waste as they try to establish healthy turf that will maintain a high-quality playing surface through countless baseball, soccer and rugby matches. A combination of seeding, core cultivation and top-dressing is the key to successful seeding and overseeding. In addition, techniques such as the use of plant growth regulators (PGRs) can tip the odds in your favor.

Turf in the winter is not immune to compaction problems. The turfgrass plant, especially its crown, is vulnerable to damage when feet or vehicles trample frozen or partially frozen ground. During the early spring, turf and soil tend to be wetter. The wetter soil is more vulnerable to compaction.

Early-morning frost, which is typical in the spring, presents special problems. The frost consists of sharp needle-like crystals. These crystals can damage turf when people walk across the frosty ground. Whenever possible, keep people off frost-covered turf. If you can't prevent traffic, lightly spray the turf to wash off the frost.

Core Cultivation

Unless you address any underlying compaction problems, overseeding will not provide the desired results. The most direct benefit of aeration is the improved *exchange* of air and moisture between the soil and the atmosphere. The term exchange is important because air and water must both enter and exit the soil profile. Plant roots and microorganisms in the soil consume oxygen and release carbon dioxide during respiration. Plant health and nutrient uptake are reduced when the rootzone lacks sufficient oxygen.

Compacted soil disrupts air exchange. Air, located in the pockets or pore spaces between soil particles, occupies roughly 25 percent of the volume of good soils. Compaction reduces the amount of pore space available for gases and moisture and restricts their exchange.

Water plays a major role in the exchange of air in the soil. It displaces air in the pore space when rain falls or irrigation is applied faster than the soil can drain. In well-drained soils, water coats the surface of soil particles, moving from one particle to another by a process called capillary action. In such conditions, pore space is open for air exchange and moisture is available to plant roots and beneficial microorganisms.

The following are characteristics common to compacted soils:

- Poor water movement, air exchange and rooting;
- Layers in the soil that reduce water, air movement and rooting;
- High salt levels, particularly in high-sodium soils;
- Subsurface soil compaction;
- A high water table formed by a compacted layer.

Aeration improves infiltration of water into the rootzone. This is especially helpful on moderate slopes where runoff is most likely. Consequently, irrigation run times for compacted areas can be lengthened following aeration.

As moisture moves further into the rootzone, turfgrass plants will respond by generating deeper and more extensive roots. The "moisture reservoir" for the turf is multiplied, enabling the plant to establish a deeper root system, thus increasing its drought tolerance. Eventually, the interval between irrigation can be lengthened because of this extended root system.

Deeper root systems also have a larger volume of soil from which to extract nutrients. Fertilizers, as they become soluble, are moved into the rootzone by surface-applied water. Slow-release fertilizers can be applied soon after aeration to improve their storage within the rootzone.

Pesticides that need to enter the soil to be effective can also be applied following aeration. In some cases, application rates can be reduced since you are assisting the placement of the pesticide in targeted areas by aeration.

Indirectly, aeration benefits virtually all critical growth factors and improves the effectiveness of all other maintenance practices.

Aeration brings the turf rootzone into balance and allows the plant to function in a healthy, conditioned environment. This is the ultimate achievement for a manager of turfgrass.

Overseed Prep

Overseeding is considerably more complex than simply spreading seeds. As a practice, it will accomplish little more than feeding the local bird population.

Before any overseeding can take place, a number of preparatory steps are necessary. Without adequately treating the seedbed, the new grasses will not properly establish in the soil.

Turf should be aerated a few weeks before overseeding to allow good seed-to-soil contact. The seeds themselves can then be applied with a variety of mechanical spreaders and seeders.

After distributing the seed, a thin layer of topdressing, such as compost, humus or mulch, should be used to keep seed in contact with the soil and protect it from wind, erosion and birds. The initiation of germination depends on the top 1/2 inch of the seedbed being kept moist. Three to five light waterings each

continued on page 26

Spring Seeding

continued from page 25

day to moisten the surface usually provide the best results. Care should be taken to avoid puddling or washing out the seed, which occurs when too much water is applied at one time. With today's high-tech controllers, this should be easy to avoid.

The length of time necessary for the new grass to germinate depends on a variety of factors, including climate, moisture and seed type.

During this germination phase when watering is frequent, turf diseases such as pythium can develop. A preventive fungicide program is important when dealing with high-density, cool-season seedling populations if conditions are favorable for disease. This has led to innovations such as fungicide-treated seeds, which cost more while providing insurance against disease. In addition, preplant or complete fertilizers are usually applied at the time of seeding to provide the essential nutrients for seed development.

Biostimulants

Biostimulants are non-mineral substances that stimulate metabolic activity when you apply them to plants. They stimulate growth and include hormones (auxin, gibberellins, ethylene and cytokinins), vitamins, organic acids, chelating agents, enzymes, coenzymes and triazole compounds. Two of these that have been researched extensively at Virginia Tech, cytokinins and triazole compounds, are proving to be very effective.

A cytokinin is a hormone plants manufacture that affects plant growth. It can be naturally derived or synthetic. Seaweed naturally contains high levels of cytokinins and other plant growth-regulating material. Therefore, seaweed performs better in stimulating turfgrass growth than the synthetic cytokinin.

Seaweed has been known to stimulate plant growth for centuries. However, it was not until the early 1970s that the growth enhancement of plants correlated with seaweed was attributed to cytokinins. Since then, cytokinins have been associated with delaying leaf senescence, enhancing bud initiation and regulating plant growth.

Triazole fungicides originally were researched for their ability to control fungi. About a decade later, research discovered applications of triazole compounds that inhibit sterol biosynthesis also cause an increase in plant-water content. This aspect can have an important impact on plant-water management.

It was shown in 1983 that Kentucky bluegrass shoot and root growth were reduced when triazole compounds were applied. At low rates, these compounds cause growth reduction of the foliage but not plant roots. This is because the foliage's growing points are at the base of the sheath. The roots' growing points are at the root tip. The reduction in top growth and increased plant-water retention of triazole-treated plants appears to contribute to an enhanced root development.

By 1986, it was shown that plants treated with triazole compounds exhibited reduced transpiration, increased yields under moisture stress, delayed senescence, and increased chlorophyll as well as carbohydrate content. Also, these compounds helped to protect

plants from chilling temperatures, heat and ozone.

Unpublished studies have shown that applications of seaweed extracts, as well as triazole compounds to turfgrass, have enhanced plant-water retention, salt and drought tolerance, and shifted fatty acids within the plant toward unsaturation. Also, preemergence herbicide injury was reduced when the turfgrass was previously treated with biostimulants.

PGRs and Overseeding.

PGRs can help with overseeding and spring transitions.

Making a PGR application before seeding into existing warm-season turf stands can give the new seedings a competitive advantage. This may help to hasten the establishment of the overseeded grass. Soil moisture, nutrients and light will be more accessible. Also, the PGR will control the existing turf growth for three to four weeks, relieving the compaction stress from mowing.

Bermudagrass is an aggressive turfgrass. By suppressing its growth, you tip the competitive advantage over to the newly planted turf.

Care should be taken to avoid puddling or washing out the seed, which occurs when too much water is applied at one time. With today's high-tech controllers, this should be easy to avoid.

Ryegrasses germinate quickly, so they can rapidly take advantage of the suppressed Bermudagrass. This gives the ryegrass a chance to develop a healthy stand, especially in particularly warm fall seasons when Bermudagrass can remain aggressive late into the season. Fescues, which do not germinate as quickly, also can be helped to establish in this way.

The same principles apply to spring transition. Cool spring conditions can favor the cool-season species well into the late spring. By applying a PGR, you give the advantage to the Bermudagrass or other warm-season varieties.

A lower application rate is needed for fescues and ryegrasses because they are more sensitive to PGRs. Some slight discoloration may occur on ryegrass with some PGRs. Check the product label for the recommended application rate.

Apply the PGR when Bermudagrass begins to show a consistent green color. At this point, the Bermudagrass should be quite competitive. The PGR application to suppress fescues and ryegrasses is about 1/8 of the rate required to suppress Bermudagrass growth, so the PGR application won't significantly affect the emerging Bermudagrass. If you decide to seed the Bermudagrass, wait at least three days after the PGR application (two weeks in California). ❑