

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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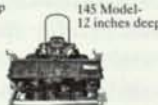
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# Sports Turf Mowing And Fertilization:

## Plan For Success

By Steve T. Cockerham



Well-managed natural turf athletic fields are safe, durable, and aesthetically pleasing. Good nutrition is a key factor in that process.

Although turfgrasses may be mowed short, mowing with greater frequency allows the root system to better recover from the injury caused by the shock of the initial clipping.

**W**hen you stop and think about it, we really expect a lot from our turfgrasses. There are not many plants that can stand to have one-third of their foliage removed continually and still remain healthy, vigorous and tough.

Wherever it is, turf has an important aesthetic function — it's supposed to look good. Athletic field appearance, although primarily a concern for spectators and television audiences, does reflect pride of the maintenance personnel. A bad-looking field, especially one where playability is poor, can be a highly visible embarrassment.

Many maintenance factors, such as mowing and fertilization, aimed at creating healthy, uniform turf also have a positive impact on aesthetics. Mowing pat-

terns, colorants, lines and logos can further enhance aesthetics.

### Sharp Mowing

Cutting grass removes some of its photosynthetically active tissue. A direct, unseen result of that removal is a reduction in root growth. As turf is clipped lower and lower, the stress on the roots becomes more severe.

If the mowing frequency is increased, then the consequences of lower clippings are decreased. Although turfgrasses may be mowed short, mowing often allows the root system to recover from much of the injury caused by the shock of the initial clipping.

The frequency of mowing should be determined by the relationship between how tall the grass is permitted to grow

and the cutting height. Removal of more than 40 percent of the top in a single clipping completely stops root growth. The larger percentage of foliage removed, the longer the period of time the root growth remains stopped. That is why the rule-of-thumb is to mow frequently enough to remove less than one-third of the leaf blade at one time. Hopefully, the root growth will not be completely stopped.

Rhizome weight and number are also restricted by mowing. Since the rhizomes of many species are important to rejuvenation, spreading, and recovery from injury, anything detrimental can eventually reduce turf density.

Tillers behave as if they were individual plants. Severe clipping reduces the

*continued on page 24*



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## Sports Turf Mowing

*continued from page 22*

number of tillers being initiated which, as with rhizomes, eventually decreases the turf density.

Bentgrass and bermudagrass will tolerate more severe defoliation than species such as Kentucky bluegrass. Since many of the bentgrasses and bermudagrasses have prostrate growing habits, the low, closely overlapping leaves permit a larger percentage of green foliage to remain after mowing. A relatively high level of photosynthesis continues and root growth is maintained.

Over a period of time, root growth may exceed food production from the reduced leaf area and carbohydrate reserves can become depleted, thus affecting the plant adversely. Bermudagrass simply takes longer to "go downhill" than other species.

As you might expect, temperature decidedly influences the impact of mowing on the entire plant. Unclipped Kentucky bluegrass grows better at relatively cool soil temperatures in the mid-60s F than at 80 degrees F soil temperature. Clipping the grass will reduce plant growth at the cool soil temperature

to below that of unclipped plants at warm soil temperature. The same relationships hold even on a hybrid bermudagrass unmowed in the rough and mowed at 3/32-inch on greens in the desert.

Plants maintained at temperatures higher than the optimum for growth for a period of time, such as occurs when nights do not cool off, experience even more significantly reduced growth. The difference in plant growth between soil temperatures is less with clipped turf than unclipped. Clipping has more influence on plant growth than soil temperature.

Even though root growth is slowed just by clipping, when the temperature increases, root growth dramatically decreases as the mowing height is lowered. This reduction in the root system is an important factor in making warm weather turf management the tricky art it is. This is why it has long been a rule of thumb for turf managers to raise the mowers as summer approaches and lower them in the fall and spring.

Since mowing and mowing height intensify the effects of temperature, good irrigation practices become extremely important. With the shortened root system, the turf is actually more susceptible to drought injury than direct heat injury.

Low mowing produces denser turf and a faster playing surface, but results in a shorter root system. Cool season species maintained at a high mowing height, then cut to a lower mowing height, are more resistant to wear than grasses maintained at a low height and allowed to grow taller. Mixtures of perennial ryegrass and Kentucky bluegrass perform better under these conditions than Kentucky bluegrass alone. Recovery of bermudagrass subjected to severe wear is essentially the same whether maintained at 1/2 inch or 3/4 inch.

Scalping the sports field has a negative effect on the appearance and surface playability. The removal of verdure (the topgrowth left after normal mowing), by mowing or traffic, significantly lowers traction.

The aesthetics of a sports field can be greatly enhanced by creating ribbon or striping mowing patterns.

### Fertilization Tips

When sports fields are expected to perform under the pressures of high traffic, the turfgrasses should be maintained at optimum vigor. Well-managed natural turf athletic fields are safe, durable, and aesthetically pleasing. Good nutrition is a key factor in that process.

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Nitrogen is the element required in greater amounts than any other fertilizer-supplied nutrient. It is used in chlorophyll, determining the color of grass and affecting photosynthesis.

Phosphorus is especially beneficial to seedling turf and sports turf injury recovery by increasing root, rhizome, and tiller development. Fertilization following aeration helps deliver phosphate directly to the root zone.

Potassium is very mobile within the plant and tends to accumulate in young, actively growing tissues. Turf rarely visibly responds to added potassium, but it improves drought, heat, and cold tolerance, enhances disease resistance, and provides greater wear and traffic tolerance.

Iron is essential for chlorophyll synthesis, which is particularly important in production of dark green grass. Turf suffering from iron deficiency is pale green, or even yellow, and does not respond to nitrogen fertilization.

Sports turf is pretty well limited to one warm season grass — bermudagrass — and three cool season grasses — bluegrass, tall fescue, and perennial ryegrass. For sports fields with any of these four grasses, nitrogen is applied at the rate of one

pound per 1,000 square feet per month of the growing season. If slow-release nitrogen fertilizers are used, the rate is one pound of nitrogen per 1,000 square feet, per month of release period.

Phosphorous is applied to warm and cool season turfgrasses at the rate of one to two pounds per 1,000 square feet, per year. Potassium is applied at one-half to one pound per 1,000 square feet, per month of the growing season. On sand-based sports fields, potassium should be applied at about the same rate and frequency that nitrogen is applied.

Turf can visibly respond to rates of iron as low as one-tenth of a pound to one pound per 1,000 square feet within a few hours after application, particularly if nitrogen is applied at the same time. A light application of iron in soluble form, such as ferrous sulfate, can be useful to deepen the turf color for a particular event. Great care must be taken in application of iron, as the potential for burning the grass is quite high.

Cool season grasses do not grow very well if the temperature is above 90 degrees F, and warm season grasses do not do well when the temperature is

below 55 degrees F. There may be little benefit in applying fertilizer when temperatures are moving out of the range of the turf species. There are, however, exceptions. In the spring, although the temperature may be a little low, its sometimes possible to "jump start" bermudagrass with a one-time application of two to three pounds of nitrogen per 1,000 square feet in soluble form.

Turfgrasses can sometimes be induced to grow a little faster than normal. This procedure of actually forcing growth can be useful in sports turf management for short-term results. Soil heating, vented tarps, and soluble fertilizer at high rates are used in "forcing." If the turf is forced indiscriminantly, there can be severe long-term negative effects. Although there has been little research into turf forcing, it is a common practice among sports turf professionals. □

*Editor's Note: Steve Cockerham is a turfgrass researcher at the University of California, Riverside. He is both a past president and active member of the national Sports Turf Managers Association.*

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## PRESIDENT'S MESSAGE

By Greg Petry

In the last issue, we discussed 1990's phenomenon of *partnerships*. I mentioned that STMA would be contacting leaders of our commercial sector to see if they would be interested in supporting an activity in 1994. Well, guess what? We had a few pleasant surprises.



The John Deere Company has committed to fund the next Sports Turf Topics. Members have received the 1993 compendium of articles that appeared in various trade publications throughout the year. This is a great resource. Watch for the 1994 issue. Many thanks to Bob Tracinski of John Deere for his ongoing support of our profession and industry.

More great news is that the Toro Company is sponsoring the production of our next five newsletters. Dr. Jim Watson, a long-time supporter of STMA and honorary lifetime member, submitted to



Toro for the support and will be working with Dennis Brown. If you run into Dr. Watson or Denny Brown, please be sure to thank them for Toro's support.

STMA and Adams publishing have also signed a new two-year deal. Many thanks to Mark Adams, Bruce Shank, and Matt Trulio for their continued support of STMA.

Three members have joined into a partnership to help coordinate our next conference and show. Mark you calendars! Plan on being in Bradenton, FL, February 4-8, 1995. Mike Schiller, Dr. Henry Indyk, and Eugene Mayer of O.M. Scott have been busy organizing this conference. Our contact at Pirate City, the host site, is Mike Hurd. Henry and Eugene met with Mike in January to plan the on-site logistics. By the way, Eugene and Henry committed their own personal resources to take on this initiative. Great job gentlemen!

Rich Moffit of St. Louis University and

an STMA board member has been working with staff to redesign and produce a new membership brochure. Rich and the membership committee have been planning a membership recruitment program. STMA has been receiving approximately 15 new membership applications per month.

Mike Trigg and the education committee have been planning the following three institutes:

- Chesapeake Chapter — September, RFK Stadium/
- Midwest Chapter — October, Milwaukee City Stadium
- Southern California — October, UCLA.

Watch the "Chapter News" for additional information. Many thanks to the chapters and those working on the local institute committees.

And lastly, Bret Kelsey and I have been painstakingly working on the 1994 budget. Although the process was extremely arduous, we have created a final plan that will leave the association with little or no debt by the end of 1994. We have reexamined some of our operating procedures, restructured the dues assessments,

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shaved expenses and conservatively projected our revenues. A very conservative approach was taken because we want to stay on track and be in a positive cash flow position by the beginning of 1995.

As you can see, the association has taken a turn for the better. We now project a positive cash flow, surpluses, etc. Of course, any surplus would be reinvested in new or improved services for members.

What tremendous *commitment* by the people who have hung in there during trying times! Isn't it interesting that some people are with us throughout good times and bad? Others have been with us part of the time — depending on how well we're doing. And of course, some will never be with us no matter how well we do.

*Commitment.* We have had a lot of people who share a vision. They have influenced what has happened and everyone has appreciated what has happened. Thank you to those who have shown commitment to our association and our profession. Let's continue to work together to promote better and safer sports turf!

## STMA Chapter News

**The Southern California Chapter:** STMA — Friday, May 8 makes the Southern California Chapter's "STMA Fun Night At The MURPH!" at San Diego Jack Murphy Stadium. Join in the opportunity to network and pick up practical tips, as well as have fun.

Attendees will gather at the East Tunnel at 3 p.m. sharp for a tour of the stadium and peek behind the scenes. Next, a panel of your peers from local schools, parks, and colleges will share problem-solving methods from "the trenches of real life" in these budget-squeezed times. Following that, the group will enjoy a buffet dinner and refreshments with a "sky box view" of batting practice and an evening game as the Colorado Rockies face the Padres.

There is a \$30 charge per person and a limit of 50 people in the sky box. Registration must be postmarked before April 27. Don't get shut out!

Send reservations to San Diego Jack Murphy Stadium c/o Steve Wightman, 9449 Friars Rd., San Diego, CA 92108 or call Steve at (619) 525-8272 for more information.

Other upcoming events include an August networking/learning/fun session at Dodger Stadium, which will include a

game between the Dodgers and Cubs, and the Southern California Institute that will be held October 12 at UCLA in Los Angeles. More details on these events will soon be announced.

For more information on the Southern California Chapter, contact Chris Bunnell, (619) 432-2421.

**Iowa Sports Turf Managers Association** — The Iowa Sports Turf Managers Association will hold a two-part workshop on Baseball/Softball Field Maintenance in Boone, IA, on Saturday, May 14.

The morning baseball session will take place at Memorial Park, 2000 Boone St. Featured presenter will be Mike Andresen from the Iowa Cubs. Mike will be assisted by Dale Roe, Iowa State University, and other ISTMA members. The tentative agenda is: 9:30 a.m. registration; 10 a.m. — Reshaping/Building the Pitching Mound; 11 a.m. — Proper Infield Preparation, including Dragging Tips; 11:30 a.m. — Prevention and Removal of Infield Lips; Noon — Drying Wet Grounds.

The afternoon softball session will take place at the Little League Complex, 200 West 2nd Street. Featured presenter will be Bill Antons of the Boone Community School District. Bill also we be assisted by

*continued on page 30*

## PRODUCT SHOWCASE

### New Medium-Size Topdresser



The new Bannerman Sport-Topper has a capacity of 1.5 cu. yd. (40.5 cu. ft.) and is hydraulically driven, either directly from tractor hydraulics or using tractor P.T.O. to power its own hydraulics operating the rolling floor and dispensing brush. Spreading width is 58" and depth of coverage can be precisely controlled from 1/16" to 1". The double-walled aluminum hopper is very sturdy but light and surface pressure when loaded is 8-10 psi. The treadless tires are mounted on compensating swing axles, ideally suited to fine-turf areas such as golf clubs. It's fast, accurate and very maneuverable.

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Dale Roe and other ISTMA members. The tentative schedule is: 1:30 p.m. — Registration; 2 p.m. — Pitching Area and Home Plate Maintenance; 2:30 p.m. — Infield Preparation and Dragging Tips; 3:30 p.m. — Removal and Prevention of Hazards in the Field; and 4 p.m. — Drying Wet Grounds.

For further information on this meeting or to register, contact Bill Antons, Boone Community School District, 500 7th St., Boone, IA 50036. Phone (515) 433-0750. For information on the Iowa Chapter contact Gary Peterson, (515) 791-0765.

**Midwest Chapter: STMA** — The Midwest Chapter will hold an afternoon Sports Turf Workshop at the baseball stadium of the Cane County Event Center, Geneva, IL on May 24. Attendees will close the session with fun and fellowship as they watch the Cane County Cougars, a White Sox farm club, take on a worthy competitor in an evening game. Contact workshop coordinator Scott Pippen at (708) 883-8600 for more details on this event. For more information on the chapter, contact the Chapter Hotline, (708) 439-4727.

**STMA Florida Chapter #1** — Scheduling conflicts have changed the May meeting plans of the South Florida Chapter. Contact John Mascaro or Ed Birch for up-to-date information.

Additional meetings are in the planning stages. A July meeting in the City of Pompano will feature aerification as the prime topic. An August 3 meeting at Floyd Hall Stadium will focus on fertilization and irrigation. This event will be hosted by Kathy Conner. Further details will be announced soon.

For more information on the South Florida Chapter, contact John Mascaro, (305) 938-7477 or Ed Birch, (305) 938-0217.

**The New England Chapter: STMA** — The New England Chapter is planning a Field Day for August 10 at Holy Cross College, Worcester, MA. Further details will soon be announced.

For information on the chapter, contact Mary Owen, University of Massachusetts (508) 892-0382.

**Chesapeake Chapter: STMA** — Special Reminder — The Chesapeake Chapter Field Day will be held from 8:30 a.m. to 4 p.m. on April 14 at Camden Yards. Another event "in the works" is a September Regional Workshop that will be held in conjunction with the national STMA.

Board meetings are held the first Tuesday of each month from 4 p.m. to 6 p.m. Members are invited to attend. The May 3, June 7, and July 5 board meetings will be held at Camden Yards.

For information on the chapter, contact The Chapter Hotline, (301) 865-0667.

**The Heartland Chapter: STMA** — Plans continue to develop the Heartland Chapter's first Sports Turf Field Day, scheduled for July 13 at the Heritage Park Sports Complex, Olathe, KS. Further details will be announced soon.

The Heartland Chapter Board will meet the first Wednesday of each month from 4 p.m. to 5 p.m. at Heritage Park Sports Complex. All members are invited to attend.

For more information on the chapter, contact Mark Diller, sports turf manager, Johnson County Parks and Recreation, (913) 782-7625 or Jack Schwarz, J.S. Sports Turf, Liberty, MO, (816) 792-2808 or (800) 344-8873.

**The Minnesota Sports Turf Managers Association** — The newly-formed Minnesota Sports Turf Managers Association continues to make progress. Those interested in finding out more about the chapter are urged to contact acting President Tom Rudburg, University of St. Thomas, St. Paul, (612) 962-6545; acting Vice President Mike McDonald, Bierman Athletic Complex, University of Minnesota, Minneapolis, (612) 625-6097; or acting Secretary/Treasurer Brian Deyak, St. Cloud Sports Center, St. Cloud, (612) 255-7223.

**Colorado Chapter: STMA** — For more information on the chapter or its future activities, contact Joe Adams, Greeley Parks and Recreation, (303) 350-9340.

## CHEMICAL LOG

### CONTROLLING WHITE GRUBS

**W**hite grubs are a common perennial pest of turf in all regions of the country. They are especially destructive in the Northeast and Midwest.

The cream-colored, C-shaped grubs are the larvae of more than 100 species of beetle, among them the Japanese beetle (*Popillia japonica*), the northern masked chafer (*Cyclocephala borealis*) and the southern masked chafer (*C. immaculata*). Although of different species, all white grubs behave alike and can therefore be controlled in similar ways.

Larvae overwinter in the soil at depths of up to 16 inches. In the spring, they migrate upward to feed on turfgrass roots for several weeks before pupating. Adults emerge after pupation and lay eggs in the soil. In three weeks, a new generation of white grubs hatches, feeds on roots until the onset of cold weather, and migrates down into the soil.

Symptoms of white grub infestation include patches of yellow or brown grass that can be pulled easily from the ground. Large sections of infested turf can be rolled back like a carpet. White grubs sometimes attract insect-eating birds, skunks, moles and other animals that cause further damage to grass as they dig through turf looking for a meal. Grub damage is most severe in the fall, when larval feeding, heat, and water stress are at their peak. Turf rarely recovers from high white grub infestations.

#### Solutions

White grub beetles prefer to lay eggs in soil that is constantly moist. Allowing the upper layer of soil to dry out before irrigating may discourage adults from laying eggs. Also, beetles prefer to lay eggs in turf that has been closely mowed, so raising mower heights may discourage oviposition as well.

The biological control milky spore disease (*Bacillus popilliae*) has been shown to control Japanese beetle larvae; however, the effectiveness of the bacteria is largely dependent upon soil temperature. It is less effective in the North where soil temperatures rarely exceed 70 degrees F. In areas where soil temperatures are low, Sevin® can control white grub populations effectively. The best time to apply the product is in late summer or early fall when young grubs are actively feeding on turf roots. In dry conditions, irrigate turf a couple of days before applying carbaryl to bring grubs closer to the soil surface.

*Editor's Note: This concludes the three-part "Chemical Log" series on controlling insects. Technical Credit: Rhone-Poulenc, manufacturer of Sevin and Chipco products.*