

# SPORTS TURF Manager

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... for better, safer Sports Turf

## PRESIDENT'S MESSAGE

Fondest Spring Greetings to our membership! It seems we, in the industry, go from a slower winter pace to full speed ahead almost overnight as our athletic fields, ball diamonds, park areas, and school yards spring to life before our eyes. At this time of year even one lost day due to rain can cause anxiety and headaches for most turf managers. Thank goodness for longer daylight hours which can often be a saving grace.

While we are not at the point of an anxiety attack, your Executive and Board of Directors are hard at work planning upcoming events. Quickly approaching on the horizon is the annual Field Day slated for July 21 & 22 at Hamilton's Globe Park. This year's agenda reflects some exciting changes and the theme is **Ball Diamond Maintenance**. Besides the usual excellent speakers, and trade show, a slo-pitch softball tournament will be held beginning on the Friday evening and continuing all day Saturday. Whether you wish to enter a team, or just come along for some educational seminars, it plans to be a superb event. The Field Day committee chaired by Dave Smith has done a lot of work in planning this occasion. Please circle your calendars to attend. See the enclosed flyer in this edition of the Sports Turf Manager or contact the STA Office at (519) 763-9431.

A sub-committee has recently met to discuss the agenda for the 1996 Ontario Turfgrass Symposium. The venue has been changed from the Univ. of Guelph to

the Constellation Hotel near the Toronto International Airport due to classroom conflicts. In '96 everything will be under one roof so hang up your coat and enjoy yourself. We will be there as a sponsoring Association offering you an array of sports field and turf related seminars and discussions.

I was encouraged by the strong showing of STA members at the last OTS where we generated slightly more than \$9,000 in revenue for the Association. These funds will not only allow us to continue existing programs but also to expand to new initiatives. For example, your Directors are seriously considering producing the series entitled *Understanding Turf Management* in the form of book. These articles which have appeared in numerous *Newsletters* have received national acclaim for their practical and educational content and value.

Please refer to the enclosed Minutes of Directors Meetings for a more complete synopsis of the activities of your Association.

Our Executive Secretary is comfortably settling into her new duties and is busy renewing memberships and keeping close attention to an STA letter of introduction campaign to spread the *Safer Better Sports Turf* mission. Membership has increased significantly since she joined us and her marketing skills are yielding positive results. Having dedicated and published office hours seems to be paying dividends in allowing her to make much more personal contact with our members and potential members.

Until next time I wish all members much success with their sports field maintenance programs and a safe enjoyable sum-

mer. Please try and join us in Hamilton on July 21 & 22 where it will be my honour to present two (2) educational scholarships to recent graduates of the Turf managers Short Course. Please come out and help us extend congratulations to some dedicated and accomplished turf managers.

Lastly, my thanks for all who have renewed membership with the STA. If you have not returned the enclosed survey, please do so at your convenience. Hopefully it will be the subject for an upcoming "Manager". I am glad you are on board with one of the leading voices in the turf industry and remain committed to our mission and support for our network of colleagues.

Best wishes for better, safer sports turf.  
Christopher Mark  
President

## SPORTS TURF ASSOCIATION OFFICE HOURS

Mrs. Sonja Schneider will be in the office from 9:00 a.m. to 1:00 p.m., Monday, Wednesday and Friday. The office phone number is (519) 763-9431. At other times a message may be left on the Voice Mail system. Please include the vital information of name, telephone number with area code, and time of calling. The office may also be reached at any time on FAX # (519) 766-1704.

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# DIRTY DIRT

Jim Galbraith  
Manager, Grounds Maintenance  
University of Western Ontario



Some story titles come easy and reflect the contents of an article to perfection. The title for this article truly reflects a situation in which the University of Western Ontario was involved during the summer of 1993.

The project started out as a joint venture between the City of London and the University. The city was faced with a shortage of facilities for their sports programs and the University had a field that required some major work as it had recently been deemed unfit for use. After some discussion and many meetings about construction and maintenance, the city agreed to do all cut and fill and rough grading which involved raising the overall level of the field, while the University would do fine grading, seeding and initial establishment of field. Everything seemed organized and ready to roll, what could go wrong?

The contractor who was hired for this project had just completed rebuilding one sports field and had proven competent in his work.

Arrangements had been made for the stripping of existing soil to both sides, the hauling in of clean fill, grading for a 1% crown and the placement of stockpiled soil back on the raised field. Bulldozers moved in to strip the soil in late June and worked through the weekend to have the field ready to receive the fill by Monday morning. This part of the renovation was to be supervised by the city as their contribution to the project.

On Monday I dropped in at the site and noticed that the fill being trucked in was much darker than I had envisioned and it appeared to be more a compost mix than clean fill of mineral soil from a townhouse complex. Further investigation of the fill caused some concern, as there was a slight odour to the soil, and it had an unfamiliar feel to it.

At that time I decided to follow one of the trucks back to the site at which it was being loaded in order to determine where the fill was coming from. I followed the truck for about 15 minutes and arrived at

a local scrap yard at the far side of the city.

I returned and called the city project co-ordinator and inquired about the soil and its contents and I was assured that it was acceptable fill. I still felt uneasy, so a meeting with the contractor, city representative and myself was arranged for the next morning. At the meeting the contractor was asked if the soil was clean. He gave assurances that it was. He was then asked about its origin and he stated exactly where it was coming from. He even stated that it had been tested for contaminants and was perfectly acceptable. At this time I felt reassured, but wanted to be sure. I suggested, or rather demanded, a soil test prior to any further work being carried out, and specified there was to be no soil placed on top of the suspected fill prior to acceptable soil test results.

Events became a bit frantic!

Before the first set of tests came back, we sent out another batch of samples as word of the project problems had spread. The contractor was anxious to complete his job, but we would not allow any work to be carried out.

We had submitted our second set of samples on a Friday prior to the Civic Holiday weekend with a rush order on it and expected results from all tests on Tuesday. We received the results from the original tests first and they increased our concerns, but we would wait for the second set, as we requested a full test for all contaminants.

When the results from the second samples were obtained, and they were terrible. Whatever you could name as a contaminant was in the soil that had been trucked in as "clean" fill. Some of the obvious ones were PCB's, mercury, zinc, lead and cadmium. What a witches brew!

A meeting of all parties involved, including the scrap yard owner, construction firm, UWO senior administration, Ministry of Environment & Energy and other involved parties was called.

The area was barricaded off, a memorandum was distributed to local home owners and the local media was advised. The Senior administration felt that an open approach with the community was the correct way to handle the situation. Discussion, denials, allegations abounded from which orders were issued to remove all contaminated soil. The original contractor was instructed to remove the soil to an authorized site as soon as possible. All costs of the operation were determined at a later date.

Removal of the soil began on Thursday at 7:00 a.m. and continued around the clock until Friday at 4:00 a.m.. All loads that were removed were recorded and records were distributed to appropriate parties. A "clean" fill source was found and the contractor completed the rough construction which allowed our crew to complete the field.

In due course the Ministry of Environment & Energy laid charges and significant fines were imposed on the guilty parties.

In retrospect, make sure your dirt is "clean". For any one else contemplating hauling in fill, it is a very good idea to have tests carried out at the source for all soil contaminants to reduce the possibility of receiving contaminated fill. Also, when issuing the purchase order, specify clean fill as per the Ministry of Environment & Energy guidelines and state that the supplier of material must provide proof that the soil is free of all contaminants or be subject to all costs of removal if soil is found to be contaminated.

All aspects of our work are affected by legislation that demands perfection, leaving little room for mistakes. Organizations should be very aware of all legislation and responsibilities involved. Hopefully from our experience you never have to go through this type of situation. It caused a great deal of stress on all parties involved and made a great project a dirty mess because of the dirt.

# UNDERSTANDING TURF MANAGEMENT

## BLUEGRASSES

The 16th in a series by  
R.W. Sheard, P.Ag.

The grass species most common to the cool season, sub-humid to arid climates of Canada for sports turf is Kentucky bluegrass.

Kentucky bluegrass was introduced into North America from Europe by the early settlers, probably as livestock feed during the ocean voyage or as mattress padding. The origin of the name "Kentucky" is probably from Kentucky where seed was first harvested from pasture stands. It may also be due to the species preference for medium textured soils formed from the degradation of limestone, thus having a relatively high phosphorus level; features of the soils of the state of Kentucky.

### The Bluegrass Family

Of the more than 200 *Poa* species in the world, there are only five bluegrass or *Poa* species which are commonly found in turf. While Kentucky bluegrass (*Poa pratensis* L.) is the most important and desirable species, a second species, Canada bluegrass or *Poa compressa* L., finds use in restoration of droughty, low fertility areas. It forms an open, stemy turf which lacks the strong, rhizomatous nature of Kentucky bluegrass. As a result it is of little value for sports fields.

Rough bluegrass, *Poa trivialis* L., is a stoloniferous species which also has limited use because it lacks heat and drought tolerance, turning brown during midsummer stress periods. The above ground stolons do not provide the wear resistance of Kentucky bluegrass. It does, however, have excellent cold tolerance making it worthy of consideration in areas where winter survival of Kentucky bluegrass is a problem.

The renegade of the bluegrass species is the widely distributed annual bluegrass, *Poa annua* L. This species is commonly considered a weed grass due to its low tolerance to wear, heat, drought and cold stress. The species is a prolific seed producer, particularly during the cool, moist spring, and spreads by the seed carried on mowing equipment and footwear. As many as 72 viable seeds per square inch have been reported in golf greens. The seeds do not have a dormancy period, thus they may germinate as soon as they hit the

soil surface. *Poa annua* also spreads by stolons and is shallow rooted, factors which reduce its wear tolerance on sports fields.

The fifth species of bluegrass is a recent introduction from Europe, *Poa sapina* Schrad. It appears to be related to annual bluegrass and has received considerable attention in Europe for sports fields. Initial information on the species indicates that while slow to develop during the seedling year it becomes quite aggressive in later years. Its aggressiveness is in part due to heavy seed production and early season growth. At the same time it is reported to prevent or inhibit the spread of annual bluegrass when managed with high nitrogen and water.

### Kentucky Bluegrass Advantages

The most significant advantage of Kentucky bluegrass for sports fields is that in addition to normal tiller formation it has the ability to spread by means of rhizomes from which new plants develop to colonize bare areas, giving it great recuperative potential. Thus under good growing conditions the stand heals rapidly following injury. The interlocking network of rhizomes and roots within the soil, rather than above the soil surface as is the case with stolon forming *Poa* species, also enhances the wear resistance of Kentucky bluegrass.

It has been estimated that a single Kentucky bluegrass plant can produce 20 to 60 feet of rhizomes from the original shoot between mid-June and mid-November. Each node on the rhizome is capable of initiating a new shoot and root system. It is this rhizome system which makes Kentucky bluegrass the preferred species for sports fields.

Additional advantages of Kentucky bluegrass are that it performs well under a wide variety of soil conditions, showing good heat and drought tolerance and that it is winter hardy. Under high temperatures and/or water restrictions, however, Kentucky bluegrass will enter a period of slow growth, often referred to as summer dormancy. With the return of fall rains the turf will resume normal growth in about three weeks.

The optimum temperature for top growth is 21 - 24°C, and 15°C for root growth. Root growth may continue below 4.5°C, a factor favouring nitrogen uptake from late fall fertilization. It is interesting to note that higher temperatures stimulate the emergence above the soil surface of growing points of new tillers from nodes on rhizomes whereas lower temperatures enhance the elongation of the rhizome.

Kentucky bluegrass has a medium tolerance to low soil oxygen levels which may be caused by poor drainage or compaction. It is a salt sensitive grass as conductivities due to salts in excess of 4 millimhos are known to be harmful. It prefers a pH in the range of 6.0 to 7.0 but will grow very satisfactorily at pH 7.5 which exists on many of our sports fields in Canada.

### Kentucky Bluegrass Disadvantages

Kentucky bluegrass is slow to germinate, generally requiring two to three weeks to emerge. Its use for the quick repair of sports field turf, therefore, is limited. Light is required for germination of all bluegrass species. Although the intensity of light is very low, seed buried below 2 - 5 mm may never emerge.

In a rating of shade tolerance bluegrass must be rated as poor in relationship to perennial ryegrass, bentgrass and fine fescues. When the shade is caused by trees the problem of shade tolerance is compounded by the demand of the tree for water and nutrients.

Ice damage is a problem throughout Canada. Kentucky bluegrass is intermediate between bentgrass and annual bluegrass in its tolerance to ice sheet injury with bentgrass being the most tolerant. Kentucky bluegrass will tolerate up to 50 days of ice cover (skating rinks) without damage if adequate drainage exists to remove water formed during thaws. A snow layer between the ice and the turf significantly reduces the ice damage. Frost heaving may be a serious problem for late fall seeded bluegrass. Again the corrective measure is good drainage.

Kentucky bluegrass is a relatively heavy thatch former. While thatch adds resil-

iciency to turf, excessive thatch contributes to disease problems. Topdressing or coring practices may have to be considered for those areas of the field where play is not intense.

### Cultural Practices

The recommended seeding rate for Kentucky bluegrass is 1.0 - 2.0 kg/100 m<sup>2</sup>. This seeding rate will provide 4.8 to 9.6 million seeds per 100 m<sup>2</sup>; about 5 seeds per square centimetre.

There are over three dozen cultivars of Kentucky bluegrass available for use in Canada (see Sports Turf Manager, Vol. 8, March, 1995). Generally a blend of two or more cultivars is preferred to capitalize on the slightly different attributes of each individual cultivar.

Kentucky bluegrass is responsive to phosphorus fertilization, particularly during the establishment period. A high rating on the soil test is desirable during this period. Where this initial high level of phosphorus fertility is achieved and clippings are not removed minimal phosphorus fertilization may be required in future years.

Kentucky bluegrass has a medium demand for nitrogen fertilization. Generally .25 to .75 kg N/100 m<sup>2</sup> per growing month is required for good growth, however these rates should be adjusted according to the sports turf managers experience in the colour and density he achieves from nitrogen. Potassium should be applied according to the rate suggested by a soil test. Alternatively a rough guideline is one kg of K<sub>2</sub>O for every two kg of nitrogen.

Disease on sports field turf is generally not a problem. Helminthosporium leaf spot, Fusarium patch (pink snow mold) and Typhula blight (grey snow mold) may be a problem under some conditions but chemical treatment is seldom necessary.

In recent years grub damage to sports fields from chinch bug and European chafer has become a problem in Ontario and Quebec. The insects damage the root system drastically which reduces the wear resistance of the turf. Where the grub population warrants chemical control is necessary.

The optimum cutting height for Kentucky bluegrass is one to two inches with the higher height preferred for sports fields. Cultivars have been developed for lower mowing heights for use on golf fairways but greater wear tolerance has not been shown to be associated with the lower mowing height.

# Bench Tarps Will Help You

Michael J. Bladon  
Head, Grounds Dept., U. of G.

A few years ago we had just finished sodding the bench areas in Gryphon Stadium at the University of Guelph when I happened to read an article on Sports Turf and saw an advertisement for geotextile Ground Blankets or Bench Tarps.

They seemed to be the answer to one of our maintenance problems. Each year we found people were wanting to get on the field earlier in the spring. At a time when we were trying to refurbish the fields, the new, young tissue and the crown were being destroyed in the high traffic areas around the bench. Hence we had a yearly resodding job to do. Sodding was an automatic \$2,400 expenditure, just for the sod. This compared to the tarps which today would cost \$ 560.00 each, plus freight.

We decided to purchase two tarps from Warren's Turf Nursery of Indianapolis. The tarps measured 15 ft wide by 75 ft long and weighed approximately 150 lb each. They are easily transported in a pick-up truck, or if you have one, by a forklift. The tarps have the leading edge (75 ft) and sides stabilized with a 2-inch wide, polypropylene reinforcement tape. This is chain-lock stitched to the fabric, with brass tooth grommets installed every three feet along the front and sides. The tarp is a light green in colour and the tape a darker green.

On the day of the game, the tarps are removed from storage, placed on a pickup or forklift and dropped off at the edge of the field. They are then unrolled in the bench area and spiked down using 6-inch "7" shaped spikes. The spikes are placed down three sides of the tarp and the players benches are placed along the back length to hold that edge down.

The tarps are removed after the Saturday game. This is very necessary, especially if rain is expected because the tarps become not only heavier to lift, but also because of

their size, are very difficult to dry. It is also considered advisable in to remove the tarp no later than the morning after the game in order to maintain turf colour. The grass should be cut before the installation of the tarp. With freshly cut grass, once the tarp is removed it was found the grass will recover more quickly from both the weight of the tarp and foot traffic on the tarp.

Routine maintenance is minimal. The tarps are 100% polyester and very, very tough and durable. We lay them out on asphalt under our stadium to clean where they are broomed off and hung to dry, if necessary. Although not extremely heavy, they are very awkward to handle. At seasons end we have our Housekeeping Department steam clean them so that they look practically new again. They can also be washed with soap and water. They are placed in an unheated area for storage, summer and winter, with no adverse effects.

The application of pesticides or fertilizers just prior to putting the tarp down is a no-no!

I would recommend these tarps to anyone whose fields get continuous heavy wear. It may be used on soccer or football fields and on baseball diamonds to cover areas for batting practice.

Two companies that I am aware of that sell these blankets are - Warren's Turf Nursery, Inc. out of Indianapolis, Ind. and Covermaster, Inc. in Rexdale, Ontario. The material is available in different lengths and widths.

If you wish to save time and money on maintenance I would suggest you consider purchasing these tarps. Even if you have artificial turf (heaven forbid), they will prevent wear in a heavy use area. Try them, you will like them.

### A POINT OF VIEW

Weeds in a lawn are not the problem. The problem really is that the grass isn't dense enough to crowd out and keep out the weeds. Proper mowing, watering and fertilization will thicken the grass to a point where herbicides are rarely required for a weed-free lawn.



# Details Make The Difference

## A Professional's Guide to Striping and Lining Soccer Fields

Kevin Vos

**B**right, crisp markings accentuate the colour and density of the turfed sports field. A good job of marking adds to the visual appeal of the facility. Sloppy field markings stand out like an out-of-step member of the marching band. But field striping and lining is more than an aesthetic touch. A fraction of an inch can measure the difference between a win or a loss in sports competition.

Sports turf managers "owe" their players, officials and spectators a properly marked field.

The first step is to determine the proper field size for the group or groups that will be using it. In a high school setting, only one field size may be needed. For our soccer complex, three field sizes are necessary to accommodate the YMCA, high school, college and several levels of soccer club players. The sport's national association - in our case, the U.S. Soccer Federation - will have published official field sizes. The Iowa High School Athletic Association also provides field dimensions within its official rule book.

Next, we prepare a scale drawing of the field, showing the precise dimensions of all areas to be marked. Write the exact measurements for each of the dimensions beside the appropriate features. If crews will mark several fields, prepare several scale drawings, clearly denoting the fields on which they will be used. These scale drawings can be laminated on one card to serve as an on-site reference when laying out a field.

### Build In Cushion

To reduce wear and stress on the heavily played portions of the field, consider marking out two practice fields, running perpendicular to the game fields, but using the same turf. If the game field runs north and south, the practice fields would run east and west. It may be necessary to reduce the practice field dimensions, making them slightly smaller the regulation size, for best use of available space. Discuss this option with the user groups. Most will be receptive to the idea and enthusiastic about the creation of more practice space.

You'll use one colour of paint for the game field, a different colour of paint for

the practice fields and additional colours if a second or third set of game field dimensions are needed. We use "dotted" lines for the practice fields, as well as a different colour. Two-person crews are the most efficient, for both field marking and for the actual painting.

Determine the basic size for a particular field. Then locate all four corners and square them up. If possible, use the services of an engineering firm or department to have the precise dimensions "shot" with a laser. If that isn't possible, use the 3-ft by 4-ft by 5 ft triangle method to ensure "perfectly square corners. (If one side of a triangle is 3 ft long and a precise 90-degree angle is formed with a 4-ft-long second side of the triangle, the line needed to complete the triangle will be exactly 5 ft long). This can be multiplied by 10, to 30-ft, or 20, to 60-ft, if desired.

Sink a 6-inch section of 1- to 1-1/4-inch PVC pipe into the ground at each corner. Position the pipe with the top flush with the ground. These serve as your identification points to reactivate the field when it has been out-of-play, and as checkpoints for each marking. Keep these pipe locations marked by applying a touch of the appropriate colour aerosol paint at least once a month during the non-playing periods. You'll want to find them easily and be able to avoid them during aeration and other field maintenance procedures.

For marking soccer field dimensions, you'll need a 300-ft tape measure; 4 spools of string - one 1,500-ft spool for the perimeter, two 700-ft spools for the goal boxes and penalty areas and one 500-ft spool for the halfway lines; stakes or spikes 8 inches long; a can of aerosol paint in the appropriate colour; and the marked, laminated, reference card for the field.

Measure precisely and place a spike at each corner of the field. Square up each corner to check accuracy. Using the longest spool, run string tightly from spike to spike along the outside dimension of the field perimeter. The narrow ends of the field are the goal lines; the long sidelines are the touch lines. On a regular high school soccer field, the width is 210 ft; the length 330 ft. In soccer, the lines are part of the field and are "in play".

Measure out from the corner back to the center, along the touchlines on both sides of the field. Place a stake at this point and,

using the 500-ft spool, run the string tightly from stake to stake, across the center of the field. Measure from both goal lines to this halfway line. It should be exactly in the center of the field. Check for perfect right angles, using the 3-4-5 method. Measuring from each touchline, locate the precise center of the field. Mark the center point with an X of aerosol paint. From the center of this X measure for the center circle. On a regulation soccer field, this circle will have a 10-yard radius. Use the tape measure and measure out 30 ft, keeping the tape tight and placed precisely on the center of the X. Move the far end of the tape in an arc, dotting the perimeter of the circle with aerosol paint.

Then go to one end of the field. Measure out from the corner for the corner kick line, one yard on a regulation field. Hold the tape in the corner, keep it tight and use the aerosol paint to dot along the arc within the field perimeter. Repeat this procedure for every corner kick line.

Next measure from the corner where the goal line and touchline meet to the halfway point on the goal line. Mark this point with an X or T with aerosol paint. Put the tape on this mark and measure along the goal line, to the left of the mark, for the dimensions of the goal and penalty area boxes. The goal box on a regulation field is 60 ft wide, so from the center, you'll measure out 30 ft. The penalty box is 132 ft wide, so you'll measure out 66 ft. Paint an L for one, a T for the other, on the stringed goal line along the left side of the goal line. Then flip-flop the tape, and measure on the right side of the goal line for both the goal and penalty box areas and make the appropriate aerosol paint markings.

Working from the corner stake, use the tape to measure along the touchline for the proper distance for the goal box, the penalty line and the penalty kick line. Use the aerosol paint to mark a "reference point" at these spots along the stringed touchline. Do this on each side of the field. On a regulation soccer field, the goal box is 18 ft deep, the penalty spot 36 ft out and the penalty box 54 ft deep. So the reference points along the touchline will be a t 18ft, 36 ft and 54 ft from the corner of the touch line.

Put the tape on the marked goal line point for the goal box and measure out 18 ft into

the field. At that point, run the tape to the 18-ft reference point on the touchline. The tape should read 93 ft at this reference point. (This number - 93 ft - will work when measuring the penalty boxes, too.) This should form a right angle at the 18-ft point in the field. The corner point of the right angle is the corner point for one side of the penalty box. Mark the point with an aerosol paint L to show where the stake will go to line out the goal box. Use the same procedure to mark the other side of the goal box and both sides of the penalty box, using the appropriate measurements. Use a 700-ft spool of string to string the goal and penalty boxes.

Now measure from the center point on the goal line out to the penalty spot - 36 ft toward the center of the field. Use the reference point along the touchline to "square up" and confirm the accuracy of the measurement. Mark the spot with aerosol paint. Put the tape at the penalty spot and extend the tape 30 ft toward the center of the field. Keep the tape tight and use the aerosol paint to mark the arc where the tape extends beyond the perimeter of the penalty box. Use the same procedure to measure and string the goal and penalty areas at the other end of the field.

After the field is painted, the string from one of the goal-penalty areas or from the center line can be used to line out the coaching/team and official areas. We've found it most efficient to place both teams on one side of the field, but at opposite ends. Team areas can then be switched to the other side of the field periodically to spread the wear.

Place the tape where the touchline and center line meet, and measure 10 ft out from the field. The outer side of these areas will run perpendicular to the touchline. The official area is 30 ft long and runs 15 ft on each side of the center line. There's a 15-ft "gap" between the official area and the coaching/team area. The coaching/team area is 60 ft long. Measure along the touchline - 15 ft, 30 ft and 90 ft - both to the left and to the right of the center line. Make sure a right angle is formed at the corner where the tape meets the touchline. Mark each corner of the official and coaching/team areas with aerosol paint. Extend the ends of these areas back away from the field, forming a right angle at each corner. When painted, these sections will appear as rectangles with one unfinished long-side for each section. String these areas after one of the spools becomes free.

Now you are ready to paint. Check with your supplier to select a good quality, athletic field paint. These products are designed to be safe for the turfgrasses and for the players. Pick the product that works well with your turf and your climate and that fits your budget.

Make sure the bucket, mixer and paint machine are cleaned thoroughly before beginning the process. We mix the paint using 1 part paint to 2 parts water. We've marked the gallon points on a 5-gallon bucket and use it exclusively for paint mixing. Mount a paint mixer on a drill for quick and easy mixing. With this method, it takes approximately one minute to mix.

Pour the paint mix through a funnel and a strainer (we use cheesecloth) into the paint container of the machine to avoid impurities that could cause clogging. A self-propelled, hydros-tratic painter is worth the cost. It's easier to lay out a straight line when the machine moves at a steady pace - and the self-propelled unit is easier on the operator. Be sure the machine is oiled, has plenty of fuel and is operating properly before starting the painting.

The time it takes to paint the field and the amount of paint needed to complete the painting will vary somewhat with each operator. Our two-person crews average 1-1/2 hours to lay out and paint a field. We average 9 gallons of paint mix per each 70-by-110-yard

field. Work with your staff to identify those who enjoy the task and are most proficient at it.

Training two or three key people to handle the job, along with their other responsibilities, will increase operator efficiency.

When painting, keep the machine on the outside of the string line so that the tires don't cross the paint. Position the spray tips inside the string line and set the spray pattern and paint guide for the desired width. We use 4-inch line widths for our soccer fields.

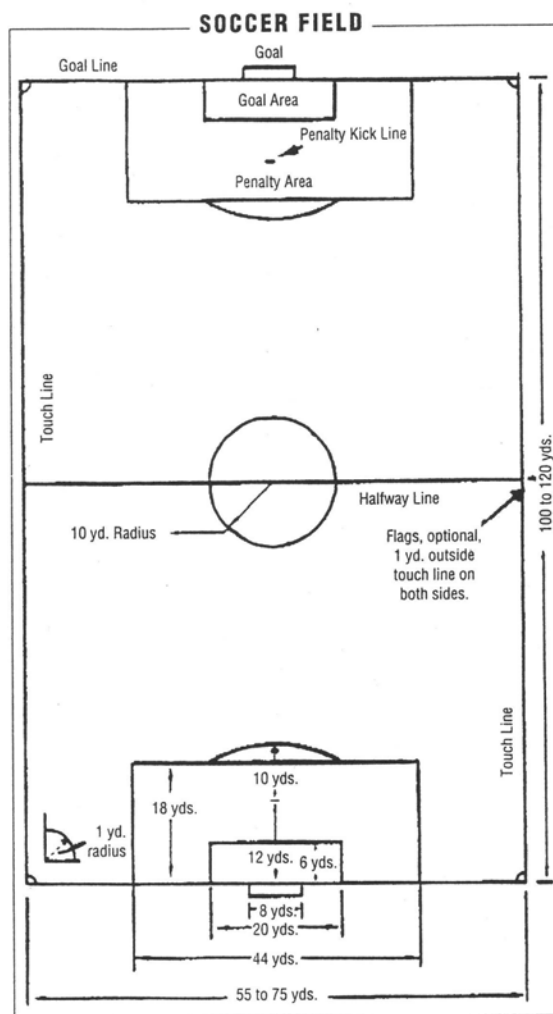
First paint the goal and penalty box lines. Next paint the halfway line. Then paint the goal line, touchline and corner kick areas. Then paint the official and coaching/team areas. After the paint is dry, come back to the main field to paint the penalty spot, penalty arc, center spot and center circle.

The second crew member rolls up the string as the machine operator paints - and makes sure to keep the string out of the painter's way. Using a portable drill for the spools makes windup faster and easier.

### Post-Painting Tips

After the field is painted, clean the paint machine immediately and thoroughly. We use a small amount of detergent in the first rinse. Fill the machine half full, pressurize the tank and spray until

An example of the lining required for a soccer field. Please note the measurements apply to U.S. Soccer Federation regulations.



the water is clear. Then refill the tank with water only, and repeat the process. Finally, clean the spray nozzle tips with a soft-bristle brush.

We paint after mowing, generally one to two days before the weekend games. And, when possible, we avoid painting when the grass is wet. Paint sticks best and lasts longer on dry turf.

We paint fields once a week so that the lines are always fresh and clear. Because

mowing with a reel mower can cause lines to "move" and because accuracy is so important, we retrace the fields every two weeks. For the in-between week, crews "trace over" the painted lines. Actual touch-up painting takes approximately one-half hour; preparation and cleanup add another half hour to the process.

The time and effort it takes to properly mark sports fields is paid back time and again in player pride - and in the knowl-

edge that the fraction of an inch that decided a game was an accurate measure of the team's efforts.

*Editor's Note:* Kevin Vos is athletic facilities manager of the Muscatine Soccer complex, Muscatine, IA, a member of the national Sports Turf Managers Association and a board member of the Iowa Sports Turf Managers Association. This article is reproduced from *SportsTURF*, Vol. 11, Jan. 1995.

## GTI HILITES

# Endophyte Alkaloid Production In Turfgrass

In 1994 Prof. Steve Bowley of the Crop Science Dept. at the University of Guelph initiated an interesting program on alkaloids related to turfgrass. Alkaloids are organic chemicals which may be produced by endophytic fungi growing in association with turf species. Endophytes are any organism growing inside a plant and may be bacteria or fungi. They may be beneficial or a disease; in this case we are considering potentially beneficial fungi.

Many turf managers find it necessary to apply one or more applications of insecticides each year for the control of insect pest such as Chinch Bugs. A potential method to reduce the reliance on insecticides is to exploit a turfgrass-fungal endophytic and symbiotic association. The symbiotic association enhances the plants tolerance to insect attack, especially those insects which feed on above ground plant parts. The tolerance is due to the production of alkaloids by the fungi, specifically the alkaloids peramine, ergopeptine and paxilline, which are feeding deterrents, and lolitrem, which is toxic to insects.

Many turfgrass species are reported to have the endophytic-turfgrass symbiotic association and are retailed to the turf manager for their insect tolerance. Among these are cultivars of ryegrass and tall fescue.

The first phase of Prof. Bowley's project has the objective of quantifying the seasonal pattern of endophyte alkaloids (primarily peramine) in endophyte-infected perennial ryegrass and tall fescue. From this information he hopes to establish a method to predict periods of the season during which the endophytes have the potential to control insect pests and management techniques to enhance the control.

Turf trials, which were seeded in 1992 at Cambridge and Ridgetown, were used for measurement of endophyte level during the 1994 growing season. Two varieties of tall fescue (Mustang and Tribute at Cambridge and Rebel-3D at Ridgetown) and two varieties of perennial ryegrass (Yorktown III and Express at Cambridge and Yorktown III and Competitor at Ridgetown) were sampled on a weekly basis. Endophyte concentration was estimated by staining and direct count of fungal hyphae present on the sheath of the second youngest, fully expanded leaf of two tillers from each plot.

Bowley found significantly higher levels of endophytic infection in the ryegrass varieties than in the tall fescue varieties (Table 1). The density of the hyphae on the leaf was also higher for the ryegrass varieties than the tall fescue. There was a trend toward

a higher percent of tillers infected and density of infection at Ridgetown than at Cambridge.

An example of the seasonal trend in percent of tillers infected is shown in Figure 1 for Cambridge. Somewhat similar trends were observed at a Ridgetown. No significant changes in the level was observed over the June to October period.

The low level of endophyte infection on tall fescue was not anticipated. Bowley suggests that Ontario is near the northern limit of adaptation of tall fescue, thus we may also be near the limit of adaptation of the tall fescue endophyte. American studies indicate a decline in endophyte during the cool seasons on tall fescue.

The high level of endophyte in ryegrass varieties throughout the season, many of which are adapted to our environment, warrants further effort on the part of Prof. Bowley.

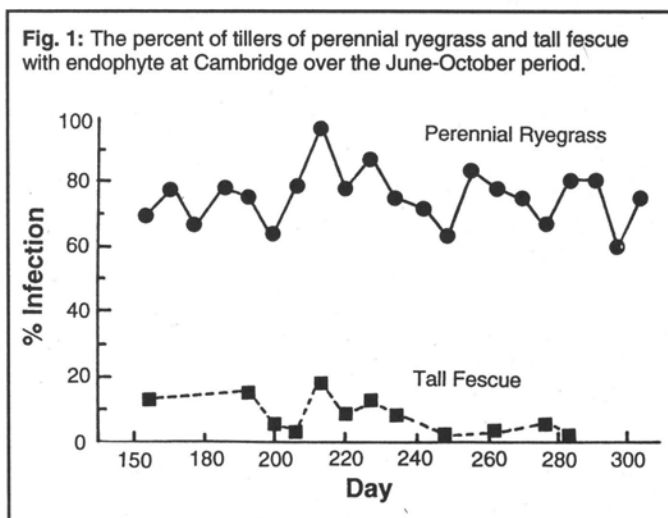


Fig. 1: The percent of tillers of perennial ryegrass and tall fescue with endophyte at Cambridge over the June-October period.

Table 1: The percent of infected leaves and the density of fungal hyphae on perennial ryegrass and tall fescue at Cambridge and Ridgetown.

	Infection		Density	
	Cambridge	Ridgetown	Cambridge	Ridgetown
	(%)		(counts/field)	
Perennial Ryegrass	75.1	65.3	2.6	1.5
Tall Fescue	9.8	0.5	0.4	0.01

# A Comparison of Bowling Green and Golf Green Maintenance

Lloyd Woods, Greens Consultant  
Victoria, BC.

At first glance, it would seem that the maintenance requirements of golf and lawn bowling greens would be almost identical. However, although there are similarities, the differences are significant and turf managers who have been involved with both agree that bowling greens require the higher level of maintenance to produce an acceptable playing surface.

A bowling green must be fast, level and true if bowlers are to play with self-confidence and finesse. Compared to a golf green, it must be very firm and thatch-free and if the bowls are to run true, the green should be level to within 1/8 inch over its entire area.

Because of the differences between the weight of a golf ball (weighing approx. 2.5 oz) and that of a bowl (weighing up to 3 lb, 8 oz), the stimpmeter cannot be used to give a meaningful measure of the speed or "pace" of a bowling green. Instead, the standard pace measurement - stated in seconds - is the time it takes a bowl to roll from its delivery until it comes to rest at a point 90 feet up the green. Nine seconds is slow, 12 seconds acceptable, and 14 seconds is considered very good for bentgrass green in our climate. The width of draw, that is the amount that the bowl curves during its travel, is related to pace. As the pace increases, draws become wider, up to 10 feet in the case of a 14 second green.

Since a good pace is so important, a great deal of the maintenance effort is directed toward creating a firm surface. This means that thatch production must be kept to a minimum and the thatch which does develop must be removed on a regular basis.

Close, regular mowing reduces thatch production. Typically, bowling greens are mowed four or five times per week at a mowing height of 1/8" or 5/32", as opposed to 3/16" or so for golf greens. Thatching is also controlled by limiting the amount of nitrogen applied. One pound per 1,000 sq. feet per growing month is considered an absolute maximum.

In spite of one's best effort to control it, some thatch will inevitably develop and must be dealt with. Regular topdressing, as is practiced on golf greens to provide a firm surface, is not acceptable on bowling greens for two major reasons:

- 1) repetitive topdressing will in time raise the level of the green relative to the plinth, (the board that runs around the inside of the ditch surrounding the green), and
- 2) sand on the surface of the green damages bowls and makes for unpleasant playing conditions.

The answer, then, is regular dethatching. Weekly verticutting throughout the playing season is needed if a firm fast surface is to be achieved and maintained.

Also, since a dry surface runs faster than a wet one, irrigation must be more disciplined than is the case on golf greens. Of course, this increases the chance of localized dry areas, particularly in the case of sand greens which are built without any peat or other amendments. Therefore, applying the right amount of water is a real balancing act which can be made somewhat easier if wetting agents are used.

Low thatch levels and the use of less water tend to reduce the incident of disease, so preventive use of fungicides is uncommon. However, the same diseases which inflict golf greens are also found on bowling greens from time to time. *Fusarium*, *ophiobolous*, *pythium*, *brown patch*, *dollar spot*, etc., show up on occasion and must be dealt with.

Wear distribution is achieved by moving the rink centre (analogous to moving the cup on golf greens) and the direction of play should be changed regularly. During tournaments and other times of heavy use, the rinks are best moved after every game.

The green must be kept level over its entire 14,400 sq ft area (120' x 120'). Identification of low areas and selective topdressing is required and is usually accomplished before or after the playing season. Core aerating is also limited to the off-season and is an operation that must be done very carefully since there is a chance that the levelness of the surface will be compromised. All holes must be back-filled because areas with incompletely filled holes are prone to sinking.

The maintenance regime of close mowing, dethatching, restricted fertility, and limited water places the green under a great deal of stress, particularly in hot, dry weather and during periods of heavy play. It is indeed a challenge to maintain the turf in a healthy condition. Fortunately the bowling season usually lasts only about six months and the turf gets time for rest and recovery through the winter months, so all is not gloom and doom.

Fortunately too, bowlers seem to be somewhat more tolerant than golfers and will accept playing surfaces which are not particularly green if only the pace is maintained and the draws are wide and true. Of course even with almost perfect playing conditions, lawn bowlers, like golfers, have been known to criticize the green - more so when the result of their game was less than satisfactory!

(Presented at the 1995 WCTA Conference, reproduced with permission from *Turf Line News*)

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## Signage: Your First Line of Defense

Floyd Perry  
Turfgrass Consultant

For a baseball team to be successful, it must have a strong pitching and a solid, middle-of-the-diamond defense. A football team needs to have a flexible defensive scheme and strong defensive personnel. A basketball team many times can become outstanding with pesky guards and an intimidating center.

What's the sports turf manager or groundskeeper's first line of defense on his property? In my observation, it's signage! Let me continue with my reasoning so you don't become confused. In today's "sue me - sue you" society, every one of us is vulnerable to potential lawsuits every time paying or non-paying patrons enter our stadiums, use our fields or view our games.

How is the sports manager the first line of defense in his sports facilities? Along with maintaining the turf areas, the clay portions, the common areas, many times the bleachers and parking lots, there needs to be developed a strong, preventive program of consumer signage and public address announcements that place the patron on alert to potential dangers along with

institutional rules and regulations.

In 1989, at Boardwalk and Baseball, our baseball staff and Ed Mangan's ground crew orchestrated more than 1,250 games in 265 days. These games were part of the professional, amateur and recreational agenda. That's a lot of games for a six-field private complex. It was accomplished by a professional, safety minded grounds staff and was extremely successful. Did we have paying patrons hit with baseballs? Did we have people go to the emergency room? Did we have people sue?

Of course, the answer is "yes". The question that hasn't been answered, though, is: "Was anyone successful in their lawsuit? That answer is "no". The company did not have a single claim that went to court or was settled by a mediator out of court. The primary reason was a strong defense in signage. The courts will tell you that everyone assumes some degree of risk when playing or viewing an athletic contest. But that risk must be explained and qualified by the host site through quality care and maintenance of the total facility and with the availability of first-aid and immediate second aid to the patron.


The first phase of defense (signage and announcements) must be implemented and in place to have a solid, well-fortified sports arena. Many patrons do not read signs or cannot relate to the English lan-

guage (international visitors), so many times symbols are required. Many patrons are too busy with viewing the event, and one-time announcements on safety are not sufficient, so it must be repeated throughout the contest. Many patrons when they pay their 25 cents feel that they own the facility and can do or go wherever they please. That's also where signage and announcements assist with access control and security.

The job ramifications and responsibilities of the solid manager or grounds keeper are widening daily. Many times new responsibilities meet with anger and displeasure since time is already short. Please avoid letting this one small part of the job get to you. Your strongest line of defense is being proactive to safety rather than reactive after the lawsuit is filed. My comments to managers and grounds keepers at my seminars is to put their requests in writing and take pictures of their strongest concerns and run it up the flagpole. It's better to solve a \$2,500 problem than face a \$2.5 million lawsuit.

What saves the managers from aggravation and discomfort from accidents and injuries on their property? What can the parks, fields, stadiums, schools and colleges do to create their solid defense? Signage! It works!

*Reproduced from SportsTURF, Vol 11, Jan. 1995.*



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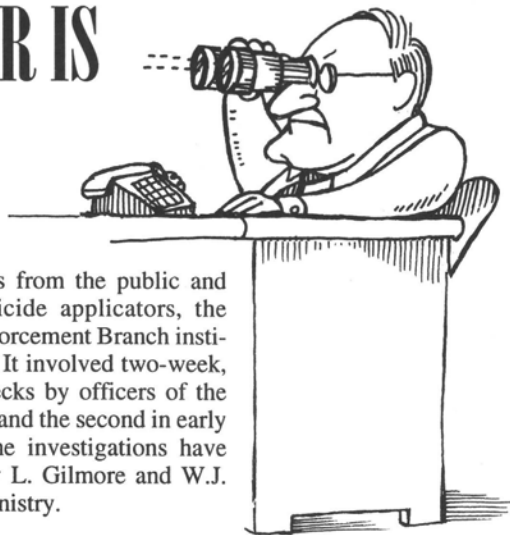
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# BIG BROTHER IS WATCHING



As a result of complaints from the public and properly-licensed pesticide applicators, the MOEE Investigations and Enforcement Branch instituted project "Herb" in 1994. It involved two-week, unannounced compliance checks by officers of the Branch, the first in early June and the second in early September. The results of the investigations have recently been summarized by L. Gilmore and W.J. Cowie and released by the Ministry.

The following table summarizes their report.

TYPE OF INSPECTION	NUMBER OF INSPECTIONS	NUMBER OF CHARGES	NUMBER OF WARNINGS
Residential/Park	311	113	224
Office/Storage	89	18	81
Golf Courses	147	38	187

Thirty-five percent of the charges laid under the Residential/Parks group involved failure for an unlicensed applicator to carry a certificate of supervision, 16% involved posting offenses, 12% left pesticides accessible to the public and 6% were caught applying pesticides without a licence. Not having a vehicle chemical warning sign was another offence for which charges were laid.

Ninety-six percent of the charges laid under the Office/Storage Location category involved storage violations under Sections 21, 121 and 122 of Regulation 914. Other charges were laid as a result of failing to notify the fire department of pesticide storage premises on golf courses and failing to secure containers during transport to prevent spillage.

The majority of the charges assigned on golf courses were also under storage violations. They also involved unsafe use of water from a water-course where ineffective back-flow equipment was in use.

Several stop work orders were issued as a result of leaking equipment and for spraying in windy conditions.

In general the programme received favourable acceptance by the industry. The programme should increase the awareness of the industry of the legislation of pesticide application, storage, transportation and posting through compliance checks, which in turn protect public health and safety by reducing misapplication and misuse of pesticides. It should also reassure the general public that the application of pesticides is being regulated through licensing and that compliance to those regulations is being enforced.

The project may be expected to be continued in 1995.



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# Dr. R.W.(BOB) Sheard, P.Ag.

**STA Executive Secretary  
1990-1994**

After four very busy and successful years, Bob Sheard has resigned his position as Executive Secretary of the Sports Turf Association. At the Jan. 5, 1995, General Meeting of the Association, STA President, Chris Mark, presented Bob with an Appreciation Award for his efforts and dedication during his years as Executive Secretary. Bob has stepped down to fulfil his duties with the Masonic Order of Ontario. However, he has agreed to accept a position as Director of the STA and serve as our Newsletter Editor.

During his term as Executive Secretary, Bob Sheard has made an impressive and lasting impact on the Association. Initially he was hired to be responsible for office management and ensuring the efficient running of the day-to-day affairs of the Association. While Bob never dazzled us with his typing speed or computer prowess, he certainly vaulted the STA into becoming one of the finest turf organizations in Canada through his dedication to education and professionalism. Many dreams and aspirations of the Executive came to fruition when Bob came on board

in August, 1990 when the STA finally had an employee fully dedicated to the affairs of the Association. Mike Bladon's convincing one of the foremost and respected soil scientists from the Department of Land Resource Science at the University of Guelph to join the STA, was to pay large dividends for the Association and its members.

As Executive Secretary Bob has played a vital role in many, many projects. He was instrumental in producing and editing the Athletic Field Managers Guide, assisted with writing the text and editing the series of three Video Tapes on Turf Management. He spearheaded the production of the membership directory and member plaques. Bob has represented the Association on the Ontario Turfgrass Symposium planning committee since 1990 and was really one of the visionaries who felt the need for an educational conference involving all turf associations and turf managers in Ontario. One of the less known, but outstanding achievements during his tenure was negotiating the office rental agreement between the STA and Guelph Turfgrass Institute and the Management Board Secretariat of Ontario. Bob spent many hours which finally resulted in an

agreement which was fair and equitable for the Association and its members and provided the Association with a permanent home.

Since arriving as Executive Secretary, Bob has been a regular and major contributor to the Newsletter. One of the primary goals of the STA is education and disseminating information to our members. Bob's series of articles entitled "Understanding Turf Management" represent this focus on education at its finest. His articles have been reprinted by numerous other turf publications and several Colleges have requested using the articles as part of their curriculum. Besides writing articles, Bob has also been responsible for producing and distributing the Newsletter. If the Newsletter has been late, its been well worth the wait.

In closing we would like to express our sincere appreciation for the effort Bob Sheard has put forth on behalf of the Association as Executive Secretary. Since 1990 Bob has represented professionalism, credibility, and a profound desire to improve athletic fields and assist turf managers in providing **better, safer, sports turf**. On behalf of all members, Thank You.



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### July 18, 19 & 20, 1995

Ontario Parks Assoc. Annual Meeting  
Venue: Anthony Roman Centre, Markham  
Contact: Jennifer Berlette  
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### July 21 & 22, 1995

Sport Turf Association Field Day  
Venue: Globe Park, Hamilton  
Contact: Sports Turf Association,  
328 Victoria Road S.,  
Guelph, ON. N1H 6H8  
(519) 763-9431  
FAX: (519) 766-1704

### August 14, 1995

GTI - OTRF Research Field Day  
Venue: Guelph Turfgrass Institute  
Contact: Ms. Pam Charbonneau,  
OMAFRA Turf Specialist,  
Guelph Turfgrass Institute,  
Guelph, ON. N1H 6H8  
(519) 824-4120 Ext. 2597  
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### October 9 - 12, 1995

Northwest Turfgrass Conference  
Venue: Skamania Lodge, Stevenson, WA  
Contact: Northwest Turfgrass Assoc.  
P.O. Box 1367  
Olympia, WA. 98507  
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### January 3, 4 & 5, 1996

Ontario Turfgrass Symposium  
Venue: Constellation Hotel, Toronto  
Contact: Office of Open Learning,  
Room 160, Johnston Hall,  
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## GRASS CLIPPINGS



- In Ireland turf is a block of peat, harvested and dried for fuel
- The word turf (torf, torfa) is a common word throughout Europe and is derived from Sanskrit - tuft of grass.
- Hashish is the Arabic word for grass, hence the synonym for the drug, marijuana

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