

>> Verticutting Kentucky bluegrass following a large tournament to push lateral growth for recovery.



THREE KEYS

to managing high traffic, high quality athletic fields



>> Top: Aerating immediately following a large soccer tournament (note the multiple sets of lines on the field); field got shifted over 2 days in a 4-day soccer tournament.
>> Bottom: Sand spread in a lacrosse goal before a large tournament.

AS RECREATIONAL ADULT LEAGUES AND COMPETITIVE YOUTH CLUBS GROW in popularity, sports facilities and parks departments around the country are tackling the unique challenge of increased demand for matches and events. The rising level of competition provides a welcome change for facilities and departments feeling the pinch of the weak economy with budget cuts and decreased revenue.

But with change comes challenge, and this case is no exception. In response to increasing demand for outdoor sports and activities, cash-strapped facilities and departments must provide fields that are safe and prepared for play, while many times operating with limited resources. Sports Turf Managers are being called upon to find proactive and creative new solutions to maintain and even increase the quality of their athletic fields that are placed under higher traffic demands.

Pro-active and creative solutions come from a re-examination of the basic principles of turfgrass management.

Grass plants are living and breathing organisms, just like humans. As humans, we stay healthy through a balanced diet, hydration, and exercise. These habits keep our energy level high and help our immune system naturally fend off infections and diseases. With a proper nutrient intake, a strong root system, and the right amount of water, a

grass plant will sustain life much like the healthy human. A healthy plant can fend off diseases with a natural immune response and also withstand heavy traffic damage from play.

Keeping this human analogy in mind, let's examine three keys to help find new solutions to maintaining high traffic athletic fields: aggressive aeration, nutrient management, and traffic management. Aggressive aeration combined with a balanced nutrient management program creates a healthy, strong and durable stand of grass. Traffic management then addresses the abused areas directly and decreases the amount of repair work required on fields.

AERATION

Concentrated foot traffic quickly compacts soil on fields, which eliminates air space and leads to suffocating roots. The gasping roots weaken and cause divots, which results in the stand of grass thinning

out. The weak roots also require additional hydration, yet water from irrigation and rainfall is not able to penetrate the compacted soils easily.

Aggressive aeration solves many of these problems by increasing turfgrass density and decreasing water usage. Because water is better able to move through the soil profile, it also decreases the number of events cancelled due to rainfall.

Dictionary.com defines the word "aggressive" as "vigorously energetic, especially in the use of initiative and forcefulness." This definition is an excellent outline to use in your decision making towards aeration. An aeration program should be "vigorously ener-

Nutrient management

A high-traffic nutrient management program can focus on three areas:

- Maintaining nitrogen in consistent, low levels
- Using the plant essential micro-nutrients for different plant stresses
- Expanding a bio-stimulant program in order to provide a plant with necessary, naturally-produced hormones, carbohydrates, and amino acids

getic”: implemented a minimum of 1-2 times per month. It should show “initiative and forcefulness”: taking place in short windows of opportunity between events and in conditions that may not typically be seen as ideal (such as heat, at night, etc).

FC Dallas Stadium, a high-traffic soccer and football field (and 2011 STMA Professional Soccer Field of the Year) sets the standard for what it means to be “aggressive.” Sports Field Manager Allen Reed aerates his field *every* Monday.

Elsewhere, the Maryland SoccerPlex has 1-2 machines continually aerating their 19 natural grass fields. The non-stop process equates to a 10-day cycle between aerations on fields that host more than 350 events apiece each year from soccer, lacrosse, and sports camps.

Sporting Kansas City’s Swope Park Training Center fields, placed under high demands as well, never pass an aeration window of 14-21 days.

This aggressive aeration keeps grass fields from experiencing turfgrass decline due to compaction. It also keeps water moving vertically through the field’s soil profile, increasing irrigation efficiency and reducing rainouts.



>> Experimentation with new methods of aeration to prepare and recover fields for heavy traffic.

NUTRIENT MANAGEMENT

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- Using the plant essential micro-nutrients for different plant stresses
- Expanding a bio-stimulant program in order to provide a plant with necessary, naturally-produced hormones, carbohydrates, and amino acids

Maintain nitrogen in consistent, low levels. Nitrogen is one of three key macronutrients required for maintained plant growth and health. Because nitrogen is key in producing proteins, it should always be present. However, excessive nitrogen leads to faster growth,

which is a factor in turfgrass destruction on high-traffic fields.

Whereas faster growth could be seen as essential to a plant’s recovery time, the faster growth actually weakens the cell walls of the plant. Just as a child who is growing quickly can have weak bones, the plant’s cell walls become weak and thin. They are easily invaded by pathogens and punctured by traffic. A stand of turf subjected to aggressive nitrogen fertilization will thin out quickly in the high traffic areas and will be prone to diseases such as brown patch and pythium.

Another aspect to note is soils with levels of organic matter contain carbon, a source of nitrogen. As summer temperatures rise and soil microbial activity increases, organic matter breaks down and releases this carbon into the soil as a natural nitrogen source. Soil testing to track the estimated nitrogen release (ENR) from the soil is important to monitor the release. The release potential in combination with a controlled fertilization program avoids a “flush” of aggressive turfgrass growth, resulting in the weak cell walls and thinning of the turfgrass stand. Additionally, “flush” growth causes the plant to burn more energy, using up the carbohydrate reserves stored in its roots. These reserves are essential for the plant to survive the summer heat, when respiration uses up more energy than photosynthesis can produce.

For each stress that turfgrass experiences, there are nutrients like manganese, calcium, and potassium that a plant finds essential to counteract that stress. From weather-related issues like heat, drought, excessive rainfall, lack of sunshine, and cold weather, to mowing, aeration, and heavy traffic, turfgrass is constantly under stress. When a Sports Turf Manager can provide those nutrients that are essential for maintaining plant health through each stress, the plant is able to continue to thrive and sustain the heavy traffic and the stress.

EXPANDING A BIOSTIMULANT PROGRAM

Because of environmental stresses such as drought, lack of sun, heat, etc and constant physical stresses like mowing, traffic compaction, etc, the turfgrass plant is not able to perform its natural growth and development processes. Biostimulants are organic products that aid in plant metabolic processes such as respiration and photosynthesis. Essentially, biostimulants help the plant maintain growth despite stress. Biostimulants include natural-occurring ingredients such as plant hormones, carbohydrates, amino acids, and anti-oxidants.

Plant hormones serve as “signaling molecules” for plant growth by carrying messages from one part of the plant to another. The critical growth hormones in turfgrass are auxins, cytokynins and gibberellins. Auxins signal root growth and development, and work with cytokynins to initiate shoot growth. Gibberellins help supply food for new cell growth, and promote cell division and elongation in the leaf blade of the grass plant.

Sports Turf Managers can use biostimulants to supply the naturally occurring hormones in accordance with the particular stress. These hormones will then signal the needed action by the plant. When root development and density is needed, auxins and cytokynins can be applied to drive roots. If recovery is required, gibberellins are applied to promote vertical growth. When used in



>> Overseeding a native soil Kentucky bluegrass field. The KBG fields at SoccerPlex receive more than 750 hours of traffic per year.



>> **Top right:** Thirty-five soccer matches in 7 days on SoccerPlex Stadium (2011 FOY). Note the multiple lines (full sided that got slid over during a weekend tournament and small sided fields for matches that got played during the week prior).



>> **Bottom right:** Lacrosse field shifted to the far side of the field.

proper balance, these three hormones work together to reach the end goal of healthy, natural growth.

Plants dealing with heavy traffic and stress also benefit from extra amino acids and carbohydrates. As needed, managers can supplement these “vitamins” to sustain the natural plant processes like photosynthesis, respiration, and recovery from antioxidants.

With the use of biostimulants in conjunction with plant growth regulators, Sports Turf Managers are able to exercise more control over plant growth processes. Different demands on fields and un-

predictable weather conditions change the needs of the turfgrass plant almost daily, so monitoring plant processes at all times in conjunction with weather and traffic sets the “diet” for maintained plant health throughout the year.

TRAFFIC MANAGEMENT

Traffic management is the most labor-intensive piece of the puzzle for high traffic field success. However, the cost of labor on the front side of field deterioration should be seen as pro-active and preventative. Overall, it actually saves money and labor once a field requires sod work or a field must be closed for a complete renovation. Managing traffic effectively will allow all fields to remain open during the full duration of the event season and require less “repair” work.

Traffic management includes two parts: Re-sizing and shifting fields to adjust traffic patterns; and addressing traffic patterns directly to improve weak areas

Re-sizing and shifting field layouts moves high traffic areas and provides the embattled turfgrass in those areas a chance to recover. Soccer and lacrosse fields have the most flexibility for re-sizing and shifting because the rules call for minimums and maximums on the competition dimensions.

Start with shifting the center of the field. The core of soccer and lacrosse is played up and down the center of the field. High traffic areas such as goalmouths, referee lines, and bench areas get moved accordingly with the move of the field center.

Swapping the side of the bench areas is also important. Teams for all sports warm up directly in front of their bench. In one day of seven soccer matches, a 15-yard x 15-yard area directly in front of each bench sees a minimum of 126 players stretching and kicking to get loose. Rotating the bench areas from one side of the field to the other in conjunction with shifting the field allows the field to experience optimum recovery.

American football fields are much narrower than soccer or lacrosse fields, so they too can be shifted and moved. This is especially true for practice fields where goal posts are not required. With a slight shift, the heavy traffic area of the center of the field allows recovery.

The key to football, as with all sports, is to spend time communicating and educating the user groups and coaches to empower



>> Repainting lacrosse fields (at night) 2 days into a 4-day lax tournament (fields took 36 games of lax in 4 days due to the move).

them as stewards of the field. “Telling” or “demanding” these changes does not work. Educate them. Include them in the discussions to attempt to understand their needs. Empower them with the goal of improving the field quality.

Setting forward on a program to move and re-size fields should start and end with a positive message that the field is going to be in professional condition with reduced closure time for renovation. No coach or administrator will argue with a better field. But the message has to be positive make sense. Yes, it will be a challenge. But communication will serve key in success.

ADDRESSING TRAFFIC PATTERNS DIRECTLY

In conjunction with re-sizing and moving fields, apply intense maintenance directly to the high traffic areas. Customarily, an athletic field is maintained in a uniform manner across the field. And in some situations, that standard can still be followed. But under high traffic conditions, extra care must be given to the areas degraded by the heavy traffic in order to maintain their quality compared to the rest of the fields.

Soccer traffic creates a diamond-shaped pattern that stretches from the goal box to the touch sideline at midfield, and then back to the goal box on the other end. Add extra aeration and nutrient applications to those areas.

Small-sided soccer fields have a wear pattern across the width of the full soccer field, requiring less maintenance to the center of the

big field but more across the width. Rotate mall-sided play with full-sided play to allow for recovery. For lacrosse, topdress inside the arch and crease areas heavily with sand. The sand protects the crown of the plant from the direct traffic that these areas receive. For recovery purposes, aeration and nutrient applications are focused to the worn areas as the field is shifted away from that area.

American football fields should be topdressed heavier down the center than the outsides. More aeration should take place through the center in conjunction with a completely different nutrient management approach.

The success of “managing traffic” will be evident in increased quality of your high traffic fields. With the extra work that goes into field movement, sod work will nearly be reduced and/or eliminated. And as your traffic management process evolves, the condition of high traffic fields will continue to improve as you discover new ideas and try different approaches that fit your specific situation.

Using these three methods, Sports Turf Managers will find proactive and creative solutions for meeting the demands of high traffic athletic fields. As Sports Field Managers, we all constantly adjust our approach due to many variables: weather, resources, and coaching demands. But incorporating these new practices will help produce healthy, strong and durable grass plants that can withstand heavy traffic and also reduce spending on expensive fungicides, grass seed, and irrigation. ■

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THE BASICS of maintaining synthetic turf

LET'S BEGIN by acknowledging that synthetic infill fields are NOT maintenance free. No matter what anyone says, these fields need maintenance routinely. Secondly, what comes out of these fields must be replaced, meaning that the infill material disappears from the field as it is carried off by players, wind, rain, snow, snow removal, routine maintenance, etc, and being that the infill material is the supporting substance of these fields, it will need to be replaced.

When we service a field we typically find that most fields are lacking infill material whether it's all crumb rubber or rubber/sand mix; we also find the turf fibers are laid over with minimal support

causing them to prematurely break off. But the worst enemy to the synthetic fibers is the sun and ultraviolet rays that it must endure day after day. By maintaining a proper amount of crumb rubber and allowing approximately only a 1/2 to 3/4 inch of exposed fiber, you are preventing the fibers from folding over and lessening the amount of material breakdown due to ultraviolet rays. On average an athlete or end user will carry off 3-4 pounds of infill material during a playing season. This needs to be replaced annually to support the fibers and provide longevity for the playing surface.

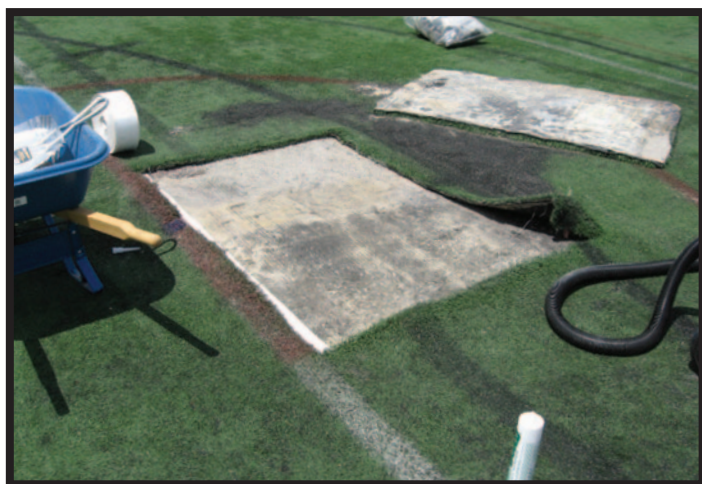
To calculate your needs, you need to measure the amount of crumb rubber in a variety locations within the synthetic field boundaries (we measure 10 locations using the ASTM 1936-10 guidelines for Gmax testing as our test points) to determine what you have. If your turf is 2 1/4 inches tall and you have less than 1 1/2 to 1 3/4 inches of infill, you need to add more. Most crumb rubber infill calculates to 0.55 pounds per square foot for a 1/4-inch lift. Most rubber/sand infill systems will not need additional sand as it tends to stay stable within the turf. There are rare occasions when the sand is removed due to operations like snow plowing or torrential downpours that cause flooding; if this occurs you will need to be added to the mix.

GROOMING ESSENTIAL

Grooming the field is an essential maintenance task that needs to be better understood. It is highly recommended to use a good groomer designed for synthetic turf such as the Greens Groomer or the Wiedenmann units. When using any groomer, adjusting it so that it lightly touches the fibers will provide the best results. Do not lower the entire weight of the groomer onto the turf unless you are trying to level out or move crumb rubber to fill an area such as a lacrosse goal crease. When tickling the fibers with the groomer's brushes the intent is to stand the fibers up to minimize the lay over from use.

Often I am asked how much or how often should I groom my field. There is no true, exact answer but from my experience I recommend that the field be groomed every 300-350 hours of use. I have read on the web articles saying 400-500 or more hours and much depends on the manpower available. At minimum it should be groomed several times during the highest use periods and less during the down times (if there is such a thing).

Trash and debris removal is another constant nuisance and needs to be done whenever it exists. Timely removal is important to keep the trash and debris from becoming ground into the infill material, which causes removal problems later. Sunflower seeds, chewing gum, candy wrappers, cigarette butts, wire ties from nets, and broken sand bags or stone bags used for weighting down goals are just some of the typical items we see when deep-cleaning a field.



>>Above: IF YOU HAVE TO DEAL with patching, contact the manufacturer or a reputable service company. There are special materials that you will need and the local hardware store, big or small, does not carry them.



>> Above left: IF YOUR TURF is surrounded by bermudagrass or any other creeping stolon-producing grass, be prepared! >> Above right: DUST, dirt, pollen, body skin cells, screws, nails, track spikes, bobby pins and human hair to name a few do not break down in these fields; it is truly amazing how much exists.

Removal of chewing gum is largely overlooked and needs to be addressed as soon as possible; most chewing gums today never harden and with the intense heat in the field it becomes gooey and eventually spreads across the turf surface. To remove use either ice cubes or a freezing spray agent to harden the gum, chip it off and remove it.

Weeds can exist and thrive in synthetic turf and if your turf is surrounded by bermudagrass or any other creeping stolon-producing grass, be prepared! These grasses tend to find their way into and under the synthetic turf and since temperatures on these fields reach optimal growing peaks before the surrounding turf, once they start spreading beneath they will find the drainage holes and send their shoots upward for the sun light. These plants become very hard to remove due to their sewing machine affect and in most cases will need to be treated chemically (as approved by the turf manufacturer) to kill them off. Easiest way is to prevent it from growing under from the beginning, understand it, look for it and act quickly when discovered.

WEAR AREAS NEED ATTENTION

Pay attention to heavy wear areas; these fields wear just like natural turf with the exception that you can't grow it back in once it is gone, so don't let it wear out. Football—center of the field between the hash marks; soccer—penalty kick area, corners, goal crease; field hockey—goal crease, penalty arc; lacrosse—goal crease areas, center of the field where face offs take place.

Lacrosse, whether men's or women's, has the ability to destroy a goal crease in as little as one year if not maintained. The infill material gets kicked or shuffled out, the fibers take a beating and break off quickly without the support of the infill material and before you know it, you have a big black area that is the backing of the turf that you will have to patch or replace. If you have to do this, use either the pieces you saved from installation or maybe cut out from outside the playing area so that it matches in color and type.

Even after one year it won't be a perfect match (even if left on a roof top to sun burn like the turf on the field) because the surrounding fibers in the field will have seen use and started to mat out or break down and if you are patching it must have worn out. Contact the manufacturer or a reputable service company to save you the pains of having to deal with the patch. There are special materials that you will need and the local hardware store, big or small, does not carry them. Don't use Gorilla glue, liquid nails, and styrene bonding agents, and/or drywall screws or framing nails for repairs as they are not designed for synthetic turf and may become a liability nightmare later down the road.

Painting may or may not have to be done on these fields depending on whether or not everything was inlaid during installation. If you have to paint use only paint that is approved for synthetic turf field; it seems that every year some company announces that they have synthetic turf paint, but do your homework and look at a company history and get recommendations.



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If you need to remove the paint ask the supplier: How this is done? Can it be done? What will it cost? How long will it take? Do you need special equipment and chemicals? Have their products been endorsed by any manufacturers and is your turf manufacturer one of them? If you have to paint try to do it at times other than the heat of the day, and if you are removing lines it works much better to do this at night or early in the morning when the turf is the coolest. Chemicals used during the heat of the day will evaporate long before they start to work and this will only cost you more time and materials.

Dust, dirt, pollen, body skin cells, screws, nails, track spikes, bobby pins and human hair to name a few do not break down in these fields, they remain for much of the life of the field and it is truly amazing how much exists. Special equipment with hepa-filter vacuums will be able to clear this out and remove it from within the turf. Rain, snow sleet and hosing do not help.

Static is common and can increase with humidity and sometimes age; if you need to combat this you can do so with a several household products. Liquid Tide washing machine soap and/or the use of a softener (Snuggles!) both work well when sprayed on the turf.

Eventually someone will ask if these fields need to be disinfected and my suggestion is to review Dr. Andrew McNitt's research pages to obtain the best answer (<http://cropsoil.psu.edu/ssrc/sportsturf-scoop>). Information can also be found by visiting the Synthetic Turf Council's website at <http://syntheticturfcouncil.org/>.

Lastly, unlike natural turf, we can't see what is going on with these fields beneath their surface. ASTM has recommended that these fields be tested annually to determine their hardness in G force (better known as Gmax). There are those who do not believe this is necessary, but I can tell you that it is an important tool. If you don't do it for a year, two, four or six you have no history data to determine what has been going on. I have tested 2-year-old fields and 11-year-old fields with less than ¾ inch of fibers remaining and almost no infill and yet the newer one tests harder than the older. Does this mean we are no longer testing the turf and we are now testing the stone base beneath? Good question and since we don't have 11 years of historic Gmax testing, we can only imagine we are now testing the Gmax of the stone base.

Synthetic fields are a great tool and if properly maintained will provide years of play for all users. What you have just read is only the tip of the iceberg and there is much to learn about these fields. Don't be afraid to ask your peers or contactor if you don't know; it may prevent you from making a huge mistake. ■

Jim Cornelius, CSFM, manages Fisher and Son Company's Pro Services division. His commitment to educating the owners of these fields will ensure playability, safety and performance for all users, which will eventually create longevity to the ever-evolving synthetic turf industry and the fields they service.

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Red Bull Arena



BMO Field

Turf report from the new Major League Soccer stadiums

TODAY'S NEWEST SOCCER-SPECIFIC PROFESSIONAL stadiums can create new challenges in turf management. We asked a few Major League Soccer stadium managers how it's going.

DAN SHEMESH,
Red Bull Arena, Harrison, NJ

SportsTurf: What type of turfgrass are you managing?

Shemesh: Our field at Red Bull Arena is Kentucky Bluegrass overseeded with perennial ryegrass.

ST: What tips do you have for keeping a good stand of grass despite all the traffic these new stadiums see with all the corporate and special events?

Shemesh: Tips for keeping a good stand of turf despite traffic with extra events: We like to aerate and deepcore as often as the schedule allows us to. We also overseed when the events are close together and do not anticipate enough recovery time. In the cooler months we use growth covers to accelerate the seed germination. Careful planning of extra non-sporting events with built-in rain dates and restrictions on what can be done on field helps minimize damage.

ST: What's been your biggest challenge this season and how did you respond?

Shemesh: Our biggest challenge this season will be the last two weeks of July where we host six games along with six training sessions. Hopefully the weather cooperates and by the time I am reading this issue of STMA the field is still in good shape.

ROBERT HEGGIE,
BMO Field & KIA Training
Grounds, Toronto

SportsTurf: What type of turfgrass are you managing?

Heggie: BMO Field was converted from artificial to Kentucky Bluegrass 2.5 years ago. I overseed with a blend of 15% Kentucky Bluegrass and 85% Perennial Ryegrass, but a few times a year I will overseed 100% Kentucky Bluegrass.

ST: What tips do you have for keeping a good stand of grass despite all the traffic these new stadiums see with all the corporate and special events?

Heggie: Obviously the key to keeping a good stand of grass is a multifaceted answer. First of all, rotation of play is vital, keeping in contact with the coaches and ensuring they are rotating around the field and not using the same areas over and over. Limiting field usage (no 18-yard box) during smaller events can at least ensure that the 18-yard boxes are in prime condition for games. If you have enough room, moving the pitch a few yards to the left or right. This changes the wear pattern since most of MLS soccer plays down the middle of the field, it also moves where the goalkeeper is standing.

Fertility is key! I personally in 2.5 years have never had to use any sort of pesticide. I am sure that it is due to the proper fertility in my plants, as well as controlling the environment as much as I can. BMO Field has a SubAir system and a hydronic heat system, so some environmental control is possible. A combination a granular, liquid and foliar fertilizers are the best route for a healthy stand of grass.

I am also a big believer in the use of silicon products, they help make the plant more turgid and resilient against wear. No one can look at a plant and know exactly what it needs. Soil and tissue test are vital to ensure that you are following the proper fertility program, there is no one program that everyone can follow, and your program should forever be changing. Try not to nitrogen load, the plant will take up as much

nitrogen as you want to let it, but it doesn't mean that it needs it. I compare nitrogen with plants like a fat kid with sugar. They'll eat and eat and eat, to the point of being full, leaving no room for essential minerals and nutrients to be consumed.

Another key component is proper grass selection when overseeding. The blend I use is 15% KBG and 85% PRG. But it's the species selection that is so important. For Kentucky Bluegrass I use "Jumpstart" a newer variety of blue that has a drastically shorter germination time. Personally I see in germinating in 5 days, far superior to the traditional blues.

For my Perennial Ryegrass selection I use Regenerative Perennial Ryegrass, again a new variety. The benefit to this is that it doesn't have the traditional growth habit of rye, its growth characteristics are actually closer to bluegrasses (stolens). Clearly a plant that grows by stolens is superior since when divots are taken there is a greater chance of advantageous nodes still being present.

Proper watering! The drier you can have the pitch, the less damage it is going to take and the less compaction the soil is going to face as well.

Make sure to aerate as much as possible. It can be very difficult to aerate due to the busy schedules and overuse, but when there is time, make sure you get out there! It's so key to promote gas exchange and proper water and fertility movement. Aeration is a one step backwards, two steps forwards procedure. Low oxygen levels and high moisture levels are a key for many pests and disease, so ensure that aeration is done as much as possible.

ST: What's been your biggest challenge this season and how did you respond?

Heggie: Biggest challenge in Toronto this year was a lack of rainfall and incredible high heat. We saw many days over 100 degrees, and it has only rained here around 5 times since May (as late August). Keeping Bluegrass and Ryegrass alive and aggressive in the heat is not an easy task. Light syringings on hot days is obviously a key to fighting this problem. [I benefit from] using the SubAir system and pressure at night, pushing cooler night time air into the soil profile and reducing its temperature. Furthermore, my irrigation water is high in bicarbonates, this creates a problem in the soil over time, tying up nutrients. So I have had to use a lot more organic acid this year than I have in the past, but this helps acidify the soil leaving nutrients available. If I know the rain is coming then I don't bother with the acid, since the pH of the rain does the same job in my opinion and it's an application I can use later. ■