Soil Testing and Potassium Recommendations for Golf Courses

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Upcoming Events

NOVEMBER 15–17  ..............................................................................................................................................
2016 Penn State Golf Turf Conference
Nittany Lion Inn • State College, PA

The Penn State Golf Turf Conference will once again be held at the Nittany Lion Inn on the University Park campus between Tuesday, November 15, and Thursday, November 17. A full schedule of speakers will deliver the latest and greatest information about managing golf turf. Speakers include USGA agronomists, university professors and industry leaders. Presentations will include a variety of subjects ranging from agronomics to business management.

Our keynote session will feature a roundtable discussion on the state of the industry as it relates to new laws on wages and overtime, as well as the shortage of available staff. The lively discussion will focus on the impact that these changes will have on your golf course maintenance crew and share some tips for navigating these uncharted waters.

In addition to the lineup of education, we will again host a complimentary Happy Hour on Wednesday following the announcement of the Pennsylvania Turfgrass Council’s Dr. George Hamilton Distinguished Service Award recipient. The Penn State Turf Club will also host its annual Turf Club Luncheon and be on site with a full inventory of Club merchandise to make completing your holiday shopping easy. State pesticide credits and GCSAA education points will also be offered.

We hope to see everyone there! Check www.ps turf.com/conferences for details and to register online.

Save These Dates!

JANUARY 4–5, 2017
Eastern Pennsylvania Turfgrass and Ornamentals Conference and Tradeshow
Radisson Hotel/
Valley Forge Convention Center
King of Prussia, PA

The Eastern Pennsylvania Turfgrass Conference has secured an excellent list of speakers and timely education topics. The traditional tradeshow format is being replaced with something new and exciting, so be sure to attend and see what that’s all about, as well as engage in some great learning opportunities.

• Excellent topics in the golf turf, sports turf, and lawn and landscape sessions
• PA, NJ, DE and MD pesticide credits, and also GCSAA CEUs
• And much more!

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JANUARY 19, 2017
Northeastern Pennsylvania Turfgrass Conference and Tradeshow
Woodlands Inn and Resort
Wilkes Barre, PA

Note: This is a week earlier than usual, due to a conflicting national turfgrass conference.

For more information, please email Dr. Andy McNitt at asm4@psu.edu.

FEBRUARY 28 – MARCH 2, 2017
Western Pennsylvania Turfgrass, Ornamental and Landscape Conference
Hilton Garden Inn Cranberry
(formerly the Four Points Sheraton)
Cranberry Township, PA

With more than 45 pesticide update credits offered, we have many speakers this year from other universities and institutions that will have great information to share with you. For more information, contact the PTC office at (814) 237-0767.
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The membership year is July 1 through June 31.
Soil fertility testing is a valuable agronomic tool comprised of four steps: sampling, analysis, interpretation and recommendation. Sampling practice is fairly straightforward. Perhaps modified in regard to depth (e.g., by rooting depth of species or need for subsoil investigation), sampling accuracy increases with the number of soil cores sampled from the area of interest.

The next stage is analysis, and “routine” soil fertility analysis affords little artistic liberty. Submitted soils are dried and homogenized before being mixed with an extraction solution. Typically chosen on the basis of regional parent material or sample soil pH, extraction solutions include Mehlich-1, Bray P-1, Morgan and Mehlich-3. Their purpose is to rapidly displace nutrients from soil and stabilize them in soluble forms, facilitating precise measure of solution nutrient concentrations by state-of-the-art analytical equipment. Success through the first half of the soil fertility-testing process relies on consistency, and this is something I believe we can all agree upon. If only the second half were so easy.

**Interpretation**

Interpretation is simple characterization of soil pH and nutrient availability levels by keywords such as very low, deficient/low, adequate/optimal/medium, supra-optimal/high and excessive/very high. Soil nutrient levels are typically interpreted by one, or both, of the predominant methodologies; the base cation saturation ratio (BCSR) or sufficiency level of available nutrients (SLAN). The SLAN method interprets assessed soil nutrient levels relative to sufficiency levels in parts per million soil, and it is, in my opinion, the superior method (Schlossberg, 2012). It is important to recognize that sufficiency levels for every nutrient have been, and always will be, open to interpretation by individual laboratories and consultants.
Hence the term: interpretation. It’s implied!

Such inherency was mindfully illustrated by Turner & Waddington (1978), who sent seven homogenous soil samples to seven labs and summarized the resulting soil test nutrient levels, interpretations and recommendations. Results of five lab analyses on four similar soils are presented below (Figure 1).

Perhaps the most admirable feature of their report, particularly in current context, was the authors’ ostensibly objective summation of factors contributing to the observed discrepancies. This afforded a perfect segue to their undoubtedly original survey objective: justifying the need for future field calibration studies to improve turfgrass fertilizer recommendations. In their comprehensive understanding of soil-testing components and procedure, Turner & Waddington (1978) refrained from “calling out” associated universities as antiquated or environmentally irresponsible. They simply recognized varying soil test-level interpretations (and recommendations) for what they are, an array of good-faith opinions provided in support of effective turfgrass nutrition and management.

**Recommendation**

When soil test levels are observed below a given nutrient sufficiency level, SLAN-based recommendations provide a nutrient delivery rate on a pre-plant or annual maintenance basis. This rate typically rectifies the difference between the current and sufficient soil nutrient level, or it comprises the soil rectifying rate plus a quantity estimated to satisfy seasonal “crop removal” of that nutrient. These approaches are referred to as “sufficiency” or “buildup and maintain,” respectively. Recommendations may be further adjusted with consideration for the resident turfgrass species/cultivar(s), irrigation water quality, soil pH, seasonal climate and associated cultural inputs.

Carrow et al. (2001) encourage managers to treat soil test recommendations as guidelines. The basis of their candor being inherent variation among methods, interpretation and recommendations precludes characterization of soil testing for turf as an exact science. Did you hear that? It sounded like 500 consultants screaming blasphemy! Carrow et al. (2001) go on to offer guidance on improved methods by classifying such variations as merited or problematic. The latter includes biased fertilizer recommendations solely on replenishment by ratios of nutrients removed in clippings, as this approach neglects mineralized N contributions as well as nutrient fixation and/or leaching mechanisms that influence loss or reduced availability of applied nutrients. By which I offer this analogy: one fewer jar of mashed peas on the shelf doesn’t mean all its original contents now reside in our 7-month-old’s stomach (rather, some covers our clothes, floor and highchair).

**Is potassium special?**

It is my opinion that plant recovery of most soil-tested macronutrients (P, K, Ca, Mg and S), when delivered to a turfgrass system at appropriate rates, under ideal conditions and using suitable fertilizer/limestone products, is highly dependable. Yet K is routinely implicated as the soil-tested macronutrient least-dependably recovered by turfgrass following a fertilizer application (Carrow et al., 2001). A quote from Meentemeyer and Whitlark (2016) — “…a potassium fertilizer application does not necessarily result in higher potassium levels in the plant…” — reiterates concern for K fertilizer fate.

In addition to fate and availability concerns, potassium’s significant role in turfgrass susceptibility to abiotic stress and disease impels its emphasis in this article. In season, K sufficiency of intensively maintained turfgrass supports water-use efficiency and tolerance to both elevated temperature and sodium levels (Carrow et al. 2001). Likewise, field research has correlated anthracnose suppression in annual bluegrass with both leaf clippings K and underlying soil test K levels (Schmid et al., 2015).

Potassium sufficiency also influences a/biotic tolerance between seasons. Following an abnormally harsh winter of 2014–15 in the NE U.S., annual bluegrass putting green plots yielding leaf clippings with 2.6% to 3.1% K content in mid-September, demonstrated significantly greater winter survival and spring recovery relative to adjacent plots that yielded leaf clippings with only 1.3% K content the previous fall (Schmid et al., 2016). However, significant incidence of gray snow mold on putting greens has been observed in direct relation to a fertilization range of 0 to 3.0 lbs. K₂O/M–month, when

---

**FIGURE 1**

Potassium availabilities and recommendations for a maintained Kentucky bluegrass lawn by soil (pH range of 6.0 to 6.7), homogenized and split for submission to five soil testing laboratories (adapted from Turner & Waddington, 1978).

<table>
<thead>
<tr>
<th>Textural class*</th>
<th>Lab A</th>
<th>Lab B</th>
<th>Lab C</th>
<th>Lab D</th>
<th>Lab E</th>
<th>All Labs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mg K /kg</td>
<td>lbs K/M</td>
<td>mg K /kg</td>
<td>lbs K/M</td>
<td>mg K /kg</td>
<td>lbs K/M</td>
</tr>
<tr>
<td>CL 98 (L)</td>
<td>3.3</td>
<td>98 (L)</td>
<td>86 (M)</td>
<td>2.5</td>
<td>48 (M)</td>
<td>2.5</td>
</tr>
<tr>
<td>C 82 (L)</td>
<td>3.3</td>
<td>82 (L)</td>
<td>92 (H)</td>
<td>1.7</td>
<td>58 (M)</td>
<td>2.5</td>
</tr>
<tr>
<td>CL 258 (VH)</td>
<td>0.0</td>
<td>240 (VH)</td>
<td>0.8</td>
<td>144 (H)</td>
<td>1.7</td>
<td>171 (VH)</td>
</tr>
<tr>
<td>SICL 269 (VH)</td>
<td>0.0</td>
<td>266 (VH)</td>
<td>0.8</td>
<td>157 (VH)</td>
<td>0.0</td>
<td>187 (VH)</td>
</tr>
</tbody>
</table>

*, CL=clay loam, C=clay, SICL=silty clay loam; US Dept. of Agriculture.
†, Soil test potassium (K) or K availability, in mg K/ kg soil (or ppm soil).
applied three or more months prior to winter dormancy (Moody, 2011; Woods, 2006). Thus, winter preparation of putting greens requires superintendents to consider the likelihood of extended ice encasement and weigh the implications of snow mold versus crown hydration injury.

Considering all this and K’s rank of 2nd among turfgrass mineral nutrient requirements by mass, I suggest annual K₂O deliveries between 60% and 100% of total annual N fertilizer applied to irrigated cool-season turfgrass maintained as golf course putting greens and tees (Figure 2). Similarly formatted K suggestions for cool-season turfgrass sports fields are supported in greater detail elsewhere (Schlossberg, 2015).

Newfangled acronyms and the ‘S’ word

Succinctly defined as cost-effective, ecologically protective and indefinitely productive, “sustainable” doesn’t reside on the wieldy or “light fare” end of the modern buzzword spectrum. Suggesting herculean practicality and unsustainability of every alternative, the word “sustainable” also implies originality and, in my opinion, is best reserved for use in “optimistic” or “goal-oriented” context.

Which begs the questions — how uniquely original is the theory underlying modish derivatives of SLAN, and just how unsustainable are soil test recommendations provided by labs who haven’t adopted them? Specifics of a minimum level of sustainable nutrition (MLSN) guideline (Woods et al., 2014) reveal a SLAN-based interpretation method, albeit intriguingly observational, followed by a two-step fertilizer recommendation procedure that falls squarely within the confines of customary buildup and maintain philosophy. I have difficulty imagining anyone who has earned credit in a college-level soil

* Irrigation H₂O pH >7.4, Ca+Mg >40 mg/L, and bicarbonate (HCO₃⁻) >150 mg/L; and/or total dissolved solids (TDS) level >800 mg/L.
† Soil test potassium (K) in the upper 0-4 or 0-6 inches as determined by ammonium acetate or Mehlich-3 extraction.
13

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Fertility course would refute the accuracy of this fundamental characterization.

Figure 3 shows all the information and results of a soil test procedure, conducted and provided by the Penn State Univ. Agric. Anal. Serv. Lab. (PSU-AASL). Using the MLSN interpretation and P, K, Ca and Mg fertilizer recommendation guidelines (Meentemeyer and Whitlark, 2016; Woods et al., 2014) for comparison, initiated readers may have difficulty concluding that “shop-worn” SLAN-based recommendations provided by institutional labs are any less cost-effective, environmentally responsible, or indefinitely supportive of turfgrass nutrition and health.

**Conclusion**

There is nothing new under the sun, and soil testing remains less than an exact science. It is my opinion that of all the current SLAN-based approaches, none universally supersedes the merit of any other. I conclude by reiterating the opinion of respected turfgrass scientists I first read 15 years ago and have been teaching at Penn State ever since — soil testing is a valuable tool and should be conducted annually. Be consistent in regard to sampling depth and selection of a SLAN-supporting soil test lab. Resulting fertilizer
recommendations should be considered as guidelines, best complemented by knowledge of nutrient roles in turfgrass, chemical properties of your irrigation water and fertilizers, and ongoing nutritional assessment. The latter component is aptly satisfied by submitting uncontaminated leaf tissue samples from all, or at least your best-and worst-performing, putting greens in early-summer. Supply nutrients in frequent doses, keep records of inputs and performance, and make modifications as you see fit.

References


“Valentine East” Now Designated as a Center of Excellence

The teaching, research and outreach facility affectionately known as “Valentine East” at Penn State’s Berks Campus, in Reading, PA, now has an official designation: Center for the Agricultural Sciences and a Sustainable Environment.

It has taken several years and countless meetings, proposals, and discussions, but a new Center has become a reality at Penn State Berks. A sign has been designed and will be installed sometime during the fall 2016 semester. The agricultural sciences program began at Penn State Berks in 1989, with the arrival of Dr. David Sanford in a teaching/extension appointment to teach ornamental horticulture courses. In 2000, Dr. Mike Fidanza arrived in a teaching/research appointment to teach turfgrass, soils and botany courses.

The Center facility includes a small teaching greenhouse and horticulture building, an overwintering house, shade house, vegetable demonstration garden, tree and shrub collection, walk-in cooler and historic stone dairy barn used for storage, and recent additions include a chemical storage building, an irrigation building, eight turf research buildings, a few acres of turfgrass research and teaching areas with irrigation and much more. This new Center represents an expansion of Penn State’s land-grant mission. Dr. Mike Fidanza will serve as the Director of this new Center.

Update submitted by Mike Fidanza, Ph.D., Professor of Plant and Soil Sciences, Penn State Berks Campus.

Next-Generation DNA Sequencing of Turfgrass Growth and Development Traits

The advancement of next-generation DNA sequencing techniques coupled with progress in the field of bioinformatics is making our ability to perform large-scale sequencing of turfgrass DNA not only possible but also affordable. The cost of sequencing DNA has dramatically dropped over the past several years — from approximately $10,000 for a million bases (the A’s, T’s, C’s and G’s that make up our DNA) back in 2001 to less than 5¢ for the same million bases today. Our lab is now taking advantage of this low-cost DNA sequencing to begin to accumulate large data sets of differentially expressed genes for a variety of growth and development processes, including disease resistance. Our biggest hurdle now is the ability to process and analyze the billions and billions of DNA sequences we are generating.

To that end, we are collaborating with scientists both here and abroad to efficiently handle and accurately analyze our massive amounts of data to better understand the underlying genetic factors responsible for growth and development of our turfgrasses. We envision that this new information will enable turfgrass breeders and, eventually, managers to better develop and maintain turfgrasses that exhibit resistance to a wide variety of biotic and abiotic stress-inducing factors.

Update submitted by David R. Huff, Professor of Turfgrass Breeding and Genetics, Penn State University.

Penn State’s Center for Sports Surface Research

Another year of exciting research is in full swing at Penn State’s Center for Sports Surface Research. Our research continues to focus on improving both safety and playability on natural and synthetic turf athletic fields. Ongoing traction testing with newly released cleats on Kentucky bluegrass, bermudagrass and synthetic turf continues. Look for the results on our website soon (ssrc.psu.edu). We are also measuring traction on synthetic turf with organic infill. With the increase in attention on organic infills, we are also evaluating other surface characteristics of these systems, including surface hardness, abrasiveness and other playability characteristics.

Additionally, we are building on previous projects that examined the best practices for preparing sod for in-season installations on athletic fields. Studies beginning this year will utilize this information as we research the latest technologies in sod establishment, grow-in and installation. The goal of this research is to further improve the safety and playability characteristics of in-season sod installations.

Finally, we continue to evaluate and test “cold-tolerant” bermudagrass cultivars. Currently, we have research plots containing ‘Latitude 36’, ‘Northbridge’ and ‘Patriot’, each grown on a USGA-sand rootzone. These plots provide us the opportunity to conduct testing on surfaces that are used on athletic fields in other parts of the country.

Update submitted by Andy McNitt, Ph.D., Professor of Soil Science, and Tom Serensits, Manager, Penn State’s Center for Sports Surface Research, Penn State University.
How Much Soil Phosphorus Is in Pennsylvania’s Lawns?

Indiscriminate use of phosphorus-containing fertilizer on runoff-prone turfgrass sites is thought to contribute to the contamination of ground and surface water. Consequently, several states have enacted laws restricting the use of phosphorus (P) fertilizers, and others are considering similar legislation, including Pennsylvania. Although soil testing is primarily performed to assess nutrient status in crop and turfgrass systems, some researchers have used soil-test summaries to examine trends in nutrient-management practices and the status of soil P in cropland and lawns at the regional scale. Currently little published data exists on trends in soil P concentrations for turfgrass sites in Pennsylvania, and such information would be beneficial to validate assumptions made for lawns and other turf areas.

Data from 68,328 home-lawn soil samples submitted to Penn State’s Agricultural Analytical Services Laboratory (AASL) between January 1, 2004, and December 31, 2015, were summarized in two 6-year increments to determine trends in soil P concentrations. P was extracted from soil samples using Mehlich-3 extractant, and P concentrations were determined via inductively coupled plasma emission spectroscopy.

Results show that 40% of the 34,456 home-lawn samples submitted to AASL between Jan. 1, 2004, and Dec. 31, 2009, were less than or equal to 45 ppm Mehlich-3 P, whereas 43% of the 33,872 samples for the period between Jan. 1, 2010, and Dec. 31, 2015, were less than or equal to 45 ppm Mehlich-3 P. Home lawn samples having less than 45 ppm Mehlich-3 P receive a P fertilizer recommendation from AASL.

Of the remaining samples submitted between Jan. 1, 2004, and Dec. 31, 2009, 53% were between 46 and 200 ppm, and 7% were above 200 ppm Mehlich-3 P. For the Jan. 1, 2010, and Dec. 31, 2015, period, 51% of the samples were between 46 and 200 ppm and 6% were above 200 ppm Mehlich-3 P. Proposed legislation in Pennsylvania states that P may not be applied to turf when a soil test indicates the Mehlich-3 P concentration is greater than or equal to 200 ppm, in order to reduce the risk of P runoff losses.

The results of the present summary show that the vast majority of soil-test P concentrations from home-lawn soil samples submitted to AASL are either adequate or slightly below adequate for turfgrass growth, and that a smaller percentage of lawns have P concentrations high enough to present a risk of P runoff. Education efforts should be directed toward individuals engaging in practices leading to excessive P in home lawns. Legislators and stakeholders should also consider that a significant percentage of Pennsylvania lawns may benefit from P applications.

Despite the fact that most fertilizer companies have eliminated or reduced P in their lawn-maintenance formulations since 2010, Pennsylvania soil-test data is not revealing a significant trend towards lower P in home lawns. Summaries of soil-test data from Pennsylvania will be monitored to determine if education efforts and reduced P in home-lawn fertilizers influence trends in soil P concentrations.

Dollar spot continues to be one the most important turfgrass diseases in Pennsylvania and throughout the United States. A new research project was initiated in 2016 to investigate the scope of resistance to commonly used fungicides on golf courses in Pennsylvania and the surrounding region. Disease samples are currently being collected from numerous golf courses, and in vitro resistance screening will be conducted.

In addition to resistance issues, many golf course superintendents have reported varying levels of control depending on the season, with severe outbreaks often reported in the autumn months. Isolates collected at various times of the year will be compared for genetic differences as well as pathogen virulence.

Information from these studies will help golf course superintendents fine-tune their management strategies to better suppress dollar spot. For more information on this study or to have dollar spot populations at your course evaluated for resistance, contact John Kaminski (kaminski@psu.edu).

Dollar Spot Resistance and Seasonal Variability in Resistance

Penn State TURF UPDATES

Bob Feindt (Cert. 1960) is now retired and living in Ovid, New York.

Jon Schriner (B.S. ’07) is now the golf course superintendent at Purgatory Golf Club in Noblesville, Indiana.

Colleen Swartz Masters (Barzona) (Cert. 1984) is now retired and living in Clemmons, North Carolina.
Better Fields in Spring Come From Work in the Fall
By Jim Cornelius, CSFM

A thletic grounds personnel across the nation know how important post-season field maintenance is to survive and get a jump on the next season. As you look ahead to spring sports, it’s always a question of when the athletes will be able to get on the fields.

When the natural fields begin to thaw out is when you see if your post-season fall work survived the winter season. The bottom line is learning that the post-season, fall field preparation is probably the most valuable thing we can do. It is crucial to put the fields to bed at the end of the season in a condition that is better than when the season started.

We accomplish this in many different ways. For one, we limit the outside users and the number of events that a field can withstand; we have changed our season ending dates for outside users to work our schedule (the season ending date on the middle school fields is three to four weeks before the high schools). This allows us to work the fields, rebuild the mounds and plate areas, correct any major lip areas (although by teaching the outside users, this is minimal), add material where needed, topdress the fields, aerate and heavily seed as well as apply a late-fall fertilizer.

We identify any/all repairs for fencing, scoreboard issues, benches, bleachers and pathways that we can make during the slower winter months with or without snowfall. By staggering the dates when we shut fields down, we allow outside users to schedule accordingly, allowing them the most time our fields will support. Having all baseball and softball fields to bed by Thanksgiving is always our goal, and then we concentrate on the multipurpose fields with a deadline of December 7.

We have learned over the years that the more we work with our users — from the Pee Wee leagues to the Senior Adult leagues and all those in between, whether outside permitted users or our own athletic teams — showing them in how to care, manage and make daily repairs allows our end-of-season bedding of the fields much more manageable, and the cost is minimal compared to total renovations. With budgets being cut, we have already placed ourselves in a position to hopefully survive the cuts and restrictions that are still to come.

Do yourself a favor — talk to users, listen to their concerns, and make a willing effort to work with them. Many of them have resources available that we may not know about: many are willing to spend time working for a common goal, and many can raise funds that the school district cannot match by increasing taxes. It’s funny how residents will scream, kick and fight over raising taxes but will turn around and hand over money to children when they come knocking on the door or hold fundraisers to support a good cause.

I guess my grandmother was right when she said $1 was too much to spend but when sold for 99¢ you made a killing. Give up your penny to earn a dollar, you may find yourself on the winning end.

Jim Cornelius, CSFM, is services manager, FSC Professional Services, a division of Fisher & Son Co., Inc., based in Exton, PA.
What on-field maintenance task do you most like performing?

Haffling: For visual satisfaction, it would be mowing. [I like it] when the grass is emerald green, and there is a nice pattern cut on it. It’s the culmination of all of the work that was put into it. From an operational standpoint, it would be when we aerate. I feel that by aerating, I am doing the most good for the grass without artificially altering it, such as with fertilizing or topdressing.

What’s your least favorite task?

Haffling: When I have to sod. Though it’s common to have to sod areas such as goalmouths, I still question myself and think is there something that I could have done to avoid having to sod. It’s an internal struggle, but I guess it’s a good thing because it pushes me to strive to continually try to improve our fields.

How do you communicate with coaches and administrators? What is important for success in that part of the job?

Haffling: I try to meet with each coach before their season starts to discuss how we will maintain their field. I think most would agree that it can be challenging working with coaches. Each coach tends to be different in how they look at the maintenance of their field. Some want to be very involved, while some, very little. The key, I feel, is to keep them informed as much as possible of what you are doing on their fields. A good rapport with your coaches will come in handy when it comes to things like dealing with the weather. If your recommendation is not to use the field because of rain, then you want them to respect your judgment and hopefully agree with you.

Has winning the Field of Distinction Award made any noticeable difference in how your work is viewed by administration?

Haffling: Honestly, I wish I had a different answer, but it hasn’t, not at Moravian College. Yes, our sports information director has shared with the campus community our winning the Field of Distinction Awards, but that is where it has ended. I hear from other winners how well received the award has been for them, and I haven’t seen anything close to that happening here. My goal for entering was to bring pride to my staff, the coach and team but also to Moravian. We have this opportunity to tell prospective students that we have award-winning fields, which to me is a big deal since we are a Division III school. Also, as an alum, I would be proud to hear that my alma mater has such a distinction. Despite all this, it’s never too late for it to happen.

What, if any, maintenance changes are you planning for the winning field in 2016?

Haffling: It has taken some time, but we have built a program that has shown great results. We have the same program as last year, and we’ll just have to see how the year progresses and adjust it as needed.
Turfgrass Calendar

November 15–17
Penn State Golf Turf Conference
Nittany Lion Inn
State College, PA

January 4–5, 2017
Eastern PA Turfgrass And Ornamentals Conference & Tradeshow
Radisson Hotel
King of Prussia, PA

January 19, 2017
Northeastern PA Turfgrass Conference and Trade Show
Woodlands Inn
Wilkes Barre, PA

January 24–27, 2017
STMA Conference and Exhibition
Orlando, FL

February 4–9, 2017
Golf Industry Show
Orange Co. Convention Ctr.
Orlando, FL

February 28 – March 2, 2017
Western PA Turfgrass Conference and Trade Show
Sheraton Four Points North
Mars, PA

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