



Each spring, superintendent Matt Strader and his staff reseed and resod high-traffic areas because of turf damage. Photo: Penn National Golf Club

alleviates much of the potential turf damage.

"We have some signage with ropes attached to stakes to alternate patterns onto and off of tee boxes and greens," he says. "Even though many golfers walk with caddies, because of the huge number of rounds we generate and the small size of our greens, we could have turf damage if we aren't careful."

PLAN OF ATTACK

Despite the best intentions of superintendents and their staffs, turf damage still occurs in high-traffic areas. But that damage can be lessened, and perhaps prevented in some instances, with an aggressive turf management plan for those areas most at risk.

"I don't think anyone wants to get into a curative mode with turf damage," Dalhamer says. "You don't want to be trying to revive damaged or worn turf year in and year out."

Dalhamer advises superintendents establish a turf management program for areas around and on greens and tees.

"You should monitor wear and tear and do as much as you can culturally to keep the turf healthy," he says. "We do a lot to stimulate the growth of grass through a fertility program, and we have an aggressive aerification program for our greens where we aerify six times a year."

That might present challenges for a superintendent whose paying customers expect pure putting surfaces when they visit.

"We use a slicer that creates an air pocket one to three inches below the surface and lets the green breathe," Dalhamer says. "All you can see at the top is a surgical-like incision. We'll do that an hour before we send the guys out to mow and roll in the morning. It's almost impossible to detect by golfers. We also verticut and topdress with sand to improve drainage."

WAYS TO IMPROVE TURF HEALTH IN HIGH-TRAFFIC AREAS

- Stimulate growth through a fertility program
- Aerify aggressively
- Verticut and topdress
- Move pin and tee locations
- Redirect golfer traffic with ropes and signs
- Hand-water when hot
- Resod or reseed

Matt Strader, golf course superintendent of the two courses at Penn National Golf Club in Fayetteville, Pa., sees a lot of wear and tear at the ends of cart paths, so each spring he and his staff will resod and reseed key areas.

"The big thing is keeping the fertility up in high-traffic areas so the grass can withstand the pressure better," he says.

Keeping turf in high-traffic areas as porous as possible can prevent serious damage.

"I've been using an Aerivator that shakes up the ground and breaks up any compaction in areas around greens and tee boxes," Hedderick says. "We'll put fertilizer and grass seed down in those areas, and the grass will come up in the hole that's made. The new blades of grass are protected until they're strong enough to withstand being walked on again."

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Island green complexes, which have a small slit of land where golfers walk on and off of the putting surface, can be a headache because there's only one or two points where people can walk.

"That's where you have to be especially aggressive aerifying to break up compaction of the soil caused by golfers walking on the turf," Wood says.

Figurella says he and his crew always work extra hard to relieve compaction in high-traffic areas. They'll fertilize and seed the area and then rope it off.

Mackie believes healthy turf is one of the biggest weapons a superintendent has in his or her battle against wear and tear on grass.

"Keeping your turf healthy and not allowing it to get lean helps prevent damage," he says. "We're always fertilizing and topdressing to prevent damage and to keep the turf strong."

SEASONS GREETINGS

The severity of damage to turf around greens and tee boxes can be seasonal. During periods of heavy rain, it's vital to keep motorized carts off fairways and rough.

"Once it gets really hot in the summer, you see stress magnified," Wood says. "So wear and tear in high-traffic areas is going to be magnified."

Usually, some of the worst turf damage occurs during a drought when the grass is stressed and can't take a pounding, Strader says.

About three years ago, Mackie and his staff started allowing carts in fairways only during the winter so golfers would stay out of the rough where the grass is susceptible to damage.

"Golfers kind of look at you weirdly, but the plan has worked well and protected the rough areas," he says.

Spring is one of the most difficult times of the year for Cooper.

"We can go from dormancy to green and then back to dormancy in a few weeks in the spring," she says. "That's when it becomes difficult to make golfers aware of the damage they can do to dormant grass, especially after they've been allowed on the fairways a few days earlier."

Once it gets hot, one can see turf stress increase, especially in wear areas.

"We have a combination of ryegrass and bermudagrass, and there's a window of time

when the rye starts to go and the bermudagrass is starting to bloom that we'll see areas suffer thinning," Wood says. "Extreme heat just complicates the problem."

Hand-watering high-traffic areas during hot spells can help prevent turf stress.

TIME TO REPAIR

Despite the best-laid plans, some turf damage simply can't be remedied.

"We've had a rare case of having to resod a par-3 tee box because it had gotten so beat up during the summer," Dalhamer says. "We're lucky because we have an endless supply of turf and the resources to resod an entire tee."

But most golf course superintendents aren't so fortunate.

"Most damage to fairways will go away eventually," Figurella says. "Mother Nature has a way of cleansing itself. But if it's serious enough damage, we'll have to go and repair the damage by hand." **GCI**

John Torsiello is a freelance writer based in Torrington, Conn. He can be reached at jtorsiello@sbcglobal.net.

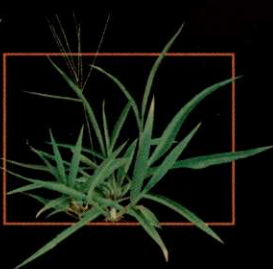
Usually, some of the worst turf damage at Penn National Golf Club occurs during a drought when the grass is stressed and can't take a pounding, says superintendent Matt Strader. Photo: Penn National Golf Club



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aeration options

SUPERINTENDENTS IMPLEMENT VARIOUS PRACTICES TO MEET TURF NEEDS

BY STEVE AND SUZ
TRUSTY

To golfers, aeration is a paradox – they don't like it done, but they like the results eventually. It's a good thing aeration options have opened the door for golf course superintendents to mix and match methods to develop the most effective strategy for the needs of the courses they manage. While typical core and spike aerification remain part of turfgrass management programs, other procedures are used, too, as the following four examples depict.

In the spring, superintendent Mark Krick and his crew aerate wall to wall, using five-eighths-inch coring tines on the greens and three-quarter-inch coring tines everywhere else. Photo: The Homestead Golf Course





A 'PLAIN JANE' PROGRAM

Frank Pizzuto, Jr. is owner and superintendent of two 18-hole courses in New York: The Elms Golf Club in Sandy Creek and The Pines in Pulaski. The Elms has been a family-owned course since it opened in 1960, and The Pines was purchased in 1983. Both are in small towns near Lake Ontario and attract golfers who are tourists and army personnel stationed at Fort Drum in nearby Watertown. Budgets are tight and have been affected by a decline of play because of troop deployment.

Both courses have sandy soil – The Pines location was sand dunes before the course was developed – and feature Pennncross bentgrass greens. Traditionally, the season runs from Memorial Day to Labor Day.

For the past 15 years, Pizzuto has aerated the greens and tees in the spring and fall with five-eighths-inch hollow tines at about a 2-inch spacing to a 4-inch depth.

“The soil is so sandy our winds quickly dry the cores,” he says. “Then we drag mat them back in. The remaining debris is just small tufts of grass that we sweep off. The core material generally fills the holes pretty well. If necessary, we’ll topdress lightly with sand matching our profile.”

The spring aeration is planned for the first week in May and the fall aeration for the last week in August, but weather is the deciding factor. Though aerating later in the fall would affect play less, it’s more important for

long-term course conditions that holes heal before the onset of winter. Because aeration equipment is shared between the two courses, Pizzuto alternates the timing based on location convenience. The last to be aerated in the fall is the first to be aerated in the spring.

Fairways, which are aerated in the fall only, are perennial ryegrass and *Poa annua* with some bluegrass mixed in. Pizzuto uses a tow-behind Ryan aerator with open-spoon tines.

“We won’t start on the fairways until after we’ve finished the greens and tees,” he says. “We can change out our tines for solid-core aerification. Typically, we’ll do that with our Toro unit and hit the greens and tees as needed for stress relief and better water penetration. With our native sandy soils, compaction is less of an issue so this ‘plain Jane’ program has worked very well for us.”

WELL WORTH IT

The Homestead Golf Club in Lakewood, Colo., is an 18-hole public course that opened in 2002. The links-style course has heavy-clay native soil. The greens are 90 percent USGA spec sand and 10 percent Dakota peat topped with bentgrass. Originally, the tees and fairways were seeded with a mix of low-grow Kentucky bluegrasses and 10 percent perennial ryegrass. Since then, the tees have been overseeded with ryegrass.

“Heavy clay soils and excessive traffic/compaction are

One trend Bob Vavrek of the USGA Green Section sees is close-space aeration, as superintendents try to pull out twice as many cores for twice as much benefit.
Photo: Steve Trusty



Superintendent Judd Pittler at Hannastown Golf Club uses one-quarter-inch quad tines on the bentgrass greens in the spring and fall. He also has added an 8- to 10-inch-deep, solid-tine aeration in the fall. Photo: Barry Reeger

the overriding factors in our aeration program," says Mark Krick, CGCS. "In the spring, we aerate wall to wall. We use five-eighths-inch coring tines on greens and three-quarter-inch coring tines everywhere else. We tackle nine holes at a time, closing down that half of the course for a day. We collect the cores using a standard Cushman core harvester on all greens and most tees. Manual harvesting is required for those tees with extreme contours."

Krick works in conjunction with Bruce Nelson, CGCS, of Fox Hollow at Lakewood to supply their cores to a local composting company, which combines them with sand and humus to produce a ground compost material suitable for topdressing. It's provided to the two courses at a discounted price.

After harvesting, Krick uses a triplex unit with the Thatch-Away Supa System Verti-Cutter head, which can get down to one-sixteenth of an inch on a verticut reel to clean up any remaining debris.

"We'll topdress the greens with the 90:10 mix of sand to peat that matches the soil profile," he says. "The tees are topdressed with a sand and compost mix. Occasionally, we have topdressed our shorter stretches of fairway, but the results didn't justify the cost and time involved. We follow up with an application of fertilizer and soil amendments – usually gypsum – on the entire course. Amendments and respective rates are

based on soil test results."

Krick aerates the greens, tees and roughs in the fall, generally starting near the end of September and depending on current weather conditions and long-range predictions.

"If we wait too late in the season, we'll have too little healing to avoid desiccation around the hole entry," he says.

Krick augmented his coring program with vertidrainage, in which solid tines are used. He's followed the reports about using needle tines, but sees them as a better fit for those with sandy soils.

"The coring process is very labor intensive, but going into our fifth year, the results have proved to me that it's worth it," he says.

SANDY SOIL'S BENEFITS

Wild Horse Golf Club, a 9-year-old, 18-hole public course in Gothenburg, Neb., has native soil that's primarily a fine sand with little silt or clay. The greens are bentgrass; the green surrounds are a fine fescue with some creeping bentgrass mixed in; and the tees and fairways are a bluegrass/perennial ryegrass mix.

Josh Mahar, CGCS, generally aerifies the fairways, greens surrounds and tees in April and then again starting in late August and going into September, depending on the weather. He uses a Toro ProCore 880 with one-half or five-eighths-inch, side-eject hollow tines. Usually, he uses the five-eighths-inch tines.

"We allow the cores to dry down and then drag them with the metal keystone drag," he says. "After that, we'll go over the area using our deck mower set as low as it can go. By then, the area is pretty clean. Our sand breaks apart so easily that by a couple mowings it's hard to tell we've core aerated. Our golfers might notice it while we're in the process of aerating, but surface disruption is minimal, and it doesn't have much effect on play."

Mahar times fertilization shortly after aeration, basing the formula and application rate on soil test results. But he takes a different approach with the native-soil greens.

"For the past eight years, we've been managing them primarily with consistent topdressing, pulling matching material from one of the hillsides," he says. "We use a light application, ranging from one-sixteenth to one-eighth of an inch, every two weeks. We topdress, brush in the material with a cocoa mat drag and mow again

to clean up anything that's been pulled to the surface by the drag."

Mahar started using needle tines on the greens about four years ago. Before that, he used only the five-eighths- and one-half-inch tines.

"We install the needle tines on our Ryan Greensaire 24 and use them once or twice a year, but only as needed on the dry spots, not the entire green," he says. "It increases water penetration, and there's virtually no surface disruption."

APPRECIATIVE MEMBERS

Judd Pittler became superintendent of Hannastown Golf Club in Greensburg, Pa., in February of 2006. The original nine-hole course has 10 push-up *Poa annua* greens (one practice). The tees are predominantly *Poa*. A second nine holes were added about 10 years ago and include USGA greens that are primarily bentgrass with some *Poa* encroachment and modified-soil bentgrass tees. All fairways are clay-loam native soil with a mix of *Poa* and bentgrass. There's more *Poa* on the original course and more bentgrass on the new nine.

"For some reason, the new greens weren't aerified during the first three or four years, so there's a large organic matter buildup in the top 2 inches," Pittler says. "The two previous superintendents attacked that aggressively with aeration and used verticutting to reduce the thatch. I've adopted similar strategies, using one-quarter-inch quad tines in the spring and fall. We collect the cores using a core harvester attachment on a Cushman. The actual mix for the new greens used a sand particle size that's a little large. To avoid choking them off with too much finer sand, our topdressing is straight silica sand with an 80:20 ratio of large to small particles."

Pittler is incorporating sand into the older soil greens to bring the two nines closer agronomically. Along with the spring and fall quad-tine aerification and topdressing, he has used sand injection with the DryJect at least once the past two years.

"We've also added an eight- to 10-inch-deep, solid-tine aeration in the fall," he says. "We've used needle tines on all the greens in July to alleviate compaction and increase oxygen and gas exchange in the root zone."

During Pittler's first season, the greens showed some disease activity when they emerged from winter.

Comparing tools for customized cultivation

> During his golf course visits, Robert C. Vavrek, Jr., senior agronomist for the USGA Green Section north-central region, sees many maintenance trends. One of them is more customized cultivation for a particular problem or goal. There are many new options available with tine types, penetration depths and spacing, and other cultivation methods that superintendents can consider.

"While superintendents generally use hollow tines for organic matter management, they might attack compaction with water or sand injection, or deep-tine treatment," Vavrek says. "With the new options, one of the trends is more close-space aeration, trying to pull out twice as many cores for twice as much benefit without spending more time on the operation."

One factor that always seems to affect aeration is golfers' rising expectation levels.

"They're less willing to accept playing surface disruption, especially on the greens," Vavrek says. "In response, we see superintendents substituting one type of cultivation for another, seeking less disruption, but increasing the number of cultivations within a season hoping for the same results."

With so many variables throughout the regions of the country in weather issues, seasons of play, and soil and turf types, it becomes increasingly important for superintendents to analyze cultivation options to determine what each can realistically accomplish in terms of their courses' specific needs, Vavrek says.

Editor's note: As well as direct consultation with the USGA Green Section staff, resources addressing cultivation issues can be found in the archives of the Green Section Record including: "Customized Cultivation," by Bob Vavrek, September/October 2006; "Aeration and Topdressing for the 21st Century," by Pat O'Brien and Chris Hartwiger, March/April 2003; and "Core Aeration by the Numbers," by Chris Hartwiger and Pat O'Brien, July/August 2001.

"We wanted to reduce abrasion on the tender turf, so instead of using brushes or brooms following topdressing, we used a push blower to blow the sand down into the holes," he says. "We didn't get any bruising, and it cleaned up well. It only took two people, rather than the eight to 10 for the other methods – a great advantage with our limited budget and crew size. Obviously, we've continued that procedure."

Pittler is using standard half-inch coring tines on the tees along with aggressive verticutting and slicing on the newer nine for thatch removal. Cores are collected on both sides.

"Our season usually runs from March to early November," he says. "Last year, mild weather extended play into January, so we weren't able to topdress the tees as planned."

Fairways are an issue at Hannastown, however, because they haven't been core aerified for more than 10 years.

"Fairway work has alternated between the Aerivator at a 4- to 5-inch depth and the AerWay slicer," he says. "We'd need to contract out for core aerification, but we're trying to work it into the budget."

Pittler found the multiple options for aeration are a great asset to his turfgrass management program.

"With the quad tines, we're getting coring benefits, but with less surface disruption and faster healing," he says. "With the deeper needle tines, there's essentially no surface disruption. These tools allow us to aerate more frequently and accomplish our goals with minimal inconvenience for the golfers. Our members really appreciate that." **GCI**

Steve and Suz Trusty are freelance writers based in Council Bluffs, Iowa. They can be reached at suz@trusty.bz.



Rx FOR HEALTHIER TURF

GROOMING PROMOTES VERTICAL GROWTH

STORY AND PHOTOS
BY DAVID WOLFF

Simply put, turf grooming is a means of managing turf's growth habit to provide a quality, healthy plant. The process uses narrow vertical blades (thin kerf) to clip the advancing growing point of turfgrass periodically.

Grooming is the easiest, most stress-free way to promote vertical growth in golf course turf, says M.C. Engelke, Ph.D., a professor and faculty fellow at the Texas Agricultural Experiment Station in Dallas, which is an agency of the Texas A&M University System. Groomer use helps eliminate grain, smooths irregularities and makes individual blades stand erect for consistency and better play. Regular groomer use will foster thicker plants and healthier, more robust turf.

"It's important to distinguish grooming from vertical mowing," says Engelke, who's also a consultant to Jacobsen specializing in the identification, production and maintenance of turfgrass. "Both processes

use vertical blades, but from a biological standpoint, this is where the similarities end. Verticutters use rotating vertical blades, which penetrate deep into the crown area of the plant, and possibly below, severing stolons and stems. This generally provides an effective means of reducing or removing thatch.”

Groomers are lightweight versions of verticutters, and they help reduce grain and lift turf for a cleaner cut. This is accomplished by setting the blades at or slightly above the height of cut (bedknife setting).

“From a biological standpoint, however, adjusting the blades to just below the height of cut (initially not to exceed 10 percent below the bedknife) provides stimulus to the plant to initiate new growing points,” Engelke says. “The rotating vertical blades sever the expanding culm (stem), remove the plant apex (growing point) and force the crown to generate a new bud.”

LIGHT SCALPING

Turf grooming can be compared to light scalping but on a much-reduced scale. Using one-half-inch spacing between vertical blades that are one-eighth-inch thick results in about 3 to 5 percent of the culms being clipped during each mowing. Each grooming “scalps” a fraction of the turf, which is staged in a timed recovery response.

“By repeatedly using groomers, the entire turf community is eventually forced to be in a rejuvenated state with new growth from the crown of the plant,” Engelke says.

Grain occurs when the culm or stem is allowed to elongate and lean a particular direction with the growing point at the cut end of the stem. If the stem is removed periodically and new growth is initiated from the base of the plant (crown), the subsequent growth is forced to be more vertical and less prone to developing a grain and less prone to scalping.



At Red Hill Country Club, superintendent Craig Kimmel uses turf groomers on his walk mowers for greens and collars, and on three fairway mowers.



At Palos Verdes Golf Club, Pat Gradoville, CGCS, cuts kikuyugrass fairways three to four times a week and uses turf groomers every other mowing.

Besides altering the way the plant grows, the position of the growing point is changed also.

“With the extending stem being severed (scalped), the plant will initiate new growing points at the crown,” Engelke says. “Repeated mowing with turf groomers encourages and conditions the plant and turf to grow tighter to the soil, making for a firmer, more open canopy. This open canopy aids in escape of excess moisture and provides a healthier, more resilient turf.”

OVERSEEDING REQUIRES GROOMING

Turf grooming can be critical especially prior to overseeding. When ambient air and soil temper-

atures decline during the fall, the plant begins to store carbohydrates in the roots, rhizomes and stolons. This helps with winter survival and spring green-up and transition.

With the acceptance of overseeding warm-season grasses with a cool-season grass such as *Poa trivialis* or perennial ryegrass, it has been a standard practice to verticut heavily and even scalp the turf. Scalping is accomplished via a verticutter, flail mower or reel mower set low enough to remove excess plant material.

“Not only is this a laborious task, but it also disrupts the course, creates considerable debris that must be removed and, more importantly, reduces the plant’s ability to store additional carbohydrates for winter survival,” Engelke says. “In many cases, it also will force the plant to use much of its stored carbohydrates just to finish out the fall growing season.”

A three-year grooming study conducted by Engelke resulted in improved turf health, fall color retention and spring green-up. The need for extensive fall preparation for overseeding was reduced, providing a superior turf during the fall and spring transition with improved winter survival.

“Grooming is a proactive cultural practice that supports maximum turf health and performance throughout the year when done routinely,” he says. “All stoloniferous and rhizomatous turfs have been demonstrated to benefit from routine grooming regardless of the height of cut.”

TAMING KIKUYUGRASS

Several golf course superintendents have had success since they started grooming their turf. Pat Gradoville, CGCS, grows kikuyugrass in the fairways at Palos Verdes Golf Club in California and says the species is a good thatch builder.