Using Turf Fans in the Northeast

Limited air movement isn't just a southeast or transition–zone problem.

BY ADAM MOELLER AND BRETT CHAPIN

Putting greens with poor air movement caused by dense tree or shrub plantings, high mounding, or being located in a low-lying area are prone to turf decline without the use of large oscillating fans.

Imagine yourself playing golf with friends or family on a warm summer day. Everyone is enjoying the game and then you get to that one green. Suddenly the air feels stagnant and hot, you start to sweat more, your clothes stick to your body, and you can't wait to get to the next hole, where there always seems to be a nice cooling breeze. Now imagine staying on that green the whole day, throughout the entire summer, with endless hot, humid days without any relief from a cool breeze. Pretty miserable, right? Well that's exactly what the putting green turf suffers through when it is located in a microclimate that has limited air movement.

The microclimates in which putting greens are located play a major role in the superintendent's ability to produce good golf conditions. Many articles have been published in the *Green Section Record* about the negative effects that shade have on putting greens, but only a few articles discuss the consequences of poor air movement.

Research and field observations are very clear that putting greens can be greatly improved with the use of fans because of the cooling effect on the turf canopy, soil temperature, and increased root development (Duff and Beard, 1966; Guertal et al., 2005). Fans also help to dry the soil and reduce turf leaf wetness duration, reducing pathogen pressure. Using a fan to dry the surface improves putting green wear tolerance, too. Oppressive heat and humidity make it next to impossible to grow healthy creeping bentgrass or *Poa annua* putting greens during the summer in the Southeast Region and transition zone if air movement is limited. As a result, most golf courses in the Southeast that have creeping bentgrass or *Poa annua* rely

Fans on portable trailers offer flexibility to improve air movement at many green sites.

on fans to keep putting greens healthy during the summer (O'Brien, 2009).

Farther north, the use of fans has slowly become more common in the past decade, but many facilities are still hesitant to install them. So why is there still resistance to the use of fans in the Northeast? Cost of fan installation and operation is one reason. The perceived disruption to the game of golf and their unattractiveness probably play a bigger role. Finally, many golfers still feel that fans are necessary only in the Southeast or transition zone and not important in the Northeast. This couldn't be further from the truth.

Obviously, the Northeast doesn't experience periods of heat and humidity for the same duration as the Southeast or transition zone, but that has no bearing on whether a fan is necessary. Instead, these conditions suggest that fans need not be operating for as long a period in the Northeast. For instance, fans run in the Southeast from May through October, while the Northeast may need fans only during June, July, and August. The bottom line is restricted air movement leads to poor putting greens in all parts of the country. It's not just a Southeast or transition zone problem.

EVALUATING AIR MOVEMENT ACROSS PUTTING GREENS

Some putting greens are obvious candidates for fans if they are encircled by dense vegetation, are pocketed, or are located in low-lying portions of the golf course. Evaluating air movement is easy to do with the use of hand-held wind meters that measure wind velocity. Next, determine air movement direction with a smoke bomb or similar device (Zontek, 1992). Correlate this information with past green performance and it should be easy to identify which microclimates are in most need for additional air movement. Turf canopy thinning, algae, disease, and excessive moisture retention are common maladies of putting greens with poor air movement to look for during the evaluation process. Keep in mind that fans are not a substitute for tree removal, but some microclimates could require the removal of hundreds of trees to improve air movement, which is why fans are so beneficial.

FAN PLACEMENT IS KEY

Fan technology has remarkably improved since their early use. Small, loud fans that improved air movement over a small area have been replaced with large, quiet fans that can improve turf conditions over a much larger area through slow oscillation. Fans work similarly to automatic irrigation heads.

Fans should be located close enough to the green that air movement is improved across the entire surface. The fan angle and height should be thoroughly evaluated so that air movement is adequate at the turf surface.

Air movement is greatest near the fan and declines gradually farther away from the fan. Consequently, fans can be misused when poorly placed. Fans installed far away from putting greens to camouflage their existence usually benefit the rough near the green complex but provide little, if any, improvement to the green. Don't fall into this trap. Just because larger fans can improve air movement over a bigger area doesn't mean they should be placed farther away from the surface. If the fan is farther than 20 feet from the green surface, it's not likely to benefit the entire putting green. Also, fans should be placed in the area that is most in need of air movement. All too often, fans are hidden so players don't see the fan from drive zone. Sometimes this works, but in most situations a fan placed directly behind the green (in clear view) is most beneficial because the oscillation will allow for the entire green to benefit. Portable fans installed on easily moveable trailers are a relatively new method to use fans when and where necessary. Like permanent fans, though, they need to be close to the putting green to improve air movement significantly.

Fan height is usually 10 feet or less to maximize air movement across the surface of the green. The angle of the fan also should be considered to maximize the benefit. Seeing the moving flag on a flagstick is a good sign, but the air movement at the turf surface could still be stagnant. During installation, place irrigation flags throughout the green so that the miniature flags are three inches above the turf surface. Adjust the fan angle according to the movement of these flags. In most instances, this requires the angle of the fan to be pointed toward the turf more than you would have otherwise. The ultimate goal with fans is to increase air movement by 3-5 mph across the entire putting surface. If this isn't achieved, adjust the fan placement, height, or angle as needed.

Surface temperature on a green with poor air movement (left) compared to a green located in an open environment with good air movement (right) can be very different, leading to poor turf performance in many instances.

FAN USE

Fan use is most needed during the summer months, but stressful weather in the spring has been common in the past few seasons, so don't wait to get them set up. Running fans 24 hours a day during periods of heat and humidity is common. If fans can't be used for 24 hours, operating them from evening to early morning hours may offer the most benefits with respect to alleviating heat stress and increased rooting (Haung et al., 2001).

CONCLUSION

The summer of 2010 was extreme and putting greens with poor air movement suffered throughout the Northeast. Many facilities learned the hard way that fans can make the difference between a good golf season and a terrible one. The agronomic benefits of fans cannot be disputed. The game of golf is played on grass, and fans may be necessary to produce healthy grass on golf courses, even in the Northeast. You might even play better golf on that green that used to make you uncomfortably hot and sticky in years past.

LITERATURE CITED

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A Case Study at Redding Country Club, Conn.

The putting green turf has improved greatly at Redding Country Club since the installation of fans.

The Redding Country Club in Redding, Conn., opened in 1973 with a challenging layout through dense woodlands and rolling hills. The dense woodlands that brought beauty to the property continued to mature and started to cause poor growing conditions for the putting surfaces. Air movement became minimal and turf was lost on a yearly basis. Brett Chapin became the superintendent in 2006 and quickly realized that it would be extremely difficult to meet his members' expectations without adjusting the microclimates around several putting greens.

DECISION TIME

USGA Green Section agronomists, Mr. Chapin, and key club officials evaluated all of the putting green microclimates during a Turf Advisory Service visit. It was very evident that the microclimates had reduced sunlight and air movement, and tree removals and fans were necessary to meet membership expectations and have reliable, healthy putting greens. In 2007, the decision was made to provide additional sunlight by way of tree removals and purchasing five turf fans. During the winter of 2007, hundreds of trees were removed and the search for the right fans began. A source of power on the western portion of the property was not available, and the cost to run electricity to this area of the golf course was very high. At that time, Turf Breeze was the only company in the market with a gas-powered fan. The fan was 50 inches in diameter, internally held a 16 hp engine, and was capable of pushing wind 3 mph over a 150-foot radius. It was determined that the coverage would be sufficient for the 5,000-square-foot-average putting surfaces. The fan came with a stand that would be secured in the ground, and the fan would have to be brought in and out each season with a large backhoe and stored inside for the winter.

THE FIRST TEST

During the spring of 2008 the fan bases were installed by maintenance staff employees. The bases were small, less than three square feet in size, and the fans were transported to the bases in early June. Immediately, questions were being asked and the fans were being talked about by the golfers. *Did we need to buy such large fans? Do we need five? Do we need more than five? How loud are the fans? What happens if my golf ball hits a fan?* The fans were started when the summer humidity and stagnant air arrived in late June. Golfers were excited to feel a breeze on a warm day and noticed that the quiet, constant sound didn't affect their concentration or conversation while putting. Suddenly, the membership was raving about the fans. Throughout the month of July the fans ran for up to 24 hours if it was determined necessary. Then the unexpected came — a trip from the local zoning enforcement officer and the Connecticut Department of Environmental Protection (DEP).

FAN CHALLENGES

Although relatively quiet, noise complaints from neighbors required some education and subtle adjustments in how the fans were used. The decision was made not to run the fans before 8 a.m. and have the fans off by 5 p.m. to minimize disturbance to the neighbors. Ideally, we'd like to run the fans for 24 hours, but making these concessions has allowed us to run them enough for our situation. Fans were also adjusted to keep the rear of the fan, where the engine is stored, from aiming toward neighborhood homes.

The next challenge came soon after, when a neighbor asked how the fans were permitted to stand alone as a "permanent structure," which violated a local regulation. A decision was made to purchase five fan trailers from Turf Breeze, a concept designed for mobile fans in sports arenas or practice fields. The five trailers arrived in May of 2009 and the maintenance staff worked quickly to put the fans on the golf course in the exact locations of the permanent bases.

THE RESULTS

The Redding Country Club utilizes the fans on a daily basis in the summer months. Removal of trees has reached more than 1,000 since the project began. Air movement has greatly increased and so has the turf quality. There has not been turf loss on a putting green since the fans have been purchased. The putting surfaces that struggled in the past, due to the microclimates, now thrive with the help of air movement, drier surfaces, and improved growing environments.