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TURFGRASS TRENDS

GREENS MANAGEMENT

Cruisin' for a Bruisin'

Ball marks — they're everywhere one looks, controversy swirls around their repair, and golfers don't always chip in to alleviate a growing problem

By Randy Kane

Complaints about the severity and longevity of damage from ball marks, or ball bruises, have been increasing over the last few years. The trend is probably correlated to changes in the game and its equipment, such as high-tech urethane-covered balls that spin more, perimeter-weighted game improvement clubs that hit the ball higher, and just more (perhaps lazier) golfers.

Problems with ball marks may also be increasing with our evolving greens management practices, such as increased amounts and frequency of sand topdressing, ever-lower mowing heights, frugal nitrogen rates and reduced irrigation. Of course, all of these things are done to get a firm, fast, consistently smooth putting surface for today's demanding golfers, so perhaps problems with ball marks are just another trade-off for these management trends.

As the ball mark topic gets hotter, it seems to get more controversial as well; there are even conflicting views about how to fix the marks and what kind of tool to use to do the deed (no lifting!?). Also, there are many claims that the newer, dense semidwarf bentgrasses are more sensitive to ball bruises and are slower to heal once bruised.

Many superintendents have given up altogether and are just plugging out bruises, sometimes even going to the trouble of replacing the small plugs with new grass — a tedious chore indeed.

Ball mark repair is becoming expensive, as most superintendents have crew members and man-hours devoted to ball mark repair, either as part of the morning mowing activity or as a separate, trained employee who custom-fixes ball marks. Many superintendents have given up altogether and are just plugging out bruises, sometimes even going to the trouble of replacing the small plugs with new grass — a tedious chore, indeed.

Why does everyone fret so much about ball marks anyway? They are just another part of the game — along with divots, car traffic, footprints and mosquito spray.

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Why does the seemingly innocuous ball mark on the left turn into the slow-to-heal ball bruise on the right?

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Actually, ball marks can be disruptive to the quality of the putting surface, no matter how many times you try to repair or smooth them as they heal. Greens with heavy ball mark damage can be uneven and bumpy, plus the purple to brown spots all over the surface don't add to the visual appeal. Perhaps just as important is the concern that thin, slow-healing ball marks act as entry points for weed seeds (like *Poa annua*) or moss spores. The ball mark problem can certainly be a bad one, but it's not going to go away until the golfers do. We don't want that, do we?

Impact and injury

Golf holes that require a short-iron approach are the most likely to have concentrated ball mark damage, most often in the front third of the green.

A short- to middle-iron approach may land on the green at speeds up to 60 mph to 70 mph, with a rotation rate of 2,500 rpm to 3,500 rpm. The direct force of the impact of a 1.62-ounce golf ball hitting the green surface at 60 mph can severely injure turf leaves (crushed cells leak water and nutrients) and often causes a depression and pushes up a "hill" of turf in the direction of travel. If the surface is especially firm, only a small dent may form with no raised turf.

Although the speed and angle of descent contribute to the severity of the ball mark, the spin rate of the ball may be even more important. It seems likely (I have no proof) that more damage is done by a high spin rate impact, especially on new greens with little or no developed "mat" layer, or on recently (or regularly) sand-topdressed surfaces.

How many times have you seen sharply struck short iron shots hit heavily sand-topdressed greens with an explosion of sand and leaves? Even if carefully repaired, these ball marks will leave a distinct, mostly dead scar,

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especially during hot, dry weather in summertime. (The leaves are shredded by the impact and quickly wilt and die.) These ball marks will be slower to heal as well, since the dryness and high surface soil/sand/mat temperatures of summer will keep new shoot and leaf growth from developing.

If ball marks were consistent in size, shape and amount of turf displaced, they might be easier for golfers to find and fix, and for superintendents to deal with. Unfortunately, ball marks are highly variable, due to many factors (golfer related, and turf related). The distance the shot travels, club selection and angle of descent into the green all vary with each individual shot. Ball marks also vary greatly based on the agronomic character of the greens, moisture content and their day-to-day management.

The distance the shot travels, club selection and angle of descent into the green all vary with each individual shot. Ball marks also vary greatly based on the agronomic character of the greens, moisture content, and their day-to-day management.

A new, sand root zone (USGA-type) green with thin, less-established turf will probably have much more disruptive ball-marking than an older, push-up soil green with a dense turf and a well-developed mat and thatch layer. Greens that are maintained at very low mowing heights with minimal nitrogen and with light frequent PGR applications will likely suffer differently from ball impacts than higher-cut, well-fed greens that are not under growth regulation.

Bruisin' the new bentgrasses

Which brings us to the next topic of concern: the vigor and recovery rates of the newer, semidwarf creeping bentgrasses. Varieties such as Penn A-4 and L-93 have higher shoot densities and a finer leaf growth habit than old standbys like Penncross and Pennlinks. On these new greens, a dense, soft mat and thatch layer may quickly develop during grow-in. So even though lower cutting heights and fast green speeds can be maintained, these greens can get soft and spongy. Therefore, the amount and frequency of sand topdressing has been increased to try to firm the surface organic layers.

Often the sand applications start soon after establishment, well before a new green is even open for play. Ball bruising on new greens managed in this way has been very severe and has led to a lot of negative comments from golfers, superintendents and the industry press.

There have been a few research projects that have tried to answer questions about the initial damage and recovery rates of newer vs. older bentgrass varieties, including some meager attempts by the author a few years ago at the Cantigny research site. Perhaps the best study to compare ball mark recovery rates was recently published by professor Jim Murphy and his cohorts of Rutgers University. Summaries of this research can be found in *Golf Course Management* (December 2003) and the *Green Section Record* (July-August 2003).

Murphy built a gas-powered "gun" to shoot golf balls into putting green height test plots, then measured initial injury and recuperative ability of 15 bentgrass cultivars, including a couple of velvet bents. The study was conducted in such a way as to remove confounding construction and management variables — they really only wanted to look at the contribution of genetic variability among the grasses. It is notable that the research green they used was only in its second year of establishment but was not heavily topdressed with sand.

Not surprisingly, Murphy's group found less initial damage and more rapid turf recovery on the newer bentgrass cultivars (including the new velvet bents) than on older, Penncross type grasses. Their study also included factorial treatments of simulated wear and compaction, which were found to increase initial damage and slow recovery from ball-marking. The study was initiated in 2001 and repeated in the summer of 2002, and the second year's data showed that the additional year of maturity for all the grasses lessened the damage from ball marks.

The authors suggest that, in most cases,

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two or more years of growth are required to allow root zone stabilization and a sufficient mat to form in order to resist the damage from the combined impact and spin of golf balls.

Alleviate damage

There are two main reasons you might have a significant or abnormal amount of ball mark damage:

- the initial strike of the ball is seriously harming the turf, or
- it takes an inordinate amount of time for the ball mark damage to heal.

If you can identify which issues are causing the damage or slow recovery rate, addressing those issues should alleviate the ball mark problem and assuage angry golfers.

Immature or poorly developed turf, lack of sufficient mat, or too much sand at the surface can lead to severe ball impact injury on greens. Low nitrogen rates or other fertility or soil salts problems also could be contributing to weak turf. Striving to keep greens firm and fast by withholding water or nutrients (or piling on sand) may contribute to excessive ball mark injury and slow recovery — especially in the heat of summer.

Maintaining a balance between what is good for green speed and what is good for turf is part of the "art" of putting green management. Having a robust, healthy, resilient turf will not only ease ball mark damage but will help with other turf issues, such as traffic stress, heat stress and diseases.

What about ball mark repair? Are golfers really to blame — either for not fixing marks or for fixing them incorrectly and increasing the damage to turf? It's always easy to point the finger at someone else, but in this case most of the complaints about golfers are accurate. An unrepaired ball mark, or one that sits for several hours in the sun (or overnight), is going to heal much more slowly than a well-repaired mark.

Mowing machines with bench settings of .1 to .15 inches will usually scalp unrepaired or poorly repaired marks, thus adding insult to injury — which is why many crewmen repair ball marks before cutting greens in the morning.

What about ball mark repair tools and the prescribed methods we have today? Are some golfers, who are attempting to do the right thing, actually doing it all wrong? Poking a tee or two-inch fork in the ground under a mark and lifting it straight up will usually tear roots from shoots, and could lead to some mower injury.

The GCSAA-backed method of poking the fork in the sides of the mark and twisting the turf toward the center could also be quite damaging, not only to roots but also to stems and stolons.

Gentler methods are needed, especially on newly established greens or those with thin, weak turf.

A new ball mark repair system has been developed by Danny Edwards of Royal Grip and PGA Tour fame, called the GreenFix Golf System. A small, more oval shaped "fork" is attached to the butt end of a putter grip, and a short, nontwisting jab around the mark is the recommended action to repair turf without tearing roots.

Having a robust, healthy, resilient turf will not only ease ball mark damage but will help with other turf issues, such as traffic stress, heat stress and diseases.

Getting golfers to use this tool effectively before putting out will be the trick, but at least they don't have to bend over anymore.

Randy Kane has been the director of Turfgrass Programs/Turf Advisor for the Chicago District Golf Association since 1985 and an adjunct assistant professor in the department of natural resources and environmental sciences at the University of Illinois since 1992. He has a Ph.D. in plant pathology from Cornell University, and a B.Sc. in turf management from Purdue.

Disclosure: *Neither Randy Kane nor the CDGA has commercial interests in any product mentioned in the article; this article is based solely on observations and opinions of the author and Illinois golf course superintendents. No research has been conducted by the author to support the views expressed herein, and no funding has been solicited or received to study this topic.*

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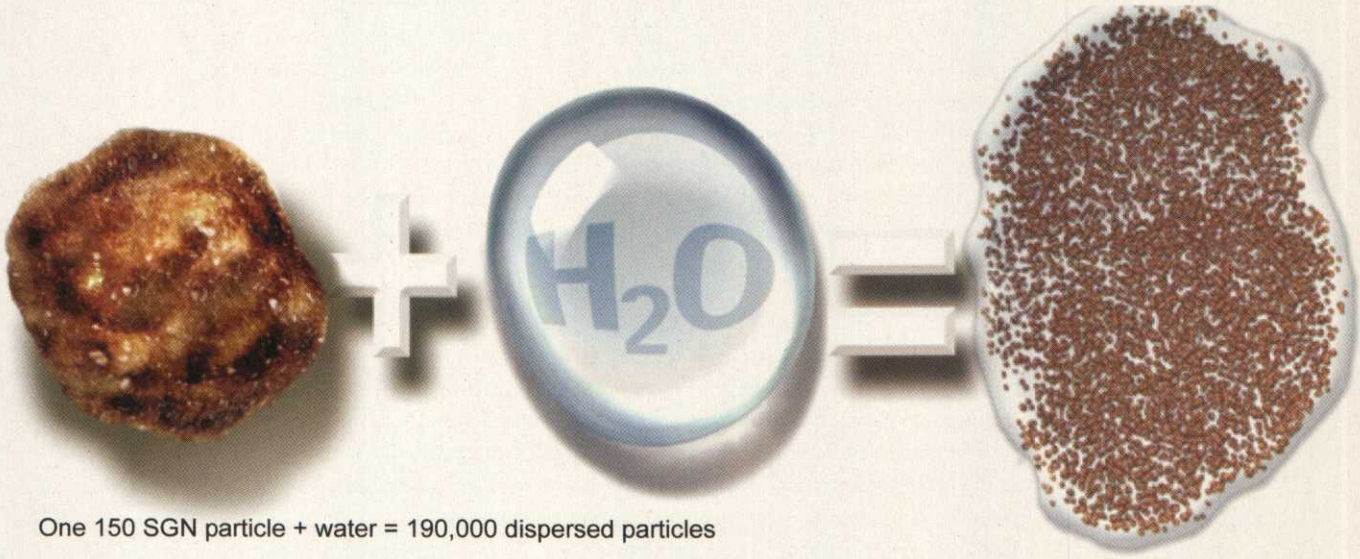

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Bentgrass Cultivars Face Dose of Putting Green Reality

By Dan Dinelli, Certified Superintendent

Selecting the best cultivar relates to the level of commitment and resources available at each site.

Recent bentgrass tests were conducted here at the North Shore Country Club (NSCC) in the Chicago suburb of Northbrook. Cultivar differences in seedling vigor, green speed and general quality ratings were formally assessed in the five-year study.

I feel very fortunate to have been part of the on-site putting green bentgrass evaluation project sponsored by the National Turfgrass Evaluation Program (NTEP), United States Golf Association (USGA) and Golf Course Superintendents of America Association (GCSAA). The goal of the study was to evaluate the performance of bentgrass cultivars under real-world putting green conditions.

The green serves our members and guests as a putting and short-game practice facility, complete with two green-side bunkers and a 70-yard bentgrass fairway. Since completion of the five-year data collection period, Tom Voigt from the University of Illinois has accumulated much useful information.

Selecting a cultivar or blend of cultivars for putting green use is very important and not a simple task. Many considerations must be studied for long-term success. Soliciting information from several resources is often the best approach to understand a cultivars personality. Data from NTEP, researchers at universities, turfgrass breeders, turf pathologists, sod farm growers, turfgrass seed producers and fellow superintendents all contribute to understanding cultivars needs, strengths and weaknesses.

Lessons learned the hard way

I recall that when the C-15 decline (*Xanthomonas campestris*) hit in the early 1980s, it was our first known bacterial blight on turf in the Chicago area. Many Toronto C-15 putting greens were affected and succumbed to this disease.

One lesson we learned was about the possibility of potential problems due to planting of cloned monocultures. At North Shore, we had 11 putting greens, collars, nursery turf and tees growing Toronto C-15. However, only turf grown under the stress of putting green conditions succumbed to the disease.

Most superintendents growing C-15 greens looked to regrassing. Seaside, Emerald, Penncross and Penneagle were the seeded cultivars from which to choose. After we consulted with experts, it was recommended that we replant greens with Penneagle creeping bentgrass.

This was a pressure job. North Shore was to host the 83rd U.S. Amateur. The theory was Penneagle's fine texture, upright shoot growth and reduced thatch potential would produce the highest-quality putting surface. Because it was fairly new to the market, expert understanding of Penneagle's nature was gained from nursery trials. Clubs in the area started to plant Penneagle on their greens.

In a few years, Penneagle's lack of vigor demonstrated poor putting surfaces when grown under the stress of putting green conditions. Here was another tough lesson learned the hard way.

Ball mark recovery, wear from play (golfers wore metal spikes then) and *Poa annua* infestation all became highly problematic for Penneagle. Penneagle is no longer considered a turf for putting green use but one of the better performers for fairway use. Many of these lessons could have been learned under the rigors of putting green trials.

Challenges with on-site testing

Anytime one is doing a test, one major challenge is to be fair when maintaining the various cultivars grown. I was instructed to maintain the green as one of the 18 greens used in regulation. This in itself was challenging, for the other 18 greens are mostly *Poa annua* growing on a "pushup" rootzone.

However, I understood the goal and viewed the putting surface as a product needing to be comparable to those greens played in regulation.

There are officially 18 cultivars growing in the trial at NSCC. Living in the world of researchers, one learns of the forced compromises in field eval-