

Milestones in Golf and Turfgrass Management

Products, programs, and procedures that have changed the game of golf and turfgrass management.

BY STAN ZONTEK

As someone who has visited golf courses for the USGA Green Section in three different regions of the country and for more than 40 years, I was asked to develop this presentation on “milestones,” the products, programs, and procedures that have changed golf courses over the years. This list was developed with input from the USGA Green Section agronomists. In the final analysis, these are some of the most significant changes we have seen while visiting thousands of golf courses over the years.

1. New Grasses. When I joined the Green Section in 1971, selecting grasses was easy. For putting greens, there was Pennncross. It was the standard, the best grass available, and the only good seeded creeping bentgrass. The other seeded varieties were Seaside creeping bent, a slightly more salt-tolerant variety, along with Highland and Astoria, lesser-used colonial bentgrasses. It is hard to imagine that early putting greens, prior to the release of Pennncross in the early 1950s, were established from sod, stolons, or weak varieties of mostly imported bentgrass seeds that required a quarter-inch or more cutting height.

The same situation occurred in the South with bermudagrass. Common bermudagrass greens were of poor quality and were replaced with Tifton 328 (Tifgreen). Ultimately, that variety was replaced with Tifdwarf bermudagrass, and now the ultradwarf bermudagrasses have replaced much of what has been grown before. All of these grasses were crop improvements in their purest form.

Putting green grasses have changed dramatically to reflect the desire for more consistent, closer cut, faster, and truer putting greens. Many of these



An example of a modern, well-maintained golf course.

improved varieties were supported by USGA-funded research. The new grasses are a major step forward, especially when one considers that the median green speed in the mid 1970s, when the Stimpmeter was first being calibrated, was 6' 6". Today, fairways stimp that fast. The new grasses are a definite milestone, mostly for the better.

2. New Control Products. In the, “good ole days” spraying greens was simple. You used a tankmix of PMA (phenyl mercuric acetate) and Thiram every week in the summer. Mercury-based fungicides were the standard of the industry for years, and included in this group were cadmium compounds. During the early days of the industry, all of the fungicides were contacts. Today, most of the fungicides are all or partly systemic.

Many of the early metal-based fungicides could best be described as

“general biocides.” That is, they controlled a little bit of everything, including some weeds. It took decades for fungal resistance to develop, and even then, it was a minor problem. With the onset of upwardly mobile, single-site systemic fungicides like DuPont’s Tersan 1991 (Benomyl), concerns about fungal resistance became a reality. Today, the control products are far less toxic, provide longer periods of control, have far shorter residuals, and generally have fewer side effects than the chemicals used years ago. Today’s fungicides are safer to the environment, are targeted for specific problems, and are effective in the work they do. Almost no metal-based fungicide chemistries are used today, and that’s for the better. Improved products to control fungal diseases and insect pests are milestones, too.

3. New Herbicides. During WWII, 2,4-D was developed for broadleaf



Research has developed modern fungicide chemistries that provide excellent disease control with far fewer side effects. The same can be said for herbicide or insecticide products.



A common picture of an early golf course where the putting greens (literally) were all that were irrigated. What was a “good” golf course then is vastly different from what a “good” golf course is today.



Early irrigation systems on many golf courses were quite basic and held together by the ingenuity of the golf course superintendent and his maintenance staff.

weed control. Before that time, most weeds were hand cut, hand dug, or spot-treated using sulfuric acid in a syringe. With all of the available herbicides for use on golf courses today, there are few weeds that cannot be controlled. Today's herbicides are broad-spectrum, have very low use rates, don't drift or migrate into groundwater, and generally allow superintendents to produce weed-free turf under almost all conditions.

4. Better Sprayers. In the old days, greens were sprayed with almost anything — from hand-held spray guns to field jet nozzles and primitive boom sprayers. Almost no protective equipment was used, except for rubber gloves, overalls, boots and a hat. When large amounts of products were to be applied, like lead arsenate, it was applied by hand through a proportioner. This is basically a 55-gallon drum with a motor, a paddle-type agitator, and a pump. Everything to be applied was mixed in the drum; it was filled with water, agitated, and the green was sprayed until the drum was dry. You then moved on to the next green.

Today's sprayers are vastly improved. Many have computers that allow for the precise applications of chemicals when and where they are needed. New nozzle technologies allow for less drift, better coverage, and lower use rates for the chemicals that are being applied. Hand guns are gone and have been replaced with computers. With today's concerns about the environment and safety, it is more important than ever to accurately and efficiently apply chemicals.

5. Irrigation. There was a time when most golf courses lacked fairway irrigation and some even used flood irrigation for fairways. The maintenance staff would open the water hydrant in the rough and dump tens of thousands of gallons of water onto the ground to flood the fairway and then let it dry out. Effective? Maybe, but definitely not an efficient way to use water.

When irrigation systems were eventually installed on golf courses, they morphed to hoses and sprinklers in boxes along the fairways, to single-row center-line irrigation systems with manual snap valves, to future upgrades

where snap valves were replaced with automatic heads. Dual-row systems were developed, with some having basic individual head control, while others had block irrigation patterns, and, eventually, to today's norm — computer-controlled, individual-head control. Early golf course irrigation systems, while effective, were not very efficient. There was a cry that golf courses were being over-watered, and with the irrigation systems of old, it probably was true.

Today's golf courses are irrigated much more efficiently than ever was thought possible just a few decades ago. The type of water used also has changed. Today, an ever-increasing number of golf courses are using recycled water to irrigate their golf courses. The efficient use of water on golf courses, even using soil-sensing devices, is a definite milestone.

6. Lightweight Fairway Mowers (and Clipping Removal). In the good old days, fairways were cut with large, heavy gang mowers. The goal was to mow the fairways as quickly as possible. "Acres mowed per hour" was the buzz phrase. In 1980, golf courses in and around Cincinnati, Ohio, began to mow fairways with lightweight triplex mowers and collected the clippings. This seemed a complete reverse of how fairways were traditionally man-

aged. "Acres per hour" was replaced with inherently inefficient three- and five-gang mowers.

The reason for the change is simple. Turf managers were just beginning to understand the whole concept of "mechanical damage."

Fairway grass was cut by gang mowers, mostly with wheel-driven mowers. That is, as the wheels rotated, they turned gears that spun the reel that cut the grass. Many of the mowers had steel wheels, some had semi-pneumatic rubber wheels, and some even had fully-pneumatic rubber tires, but when these machines moved and turned, grass was bruised, braised, and physically torn up. Large acres of grass could be cut with these machines, but not very well. Also, if there was a desire to have creeping bentgrass fairways (also a new development at that time) then lightweight fairway

mowing and clipping removal were necessary.

As golfers wanted better fairways with lower mowing heights, more bentgrass was being maintained, and the best way to produce high-quality fairway turf was to mow the grass with lightweight mowers.



In the "Good Old Days" roughs were . . . rough. Right or wrong, these areas now receive a much higher level of maintenance for improved turfgrass quality, density, and consistency.

Few golf courses today mow with heavy gang mowers. Pure efficiency was replaced by the desire for better fairway turf that did not die out during the summer. Today, almost all fairway turf is cut by some type of lighter machine that is less damaging to the grass and less compacting to the soil, while providing a better quality of cut.

7. Better Rough Mowers (and Better Roughs). While these are two different issues, they are interrelated. At one time, roughs were really rough — non-irrigated, seldom fertilized, rarely with a complete stand of grass, and most had almost more weeds than grass.

The mowers used to mow roughs were basic at best. Most were pull-behind units, and the tractor ran over and laid down the grass before it was even cut. Oftentimes, the reel mowers had "Blitzer frames" with four blades to a reel. The fewer blades reduced the quality of cut for the grass in the roughs but allowed for better mowing of weeds and seed stalks like dandelions, plantains, and bermudagrass seedheads. Roughs were rough and little was done to maintain them.

This all changed in early 1970s, when golf courses began to improve their roughs. Grub damage was no longer tolerated in these areas. Weeds were controlled, a better stand of grass was grown, and roughs were irrigated and fertilized. Even then, the roughs were cut with pull-behind mowers, and, while the grass was better, playability



There was a time when every golf course mowed fairways with some type of heavy, high-capacity fairway mower. While these machines did a good job of mowing fairways, the desire for closer mown fairways caused the transition to lightweight 3- and 5-gang mowers. Clippings also were removed, which improved how the fairways looked and played. The use of lightweight fairway mowers transformed how these areas played and were maintained.

was not. Then came *The Massacre at Winged Foot*, a book by Dick Shappe. It discussed the 1974 US Open at Winged Foot GC. Part of the reason the golf course played with such difficulty was the Kentucky bluegrass rough. It was allowed to grow in the spring, and if Kentucky bluegrass gets too long, it tends to lie over or lodge. The pull-behind rough mowers simply could not cut the grass, regardless of how many times it ran over the turf (which probably made it worse). The rough was penal, combined with the hard, fast, and dry greens.

After the championship, the only way to cut the grass was to use a rotary mower, and this was a revelation. The vacuum action of the mower sucked up the grass and mowed it at an even, consistent height. Almost overnight, the maintenance of roughs was much better. Rotary mowers, along with all of the other maintenance inputs, resulted in better grass in the roughs; they complemented each other to produce roughs of today — consistent density and the grasses cut at the same height. Is it for the better? You decide.

8. Spoonfeeding. It was not all that many years ago that putting greens were fertilized almost exclusively with granular fertilizers. In fact, greens were fertilized with significantly more fertilizer than they are today. I can remember mowing greens and feeling lucky to make four passes across a green and then dumping the clippings. In contrast,

most putting greens today seldom produce enough clippings to dump clippings once or perhaps twice. The greens of old were cut higher and fertilized and watered more.

As the desire for faster greens developed, two things happened. Grass was cut lower and greens were kept “hungry” by applying much less fertilizer. In retrospect, as conservative as the industry is, it can react and overreact as well. Arguably, over-fertilized greens morphed into under-fertilized greens. Diseases favored by low nitrogen, like anthracnose, exploded. Moss on greens began to replace the grass as the turf lost its density. While the greens may have putted well, the grass was not healthy, and with less density, moss and spike-marking issues became common.

The compromise was a spoonfeeding fertility program whereby small amounts of nutrients were sprayed onto the greens weekly or biweekly. The grass is healthier, density is maintained, and growth is slower (especially in conjunction with a growth regulator program). The greens became smoother, more consistent, and faster without the peaks and valleys associated with fertilizing greens exclusively with granular fertilizers.

Although spoonfeeding greens may seem like a small part of overall turfgrass management, it is not. In fact, some golf courses use similar spoonfeeding programs on their bentgrass

fairways. Using less fertilizer in a more efficient and effective manner is a milestone of maintenance.

9. Growth Regulators. There are few golf courses in the United States today that are not using plant growth regulators (PGRs). Managing the way grass grows, like a spoonfeeding program, seems to make the grass look and play better while reducing total inputs of fertilizer, water, and chemicals to the grass. For example, regulated turf requires less mowing, generates fewer clippings, uses a little less water, has better density, and can even improve the grass plant's ability to handle summer stress. Golf course superintendents have embraced PGRs. They give the turf manager more options, like alternating mow/roll programs during the heat of the summer, while still maintaining good turf quality, playability, and green speed with less stress on the grass. There are other beneficial side effects to using PGRs. With the products, *Poa annua* can be better managed and controlled.

In a unique sort of way, PGRs are chemicals that can make for a more sustainable golf course with lower inputs while maintaining good turf quality in all areas of the course. Integrating PGRs into the routine maintenance of a golf course is a significant milestone.

10. Spikeless Alternatives. Remember when golfers walked on pavement like they were walking on ice



Spoonfeeding is the weekly to biweekly fertilization of putting greens with light rates of soluble fertilizers. The goal is to have an even, consistent growth rate of the grass, which helps provide consistent putting greens. This consistency is deemed important to how modern putting greens are defined and maintained.



Heavy rollers. These early rollers definitely compacted the soil! Today, lightweight rollers are part of how putting greens are routinely maintained. Fears about compaction have been replaced with faster putting green speeds without having to cut the grass too closely. Rolling also provides a smoother putting surface



Soil to sand. Early golf greens were constructed with some blend of modified soil, whereas today's golf courses are constructed (and topdressed) with some type of sand. This is a huge milestone, a change for the better.

and remember the metallic click of the metal golf spike? Remember spike marks and all the Rules of Golf and playability controversies that they created? Well, they are gone (or mostly so).

Alternatives to the metal golf spike are a milestone for golf and grass. Interestingly, the USGA did research in 1958 on turf damage caused by metal golf spikes. It only took 24 years for functional non-metal spikes to become a part of our industry and the game of golf. Golf courses are better without the traditional metal spike.

11. Rolling Greens. What was the first greenkeeping task ever developed for better putting greens? According to Walter Woods, retired links superintendent, St. Andrews Links Trust, Scotland, it was rolling putting greens for smoothness. Like the spikeless golf shoe, it has taken our industry only 100 years to rediscover ways to make putting greens smoother and faster without mowing lower, using less fertilizer, or over-regulating the grass with PGRs. Concerns about compaction from putting green rolling have been dismissed by university research. The rediscovery of rolling greens is a milestone and we can learn from looking back.

12. Soil to Sand. To continue with the theme of rediscovering old techniques, where are some of the best

golf courses in the world? Arguably, they are the links courses that grow on sandy soil. In 1960 the USGA published its first specifications for a sand-based system of putting green construction. These specs were considered radical for their era. Older greens were constructed with clay bases to hold water, due to the basic irrigation systems of that day. At the time the specs were published, putting greens were routinely topdressed with 1-1-1 mixes of soil, sand, and peat. They were heavy mixes, at best. Changing putting greens and tees from a soil-based system to a sand-based system is a milestone rediscovering what old Tom Morris used to tell his assistant, Mr. Honeyman, as they prepared their topdressing and construction mixes using beach sand mixed with leaf composts: "More sand, Honeyman."

Fairways are now routinely topdressed with sand, including some on the Old Course at St. Andrews. Today, fairways are being sand capped in new construction, and it is hard to find topdressing or construction mixes that are not predominately sand.

13. Construction Specs. Prior to the publication of the original *USGA Specifications for a Method of Putting Green Construction*, scientifically based construction guidelines did not exist. Today, the *USGA Guidelines for Putting Green Construction* are recognized worldwide as the standard for the industry.

14. The USGA Green Section and University Extension Programs. The establishment of the Green Section in 1920 as a turfgrass research arm of

the USGA, in cooperation with the US Department of Agriculture (USDA), established a foundation for the turfgrass research and extension service programs available today. In 1953, staff members of the USGA Green Section began to take research information into the field on a one-on-one basis with golf course superintendents and course officials through the Turf Advisory Service. Can you imagine our industry without the USGA Green Section?

We have achieved much, and our services continue to evolve for golf courses, golf course superintendents, golf course owners, administrators, and committee members. For every golfer and turf manager who asks a question, we are here for you.

I must thank the USGA as an organization for continuing to invest in and support an operation that has never made money or even come close to breaking even, but exists for the game of golf and turfgrass management. This extension service and the information USGA agronomists provide has improved the overall appearance and playability of every golf course we interact with. This improvement in golf courses and the level of maintenance they receive have contributed to elevating the status of what a golf course superintendent is, a professional. This too is a milestone.

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