



Uniform precipitation rates and precise irrigation control are critical to great fairways. Garden City Golf Club, New York.

The Quest for Great Fairways

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ONLY A FEW years ago terms like aerifying, verticutting, overseeding, grooming, triplex mowing and clipping removal were restricted to discussions about putting green maintenance, but today, these and many other previously limited-use terms are applied to fairway management, the result of technological innovations and golfers' demands for closely cut, uniform, and consistently good quality fairway turf.

The challenge for the golf course superintendent is obvious, for it is one thing to maintain intensively and expect perfection from two acres of putting green turf growing on modified soil, and yet another to seek perfection from 25 to 40 acres of fairway turf growing on rolling terrain and unmentionable soils. Additional pressure comes from golfers who see the manicured, crisscross-

striped fairways on television each week and don't realize not only that they are probably at their peak for the season but also that the cost of developing fairways that approach the quality of putting green turf is enormous.

Whether most golfers would even like to play on manicured fairways cut at less than half an inch is debatable. As with many other golf course standards, what constitutes desirable fairway turf is certainly in the eye of the beholder. While most professional and good amateur golfers look for dry, closely cut, uniform fairway turf that allows them to strike down at the ball, most average and high handicap golfers like to scoop the ball. They prefer turf with good density but maintained at a higher cutting height. Despite these differences in playing standards, however, most golfers would agree that top-quality fairway turf

should be dense, uniformly healthy, with a minimum of thatch, and maintained in as dry a condition as possible.

Is it possible for a golf course superintendent to provide these conditions day after day, month after month? Of course it is! Though the vagaries of nature are always present, given the tools to do the job and the labor to follow through with the appropriate management programs, almost any golf course can enjoy consistently good fairways. Therein lies the hitch; relatively few golf courses are financially able or willing to provide these resources to the superintendent.

A review of the prerequisites for producing consistently good-quality fairway turf should help shed some light on how certain golf courses always seem to be in great shape while others tend to fall apart in August. These prerequisites include:



- Good drainage
- A good irrigation system
- A thorough pest control spray program
- Regular aerification cultivation
- Use of lightweight mowers
- Use of practices that promote desirable grass species at the expense of *Poa annua*.

Certainly some golf course superintendents rarely aerify their fairways, continue to use large mowing units, proclaim *Poa annua* as the only truly dependable grass in the business, and have very respectable fairways from year to year. Nevertheless, *most* of the golf courses with consistently great fairways by today's standards are those that use the aforementioned tools and practices as the framework for their fairway maintenance programs.

A closer look at these practices and why they work should provide some insight as to how golf course superintendents can provide their golfers with the best possible fairway turf.

Good Drainage

The old saying that the three most important qualities in producing good turf are drainage, drainage and more drainage, certainly applies to fairways. No other single factor is more important, for poorly drained soils can never produce consistently healthy turf and the proper playing characteristics.

Good soil drainage is necessary for good soil aeration, which is critical for

healthy turfgrass root growth. In addition, poorly drained soils tend to compact easily under moderate traffic, further restricting soil aeration and root development. And finally, persistently wet soils are usually very soft and produce playing conditions that are far from ideal.

Because drainage installation over large areas can be time consuming, costly, and messy, too many golf courses like to ignore it and instead try to develop good fairways by instituting more sophisticated (and often expensive) maintenance programs, which they hope will compensate for the lack of drainage. This sometimes includes installing extensive cart path systems, the switch to lightweight mowers, and the use of expensive chemical and cultural management programs. Frankly, this approach is a waste of time and money. The best advice is to spend money on a good drainage system. There are no shortcuts. For those who are contemplating drainage work but aren't sure how to proceed, plenty of good information is available from the USGA Green Section and other sources.

A Good Irrigation System

While providing good drainage is unquestionably the first priority in producing great fairways, the availability of a good irrigation system is certainly second. The ability to apply irrigation water when and where it is needed and in precise quantities is essential at courses

where standards for fairway turf are high. A good irrigation system that provides uniform coverage will use less water during the course of a season than a weak, inefficient system. What constitutes a good system? Where consistently good-quality turf is desired, important characteristics would include:

- An adequate source of water.
- An automatic pumping system of sufficient flexibility and capacity to enable the course to be irrigated reasonably quickly.
- A properly designed and installed automatic field system with individual head control wherever necessary.
- A skeleton manual snap valve system for greens, tees, fairways, and other areas where special applications or hand watering might be required.

Naturally, all the important details cannot be mentioned in this brief discussion, but even taking these characteristics at face value, it is apparent that a majority of the 12,000 golf courses in the United States make do with weak irrigation systems. Many more golf courses in the hot, humid South and the arid West have decent irrigation systems because of the consistent penalties imposed by weather extremes where poor systems are used. Courses in the temperate northern states generally install less sophisticated (but expensive, nonetheless) systems that in many instances are simply not suited to handle midsummer

(Opposite page) Lightweight mowing is setting new standards. Pine Valley, New Jersey.

(Right) Disease is everywhere and control measures essential.

(Below) Fairway aeration provides many benefits, and modern equipment leaves no reason to ignore it. National Golf Links, New York.

(Bottom) How fast are your fairways? Superintendent R. Bator, Pine Valley, New Jersey.



stress. Many courses do not even realize how weak their systems are, blaming summer turf failure on diseases or other problems, when in fact the irrigation system deserves most of the fault. If an irrigation system cannot comfortably handle the worst day of the summer, then it is not the one for golf courses where top-quality fairways are desired.

Precise water control is one of the major keys to good turf management, and in this regard, good drainage and a good irrigation system go together. A golf course with both is 90 percent of the way to great fairways. Courses that lack one or both will never have consistency.

Pest Control Spray Program

Of significant importance in many regions of the country is the damage done to fairway turf by diseases, insects, and nematodes. In areas where long hot summers and humid weather are normal, damage from these pests is easily recognized, and most golf courses have devised thorough, generally effective, and regular spray programs. However, in the northern tier of states and in the

more southerly mountain areas, where summer weather is not as extreme, these diseases take their greatest toll! Diseases such as dollar spot, red thread, and leaf spot are active but hardly devastating, and only a few clubs are inclined to spend thousands of dollars to control diseases that are apparently doing little damage. It is common to hear summer questions like, "why don't our golf balls sit up on the fairway like they do on television?"

In these areas, dollar spot, leaf spot, and other diseases can be active for nearly the entire growing season, gradually thinning the turf and reducing its density. Often, crabgrass, *Poa annua*, and other weeds take advantage of these openings and become widely established. This cycle is usually not easily recognized by even the most experienced turf managers. What's most telling is that the establishment of even a minimal disease control spray program often shows dramatic results in improving turf density.

Obviously, golf courses in quest of great fairways should establish a thorough pest control program.

Aerification/Cultivation

Whether it is called coring, core cultivation, or just plain aerification, removing cores from the soil is widely regarded as a beneficial practice. Aerating helps to relieve soil compaction, encourages water infiltration and air penetration into the soil, promotes turf root growth, and brings soil to the surface of the turf, which acts as a topdressing for thatch control. This practice has been an integral feature of the management of putting green turf for a long time, and for several reasons it is now enjoying a revival.

As fairway turf culture approaches that of putting green management, superintendents are recognizing that the benefits of aerification on greens are equally helpful in efforts to upgrade fairway turf. The role of aerification in controlling fairway thatch, achieved by breaking up the cores and intermixing the soil with the thatch layer, is so especially critical that by itself it makes coring worthwhile. The rising popularity of fairway aerification is also closely linked to the availability of effective new equipment that features closer tine spacing, good penetration, and less disruption to the playing surface compared to fairway aerifiers of the past.

Aerification cannot be done too often for the health of the turf. Some golf courses are now aerating fairways once a month, especially where poor soil conditions, heavy traffic or thatch problems exist. For most courses, once or twice per season may be all that time allows. If it's possible to double aerify on each occasion, however, so much the better.

With the recognized importance of aerification in turfgrass management and the advent of a new generation of aerification equipment, there's no excuse for golf courses not to increase the number of times they aerify their fairways. It must be done if consistently top-quality turf is desired.

Lightweight Mowing

The introduction of the riding triplex mower in the early 1970s brought about a revolution in the design and maintenance of putting greens. The recent use of these triplex machines and other maneuverable, lightweight mowing units on fairway turf has led to even greater changes in the design and maintenance of fairways.

In no uncertain terms, the results of the widespread and growing use of lightweight mowers on fairways has been dramatic, and it continues to look



Good drainage is a prerequisite for good turf. Tile and stone-filled trenches are topped off with coarse sand and then seeded at Cherry Hills Club, Ontario, Canada.

more impressive each year. The significant reduction in soil compaction and turfgrass wear problems, the ability to make most turns in rough areas, the flexibility of changing mowing patterns, the ability to reduce the cutting height on the fairways, and the recognizable but not totally understood advantages of clipping removal are among the positive effects thus far. One of the major benefits has been a distinct increase in the population of bentgrass and other desirable grasses at the expense of *Poa annua* on fairways where lightweight mowers have been used for several years. This effect is even more dramatic where clippings are routinely removed.

A golf course need not make the relatively expensive commitment to the triplex greensmowers with clipping removal to realize the benefits of a lightweight mowing program. A wide variety of triplex and five-unit mowers are available today that will do the job more quickly. Many courses move into this type of mowing program slowly, buying a single lightweight mower and using it on par-3 fairways, problem fairways,

approaches, etc. As resources allow, additional units are added, and the program is expanded.

Needless to say, a lightweight mowing program presents its own problems that should be considered before making major commitments. It is significant, though, that many medium- and low-budgeted golf courses are using lightweight mowers and improving their fairway turf. For a club committed to great fairways, such a program cannot be ignored.

Promoting Desirable Grasses

The debate over whether turf management programs should be geared toward eliminating or promoting *Poa annua* is one of the oldest battles in the business. There are certainly golf courses maintaining very respectable *Poa annua* fairways, but where the goal is to develop consistently great fairways, there are two good reasons for gearing the maintenance program toward eliminating *Poa annua*.

1. It is very difficult to achieve consistency with *Poa annua*. *Poa* is unforgiving

in its maintenance requirements and in its tolerance of weather extremes compared to the cool-season grass alternatives. Simply stated, the chance for periodic failure with *Poa annua* is high, and consistently great fairways cannot be dead fairways.

2. When the weather turns hot and *Poa annua* roots take their customary place at the surface of the soil or in the thatch layer, *Poa annua* fairways will inevitably be *wet* fairways. Shallow rooted turf requires frequent irrigation or syringing, and great fairways cannot be *wet* fairways.

Deciding that *Poa annua* should be eliminated is one thing, but establishing a more desirable grass in its place is something else. Over the years, superintendents have had varying degrees of success in reducing *Poa annua* and keeping it out of their fairways by manipulating cultural practices to favor the desirable species. It was a painstakingly slow process, however, and many superintendents simply gave up and decided

to live with or cultivate *Poa annua*. Today, results of the use of lightweight mowers and of the newer plant growth regulators offer more of a promise for controlling *Poa annua*. Very briefly, the following should be taken into account in establishing programs to promote or keep desirable turf species at the expense of *Poa annua*. Specific recommendations would vary depending on location and the species being grown.

- Use irrigation water carefully and prudently.
- Carefully time and use light to moderate rates of fertilizer.
- Time cultivation practices to avoid primary *Poa annua* germination periods.
- Monitor pH. Bentgrass, for example, competes better against *Poa annua* at pH levels below 6.0.
- Overseed desirable species on weak fairways.
- Establish a lightweight mowing program and collect clippings, if possible.

- Investigate the use of the newer plant growth regulators.
- Limit golf cart use on fairways when the soil is wet and subject to compaction, and when the temperatures are high and the turf is likely to wilt.

It really doesn't matter what species of grasses are being grown. Taken together, the essential principles and important practices outlined here form the framework for successful fairway management programs regardless of the species of grass.

For the majority of golf courses that perhaps lack the resources but nevertheless want better fairway turf, aiming to upgrade their facilities and programs in each of the categories discussed here will give them an opportunity to enjoy very respectable fairways most of the time. For golf courses with the resources, commitment and desire, following these guidelines faithfully can result in fulfilling their quest for consistently great fairways.

More on "Pesticides — Changing an Image"

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QUESTION: I read with interest your article "Pesticides — Changing an Image" in the January/February issue of the GREEN SECTION RECORD. What are the legal ramifications of such a pesticide disposal system? Also, is there more information about how to build and install a micro-tank pesticide treatment system such as the one described in the article? (New York)

ANSWER: With regard to legal concerns, the best place to start is by checking with your state and local EPA and DEP offices that are concerned with pesticide and toxic wastes. Treatment systems, such as the micro-tank, appear to be illegal in some states, while other states have adopted federal regulations of pesticide disposal as developed by the U.S. EPA. Currently, the U.S. EPA is recommending the storage of excess dilute pesticide mixtures and equipment

rinsates for use with subsequent spray operations. Toxic wastes are not generated using this approach. Nevertheless, the EPA looks upon micro-tank type systems as a possible solution, depending on such factors as location, type of chemicals involved, and what testing methods and procedures are being provided.

At least one commercial water treatment company is developing a charcoal filtration system that could allow limited reuse of tainted water. The proposed system would be relatively inexpensive and licensing would be much more economical than that of a hazardous waste treatment facility. Some agencies have taken the position that a micro-tank, such as the one mentioned in the article, are hazardous waste treatment facilities rather than pesticide disposal systems, thus making licensing cost prohibitive.

As far as the micro-tank mentioned in the article is concerned, Iowa State University's Horticulture Department is said to be working on a bulletin that should provide more details as to the construction and installation procedures. With the micro-tank system, more emphasis may be placed on providing a means of sampling and testing the system, where it is best located, what evaporative requirements are imposed and perhaps what license, if any, will be required. The Federal EPA is fully aware of the Iowa State University system and believes it to hold potential.

As more is learned about the micro-tank and other new methods of handling dilute pesticide wastes, the EPA may, in all likelihood, develop new regulations to keep up with technology. For now, it may be better to hold off doing anything until the regulating agencies can catch up with industry advancements.