

# The Secrets of Championship Greens Revealed

by DR. DOUGLAS T. HAWES

**T**HE NEXT TIME you hear of “spoon-feeding greens,” you may want to check the size of the spoon. It may account for only a quarter-pound of nitrogen per 1,000 square feet, or it may be no more than one ounce of nitrogen per 1,000 square feet! There are all sorts of low nitrogen fertilization programs for putting greens these days — from a sniff to a sniffer. How good are they and what do they offer?

Increasing numbers of golf course superintendents today avoid feeding greens at all from late June to early September. For years the Green Section has advocated less nitrogen on greens, although we have not been very specific about actual rates. When he was Eastern Director of the Green Section, Alex-

ander M. Radko wrote an excellent article on the subject, “Why the Nitrogen Race?” He noted that, “Better putting surfaces are a reality when the turf is on the lean and hungry side. They putt smoother and faster, and they are more nearly true, less likely to become severely infested with *Poa annua*, less subject to wilt, and they do not build up heavy mat or thatch so rapidly.”

Obviously the encouragement of lower nitrogen rates for bentgrass greens has succeeded. Some are now even saying the rates have gone too low; they may be right in some cases. I have seen a few awfully thin greens caused by under-fertilization. Serious putting green losses that developed on some courses in recent years were caused by several earlier

seasons of under fertilization, according to Bill Bengeyfield, National Director of the Green Section. This condition of weak turf and poor growth resulted from slow depletion of organic or slow release nitrogen sources within certain putting green soils. Older greens can often coast for a year or two on this type of accumulated nitrogen, but they cannot go on forever. Sooner or later, a return to sensible nutritional practices will be essential.

Many factors determine what it takes to produce championship putting greens, therefore, it is difficult to establish hard and fast rules. Nitrogen applications do appear to be one of them, however. Years of experience have indicated that a half-pound of nitrogen per 1,000 square

*The scale can tip both ways — some greens are too thin; some too fat.*





feet per month of growing season may be a better, more healthy application rate than the past standard of one pound per month. Of course, some golf courses with championship putting conditions follow a higher nitrogen program. And yes, you must consider many factors before making a decision for your own golf course, factors such as:

- The nitrogen source
- The soil mix of the greens
- Age of the greens
- Size of the greens
- Amount of play
- Amount of nitrogen applied per application
- Soil pH
- Other nutrient levels
- Type of grass
- Time of year
- Rainfall - water quality
- Salinity level
- Temperatures.

All play an important role, and yet the majority of golf courses today tend toward the use of a half-pound of nitrogen or less per 1,000 square feet for each month of the growing season.

Another trick gaining in popularity (and effectiveness) is the use of two

ounces of ferrous iron sulfate in no more than five gallons of water per 1,000 square feet (do not water in). This will improve color during mid-summer. It is far safer than trying to improve mid-summer color with more nitrogen and more water. We have all known disasters resulting from this practice in late July and August.

Each golf course superintendent must examine the factors affecting the nitrogen need of his greens. No fertilizer salesman, vendor, or consultant should make this judgement. The superintendent alone must make the final determination and then set his plans for a total management program.

The decision regarding fertilization practices depends upon the growth rate of the grass. Growth rates greatly influence putting green speeds. Dormant winter greens will gain speed under dry weather and wear, while the flush of spring growth will slow greens down. During the summer, growth slows again and speed picks up. Greens can undergo a tremendous variation in putting green speed through the seasons while remaining at the same height of cut. The Stimpmeter can be a sensitive tool in determining growth rates.



(Above) An iron application improved the color of this green without the need of additional nitrogen.

(Top, right) Grass blades on a high nitrogen diet tend to be wide-bladed, dark green and tender.

(Right) Old bentgrass greens develop patches of fine-textured, well-adapted strains. These show up clearly in the late fall and early spring as greens are on the hungry side.







One must be extremely careful applying these materials. Applications above a quarter-pound available nitrogen per 1,000 square feet may cause a flush of growth which will, on championship greens, slow down Stimpmeter speeds dramatically. During heat stress, rates above a quarter-pound cause creeping bentgrass to come under additional stress due to stimulated top growth at the expense of root growth. Roots die more quickly on cool season grasses when they are fed with large amounts of nitrogen during the summer.

Methyl ureas, natural organics and coated fertilizers have somewhat less readily available nitrogen. We find that a quarter to a half-pound nitrogen from one of these sources produces a similar type of response in the grass plant as a quarter-pound of the soluble materials.

The most slowly available nitrogen sources are urea formaldehyde and IBDU. These materials are generally recommended for application at much higher rates than the others because not all of their nitrogen is immediately available. However, some of it is available in water-soluble form, and a quick initial response, depending on how much is initially applied, is possible. To some extent, the release rate of urea formaldehyde, methyl urea and natural organics is temperature dependent. Microorganisms break them down to nitrogen forms usable by plants. Assuming moisture conditions are adequate and the temperature rises, microbial activity increases. Therefore, as hot weather develops and bentgrass growth and the plant's need for nitrogen decreases, the slow release materials continue to make nitrogen available.

IBDU and coated nitrogen materials become soluble and are made available by the amount of water applied to the surface with very little temperature effect. Thus, when we are dealing with this slowly available material, it is a little more difficult to predict how it will behave. Particle size also affects the response of all slow-release materials. Some commercial fertilizers may include several nitrogen sources. The manufacturer is probably trying to provide a product that will give quick greenup response yet offer long-term nitrogen release as well. The response seen from different commercial fertilizers will vary from product to product, and, it will also vary depending on the time of the year used. Because of the difficulty in knowing how a slow release fertilizer may respond to relatively unpredictable weather conditions, many



Of course, growth rates are directly influenced by nitrogen levels. A pound of nitrogen applied in the spring will slow greens down by six to 12 inches on the Stimpmeter. A hard frost in the late fall may speed them up by the same amount. This can be serious in the late fall if greens are already fast. They may go into the winter very slick. With no further growth, they will stay that way or become even faster until spring.

#### Nitrogen Sources

Basically we should consider three, maybe four types of nitrogen sources. The first are the soluble nitrogen fertilizers, such as urea, ammonium nitrate, ammonium sulfate, and liquid fertilizers.



superintendents are breaking away from their use on greens. They want better control of nitrogen levels and grass response. They obtain it by putting nitrogen on in very small dosages of readily available (soluble) nitrogen. This is sometimes referred to as "spoon-feeding" the turf. In natural situations, grass is toughest when only very small amounts of nitrogen are available. High rates of nitrogen result in quick healing but lush growth. A lush, fast-growing grass plant is a tender one easily damaged by traffic and disease. Therefore, we gain speed of recovery with high nitrogen rates, but we lose a lot of the grass plant's tolerance of wear and stress.

It has been said that high quality championship putting greens are found only at high-budgeted clubs. This is not true. Some of the finest quality greens can be found on relatively low-budget courses. It is not so strange, however, that this may be for only a very limited period, because that superintendent frequently moves on to a high-budgeted club. The quality greens "move" with him.

There is a certain philosophy regarding the use of fertilizers for putting greens and how it relates to their quality and cost. I think it is true for all golf courses. If you develop a correct and proper nitrogen program for your greens and the results are successful and satisfactory to you, then the cost of the fertilizer is inconsequential. If Brand X is helping you consistently produce championship greens, use it! The particular product is a negligible expense toward maintaining the golf course. Let me add, however, that I do not imply that the most expensive fertilizers will produce the best greens. Rather, the best greens are produced by the fertilizer best suited to your talents and your golf course.

### What About Potassium?

More and more we seem to be realizing that high quality putting greens require as much potassium as they do nitrogen. This is especially true on new greens built to USGA Green Section specifications, and even more so on the so-called straight-sand greens. Those applying equal or

more potassium than nitrogen have less need for syringing, and the greens stand up better to traffic. At high potassium levels, the grass is less prone to wilting, more disease resistant, has a better root system, is more traffic tolerant, and has stiffer blades. It is important to remember that available forms of soil potassium are almost as mobile and leachable as soluble nitrogen.

### Other Factors

Maintaining championship greens daily requires more than just a good fertilizer program. Firm, smooth greens at 8½-foot Stimpmeter speeds and free of grain require daily maintenance. They are mowed every day at 3/16-inch or less, verticut or brushed lightly at least once a week. Usually they are lightly topdressed monthly during the growing season. Topdressing usually seems closely associated with faster putting speeds. It aids in obtaining a firmness of surface. It makes it easier to reduce grain, because by brushing in the topdressing, the grass blades are forced to stand up. It is not necessary to topdress to have championship greens; it just seems to make it easier.

It is the superintendent and his crew; they produce championship putting surfaces. Clubs known for consistently having championship putting greens, regardless of the superintendent in charge, have probably been very careful when hiring their superintendents. They also have greens with enough surface area to handle traffic adequately. These clubs also have greens with good surface and internal drainage.

Championship greens should be fast, uniformly paced, firm but resilient. Close daily mowing, a light nutrient program, minimal amounts of water, a good topdressing schedule, and grain control are the accepted means of achieving such surfaces. Championship conditions are not possible where greens are small in relation to volume of play. Where there is poor surface and internal drainage, the outlook is bleak indeed.

Now that the secrets are out, you, too, can provide putting conditions your members will boast about. It is not easy to do, but carrying out the proper program day in and day out can lead to great rewards for your course and yourself. The rules to remember:

1. Avoid early spring fertilization on bentgrass greens.
2. Apply no more than a half-pound nitrogen per month of growing season.
3. Keep potassium levels up.
4. Groom, groom, groom.

*Green Section agronomists try to help clubs build championship putting greens.*

