A Publication on
Turfgrass Management by the
United States Golf Association®

May/June 1984

USGA®

Green Section RECORD

Perennial Ryegrasses are Getting Better!

USGA®

Green Section RECORD

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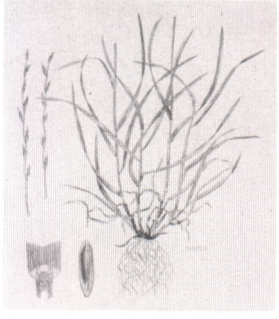
Vol. 22, No. 3
MAY/JUNE 1984



Cover Photo:
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GREEN SECTION RECORD (ISSN 0041-5502) is published six times a year in January, March, May, July, September and November by the UNITED STATES GOLF ASSOCIATION®, Golf House, Far Hills, N.J. 07931. Subscriptions and address changes should be sent to the above address. Articles, photographs, and correspondence relevant to published material should be addressed to: United States Golf Association Green Section, Golf House, Far Hills, N.J. 07931. Second class postage paid at Far Hills, N.J., and other locations. Office of Publication, Golf House, Far Hills, N.J. 07931. **Subscriptions $6 a year.**

LOLIUM — FOLIUM

Perennial Ryegrasses are Getting Better!

by **STANLEY J. ZONTEK**
Director, North-Central Region, USGA Green Section

AMONG THE 1,500 or so species of grasses growing in the United States, only about a dozen are suitable for turfgrass purposes. Even on that limited scale, ryegrasses have never received a very high rating.

Their early use was limited mostly to southern golf courses for overseeding bermudagrass for winter color. They were accepted in the more northern areas of the country as a short-lived nurse or companion grass for Kentucky bluegrass and fescue blends. The annual or Italian ryegrasses (*Lolium multiflorum* Lam.) and early varieties of perennial ryes (*Lolium perene* L.) were either true annuals or, at most, short-lived perennials. They had wide and coarse leaf blades, were susceptible to a wide range of diseases, were stemmy and oftentimes difficult to cut and maintain. They had a very distinctive and not necessarily pleasing color and growth habit. The ryes were considered cheap, of low turf quality, and found mostly in inexpensive grass seed blends. They germinated quickly, but beyond that, they were not particularly long-lived and were definitely not the types of grasses a knowledgeable golf course superintendent would use.

All of this has begun to change, however, and may soon change even more!

IMPROVED VARIETIES of ryegrasses began to appear in the late 1950s and early 1960s. NK-100, Pelo, and Norlia are examples. The new varieties exhibited, for the first time, characteristics the turf manager could use. However, they were still coarse bladed, stemmy, and had rapid vertical growth, especially early in the spring. Most of them were included in seed mixtures with predominantly Kentucky bluegrasses and fescues. Few if any could stand alone as distinct varieties. They did, however, begin to stimulate interest in perennial ryegrasses, because they had good persistence and generally quite acceptable performance, far beyond that of the common ryegrasses then available.

REAL ADVANCES in turf type perennial ryegrasses occurred in 1967 and 1969 with the release of Manhattan and Pennfine, respectively. These grasses were the first perennial ryes to have excellent management characteristics, appearance, and playability. They had thinner leaf blades, which made them easier to mow. They had good density, a decumbent growth habit, a pleasing green color, and excellent persistence. They seemed very similar in appearance and performance to the improved Kentucky bluegrasses and, from a few feet away, were practically

Figure 1.

Figure 2.

indistinguishable from them. This confusion in identity still exists. Some turf managers believe they are growing Kentucky bluegrass but, when you really examine the grasses, oftentimes you find that they are predominately perennial rye.

Other improved perennial ryegrasses soon began to appear. They were the result of intensive breeding efforts to further improve this species. Today over two dozen improved turf type perennial ryegrasses are available! In essence, the turfgrass breeder has invented a turfgrass species. Because of his efforts, the golf course superintendent has a new class of turfgrass for his work.

Perhaps the first turf managers to appreciate and use the new perennial ryegrasses were the southern golf course superintendents. They were quick to catch on to the superiority of these grasses. For years they had been using and relying on the old annual or semi-perennial types for winter overseeding. With the improved varieties, they had grasses with superior playing characteristics as well as better and smoother spring transitions. Although they were more expensive to use on a cost-per-pound-of-seed basis, fewer total pounds of seed per 1,000 square feet were required. Nevertheless, while the extra quality did cost extra money, it was worth it, especially for greens. Today the new perennial ryes have almost totally replaced annual ryes in southern putting green overseeding.

Golf course superintendents in the northern cool-season areas have been somewhat slower to integrate perennial ryes into their seed blends. Most superintendents still use predominantly Kentucky bluegrass blends to overseed fairways (except those golf courses using bentgrass for overseeding). As time goes by, however, more northern superintendents are beginning to work higher percentages of perennial ryegrasses into their seed mixes. The reason is simple. Of all the overseeding work done over the years, it is the improved perennial ryegrasses that are establishing themselves! When superintendents went down on their hands and knees and really looked at the types of grasses surviving from overseeding, instead of finding Kentucky bluegrass, more often they find perennial rye dominating in the stand. What many thought and perhaps still think is Kentucky bluegrass is really ryegrass. Furthermore, it seems to be effectively competing with *Poa annua* as well as providing an enjoyable grass cover for play. In the mid to late 1970s, the perennial ryegrasses came into their own as a distinct genus and species of turfgrass. From all appearances and from their performance to date, they are here to stay!

Evidence is growing that perennial ryegrasses are beginning to replace Kentucky bluegrass as the primary fairway turf in northern areas because Kentucky bluegrasses simply cannot tolerate the lower cutting heights demanded by today's golfers. Therefore, the choice in fairway grasses, where cutting heights are to be less than one inch, are either zoysiagrass or bermudagrass (in the southern climates and transition zones); and bentgrass, *Poa annua*, and perennial ryegrass (in the northern climates and transition zones). Pure Kentucky bluegrass fairways are becoming more rare. The ryes generally have outperformed Kentucky bluegrass at lower cutting heights, are to the average golfer indistinguishable from Kentucky bluegrass, can tolerate lower fairway cutting heights, and they seem to compete quite favorably with *Poa annua* — even to the extent of actually pushing *Poa annua* out of fairways following a comprehensive overseeding program.

TODAY, RESEARCH stations like the New Jersey Agricultural Experimental Station, working with other universities and independent commercial seed companies, are continuing to release new generation perennial ryes. These new ryes have even better turf qualities, better disease resistance, and generally

Figure 3.

Figure 4.

Figure 5.

better overall performance than the first and probably the second generation perennial ryes. From a modest beginning only a few years ago, their use has exploded.

AS WITH ALMOST everything else in turfgrass management, however, there are no panaceas, no perfect chemicals, and no perfect grasses. There are always advantages and disadvantages. Following are some of the strengths of the new perennial ryegrasses.

1. Low cost per pound of seed. Perennial ryes are relatively economical to use.

2. Excellent seedling vigor. *(See Figure 1.)* When planted with good soil-to-seed contact, they germinate quickly (usually less than a week) and they establish a playable turf quickly.

3. Long-lived perennials. The original research plot of Manhattan perennial rye was planted in 1966 and is still thriving. With proper management, the new perennial ryes are long-lived perennials.

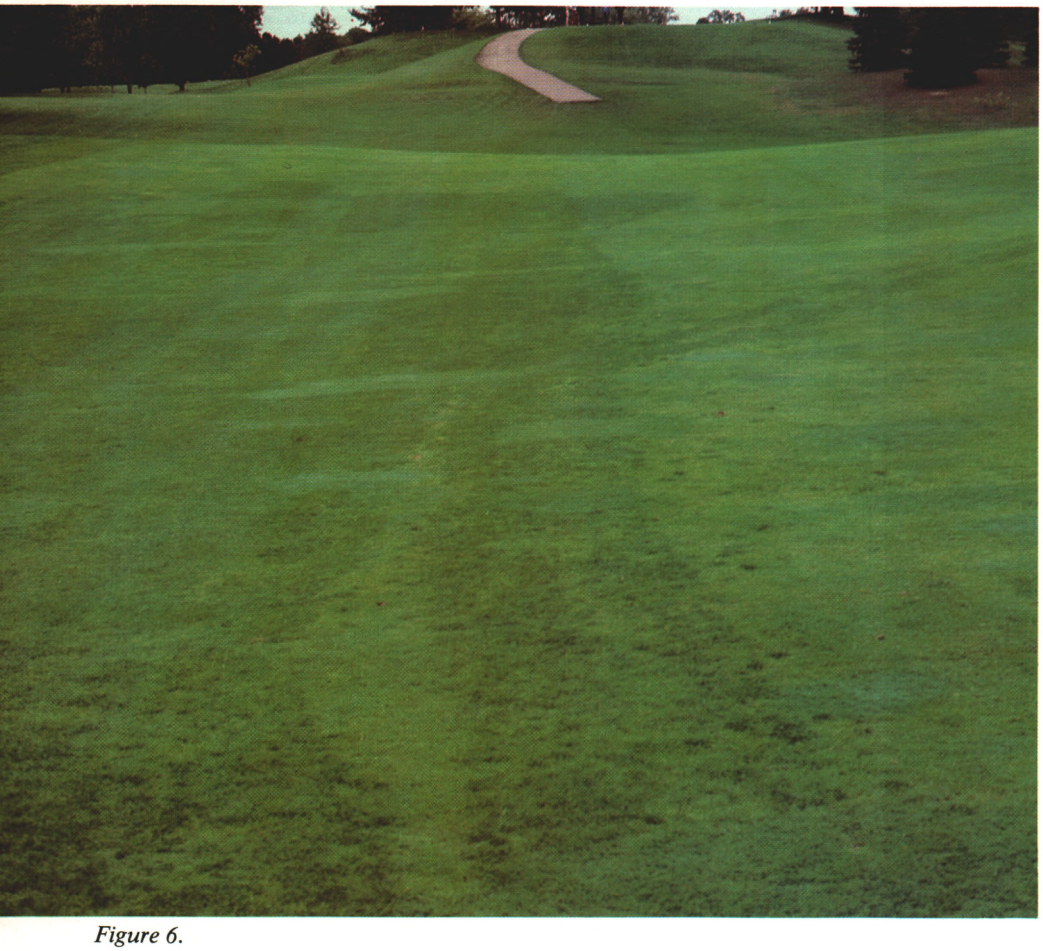


Figure 6.

Figure 7.

4. Excellent competition with *Poa annua*. Some evidence exists that an allelopathic phenomenon exists between *Poa annua* and perennial rye. Allelopathy is defined as the competition between one plant and another whereby one species produces a compound that suppresses the other species. Research has been performed to substantiate this theory. The perennial ryegrasses seem to compete quite well with *Poa annua* and co-exist, if not eventually predominating over annual bluegrass.

5. Tolerant to close mowing. The perennial ryes tolerate cutting heights in the ½-inch to ¾-inch range better than most Kentucky bluegrasses.

6. Good heat tolerance. *(See Figure 2.)* Although differences in heat tolerance exist between different varieties of the perennial ryes, they hold up better as a group than most other cool-season turfgrasses.

7. Good drought tolerance. The perennial ryes hold their color and don't seem to go dormant nearly as rapidly as Kentucky bluegrasses in dry weather. Once it is established, perennial ryes tolerate droughty conditions very well.

8. Good insect resistance. Some varieties of perennial ryes show excellent resistance to insects such as sod webworms, aphids, and chinch bugs.

9. Good density and playability.

10. Reasonably good winter hardiness. Although somewhat susceptible to ice damage, these grasses nevertheless exhibit good winter hardiness.

11. Excellent early spring green-up and vigor (sometimes too early and vigorous; see ryegrass weaknesses). Seems to initiate growth early in the spring, which can be important in areas where the golf course is open for play as snow and frost leave the ground.

12. Compatible with Kentucky bluegrasses. The perennial ryes closely resemble appearance and growth habit of Kentucky bluegrasses and, in a blend, they can actually complement each other. This is quite true where Kentucky bluegrasses have had a problem with *Fusarium* blight. The ryes are quite resistant to this disease.

13. Excellent wear tolerance. *(See Figure 3.)* Perennial ryes outperform almost all other cool-season grasses in areas of high traffic. This toughness relates to difficulty sometimes in cleanly cutting the perennial ryes, because they have a high fiber content in the leaf.

Since there is no perfect grass for every golf course, there are no perfect

Figure 8.

perennial ryegrasses. Although they have a long list of strengths, they also have some weaknesses. Some of them are:

1. Susceptibility to diseases. As a group, the perennial ryegrasses are quite susceptible to a wide range of turfgrass diseases. They include dollar spot, brown patch, red thread, pythium blight, leaf spot and rusts, snow molds, etc. Perhaps the only primary turfgrass disease to which they are relatively resistant is fusarium blight. Therefore, in order to maintain the perennial ryes in a disease-free state, you may need a comprehensive fungicide spray program at certain times.

2. Tough to cut. *(See Figure 4.)* Sharp mowers are needed to clip perennial ryegrass cleanly.

3. Slow spreading. As a group, the perennial ryes are classified as bunchgrasses. Generally they do not have rhizomes or stolons and usually spread by basel tillering. There are a few exceptions to this rule, however; some of the newer perennial ryes do have some rhizomes. Nevertheless, most are bunchgrasses and do not spread very rapidly, if at all. Unless they are planted in a reasonably dense stand, they can become clumpy. *(See Figure 5.)*

4. Rapid vertical growth in the spring. This can either be an advantage or a disadvantage, depending on the use of the perennial ryes. Although the newer second and third generation perennial ryes have far less vigorous vertical growth in the spring, it still is a concern.

5. Susceptibility to winter injury. The perennial ryes seem susceptible to ice damage. They can winterkill out in some years where water sits and freezes in low spots.

6. Too persistent. *(See Figure 6.)* Sometimes perennial ryegrasses can survive even under low cutting heights in stands of creeping bentgrass. They sometimes have remarkable persistence in areas where you don't want them. Depending on the weather, in southern overseedings the perennial ryes can also linger too long in the spring, which can make the spring transition to bermudagrass more difficult.

PERENNIAL RYEGRASSES have excellent wear tolerance. *Figure 3* illustrates this point clearly. The patches of grass in this cart traffic wear area are perennial ryegrass. All of the surrounding grass is Kentucky bluegrass worn down almost to the soil. By seeing this and realizing that the ryes are tolerating the traffic, then the golf course superintendent can use this strength to advantage.

Perhaps one of the most interesting uses for perennial ryegrasses is for fairway renovation. Along with improved Kentucky bluegrasses, they can be used to renovate and generally rejuvenate old common Kentucky bluegrass fairways. This program of overseeding perennial rye/improved Kentucky bluegrasses into existing fairways has generally worked well. *(See Figure 7, showing a "skip" in ryegrass/Kentucky bluegrass overseeding.)*

Another increasingly important use of improved perennial ryegrass is on those golf courses that are reducing their acreage of high-maintenance fairway turf. Over the years, many golf courses have developed 40 to 50 or more acres of fairways. Obviously, this amount of acreage can become expensive to maintain. Because most of these fairways are predominantly *Poa annua* with some creeping bentgrass intermixed with some lingering Kentucky bluegrasses, you just cannot let this type of mix grow tall. It makes for a thick, clumpy, gnarled mass of vegetation. Therefore, these former fairway grass types must be replaced with other, more upright growing grasses.

Another use of perennial ryegrasses alone or mixed with some improved varieties of Kentucky bluegrasses is to re-establish rough areas where fairway acreage is being reduced. *(See Figure 8.)*

INCREASINGLY, the perennial ryes are being used as an intermediate step in converting *Poa annua*-infested fairways to bentgrass. The thought of extensive fairway renovation — converting

Figure 9.

from one grass to another — is not a happy one. No one likes to have his golf course torn up for renovation, particularly in the northern parts of the country where there is already a short golf season. Routinely, fairway renovation requires an overseeding program and a number of years to complete. It is expensive and disruptive.

Sometimes, to speed renovation, a scorched earth policy is adapted. Using herbicides like Roundup, all the vegetation is killed and the fairway area replanted to the new grass — usually bentgrass. This type of program requires a tremendous amount of club communication, persistence, patience, and understanding. Even then, complaints, grief, and aggravation are commonplace. Nevertheless, results have been quite good to date if one is prepared mentally as well as physically for the undertaking.

There is an alternative to the scorched earth program. It involves a vigorous overseeding effort using perennial ryegrasses. Because of their excellent seedling vigor, speed, and ease of establishment, and their ability to compete with annual bluegrass, the perennial ryes can be established first — alone or in conjunction with bentgrass overseeding. The idea is to establish perennial ryes at the expense of the *Poa annua* and then begin seeding bentgrasses into the ryegrass stand, or to allow the bentgrasses that are already there to spread. Using their supposed allelopathic properties to naturally suppress the *Poa annua*, the ryegrass acts as a nurse crop for the bentgrass. It is interesting that some golf courses seed the bentgrasses at the same time that the fairways are opened for the perennial ryegrass overseedings, while others wait for the ryes to become established and then begin seeding the bents into the ryes. Both approaches seem sound and both have merit.

Figure 9 shows the 17th fairway at the Butler National Golf Club, in Oak Brook, Illinois, just before the 1982 Western Open Championship. This fairway was heavily overseeded using the perennial rye/creeping bentgrass combination. At the time this picture was taken, the fairway was predominantly perennial rye with some lingering *Poa annua* and Kentucky bluegrasses. The bentgrasses were young seedlings but, as of this writing, two seasons later, this fairway as well as all the others on the course (they were all renovated in 1982) are predominantly Penneagle creeping bentgrass with relatively minor amounts of *Poa annua*, perennial ryegrass, and Kentucky bluegrass remaining. It should be noted that following the fairway ryegrass/bentgrass overseeding, the fairways were given a lightweight triplex mowing and this, along with the seedings, seems to have contributed to the increase in bentgrass at Butler National. The change was so gradual that I suspect the majority of golfers didn't even know the fairways were being renovated and converted to bentgrass.

Butler National is one of a group of clubs, including Westmoor Country Club in Brookfield, Wisconsin, that have so far successfully used perennial ryegrasses on their fairways as an intermediate step in converting from predominantly *Poa annua* to predominantly creeping bentgrass fairways.

THERE WILL surely be continuing research by seed companies and university turfgrass breeders to further improve disease resistance, winter hardiness, heat and drought resistance, and all of the other characteristics which would make the perennial ryes even more attractive. The breeding of types with greater rhizome characteristics is especially needed, and at least one of the new third generation perennial types — Manhattan II — shows some segregates having greater rhizome-producing qualities.

The future looks bright for these grasses. They are already an improved tool for use by golf course superintendents, and they have the promise of becoming even better.

Hi-Tech Equipment Calls for Higher Skills and Better Training

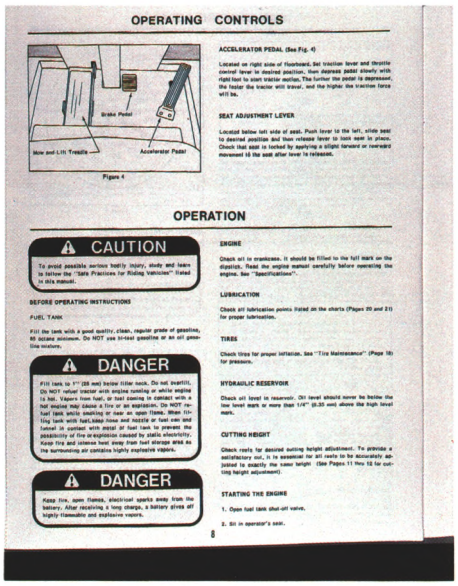
by KARL ED OLSON
Agronomist, Eastern Region, USGA Green Section

AT TODAY'S PRICES for golf course maintenance equipment, can any golf club really afford minimum-wage operators? And are you, the golf course superintendent, constantly sharpening your teaching skills and training techniques? Of course the answers should be "no" to the first and "yes" to the second question. But honestly, is this reality? Too often, perhaps, the answer is "no" to that question.

Careless operation and haphazard maintenance can cost a golf course thousands of dollars each year in repair and replacement. Expensive, sophisticated equipment requires high operating skills and sound mechanical maintenance. What can be done to protect the club's investment and the superintendent's reputation?

A number of surveys have shown that operator abuse of equipment can be traced to several factors: 1) low wages, 2) temporary nature of employment, 3) inadequate training, and 4) little or no communication between operators and supervisor. It was not uncommon years ago to find permanent employees who could be responsible for operating, adjusting, and maintaining a piece of equipment strictly on their own. This gave them a sense of pride and a feeling of belonging to the organization. It frequently resulted in a consistent, safe, and efficient operation. At many courses today, employees are expected to operate all kinds of equipment, but they have no responsibility for maintaining any of it.

If a superintendent was ever offered a brand-new hydraulic greens mower for $300, he would probably think twice before accepting the offer. At that low price, something must be wrong, stolen, or missing. Yet that same superintendent is expected to hire reliable, permanent


OPERATING CONTROLS

ACCELERATOR PEDAL (See Fig. 4)

SEAT ADJUSTMENT LEVER

Figure 4

OPERATION

CAUTION

ENGINE

LUBRICATION

BEFORE OPERATING INSTRUCTIONS

FUEL TANK

TIRES

DANGER

HYDRAULIC RESERVOIR

CUTTING HEIGHT

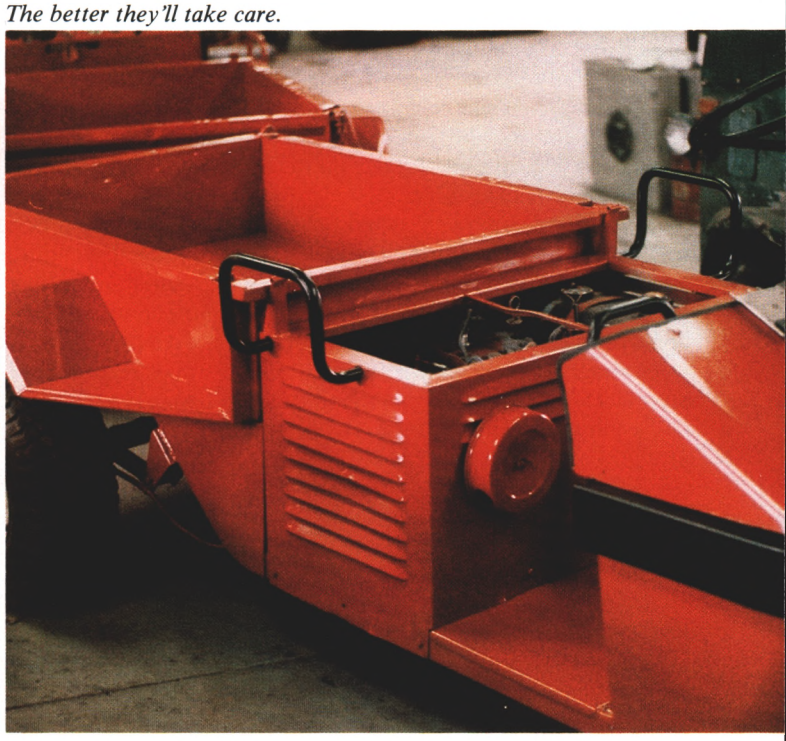
DANGER

STARTING THE ENGINE

Put "hands-on" the operating manual before "hands-on" the machine.

The better the care . . .

The better they'll take care.



help for $5 an hour or less. Most qualified people laugh at that salary. The first step in hiring a capable crew is to offer a wage commensurate with their abilities and responsibilities. Remember, these people are going to be maintaining your golf course, worth millions of dollars, and they will be doing it with equipment that costs tens of thousands of dollars.

WHAT KIND OF people do you look for when hiring? Running a greens mower, in many ways, is more complicated than operating an automobile. Don't assume that if someone can drive and maintain a car, he can run and maintain a greens mower. Furthermore, experience on another golf course doesn't mean the person knows what is expected of him on a new job. The most important qualities to look for are maturity and common sense.

When new employees are hired, how much time should be allotted for training? Is one week enough? Is three weeks too much? Is enough time allowed for training before the person is needed as an active participant on the course? Too often an employee is expected to properly mow greens after only verbal instructions.

To begin with, a new employee, or old employees dealing with a new piece of equipment, should read the operator's portion of the equipment manual before ever turning a key. Once confident that the person understands the manual, the mechanic should go over the book and the unit with the employee. The mechanic should let the employee know what ongoing daily maintenance procedures he (the operator) will be responsible for. This step makes the operator understand that he plays an active role in the operation of his machine.

Having the operator work closely with the mechanic will also help prevent operation of a piece of equipment whose performance is not up to par. The operator needn't know how to replace an engine or restore a hydraulic system, but he should be responsible for and know how to clean filters, check tire pressures, oil levels, hydraulic lines, and steering cables before operation. The operator should know what weight oils go into what machine, and he should check these levels often enough to avoid damage to the hydraulics and the engine. For this portion of the training program, the superintendent and the mechanic must thoroughly know about the piece of equipment themselves. This means reading the manuals, studying the machine, and attending training seminars.

A WORD ABOUT safety. We should never, under any circumstances, allow an employee to alter or bypass safety stops on equipment. If the machine does not work properly, it should be thoroughly checked out by the mechanic. An hour in the shop is considerably less expensive than a maimed operator. Always have a downed piece of equipment repaired properly. Showing the employees that you are concerned with their well-being will make them more conscious of their own safety.

After the employee has completely read the manual, it is time to move the machine. Depending on the circumstances, the actual trainer may be the superintendent, assistant, or foreman. The first step is checking out the machine. The employee should check tire pressure, oil levels, and hydraulic lines. He should check for signs of leakage where the unit was parked. Safety features should also be checked, and the mechanic should go over the complete check list. The employee should then start the unit and be shown the proper driving pattern from the shop to the yard and to the golf course. If all employees know the traffic patterns, accidents can be avoided in the shop area. Time should be spent practicing starting, stopping, and parking the units. Also, by assigning each unit its own parking spot, it is easy to tell if that piece of equipment has an undetected leak.

Show the employee what to do when he brings the unit in for the day. If there is an equipment log or a service form to be filled out, he should be instructed in the proper procedures. He should check to see if the unit is due for routine maintenance and, if so, inform the mechanic. Keeping up with preventive maintenance on equipment can prevent costly repairs and engine replacements before their time.

When the employee feels comfortable with the operation of the machine, it is time to move him to the course. For example, let's assume the person is learning how to mow greens. The best place to practice would be a nursery or practice green. Show the employee the proper speed and angle of approach, then park the machine. Follow this with a walk through, explaining when to slow to mowing speed, when to lower or engage the cutting units, when to disengage the cutting units, and where to turn. Then, have the employee start the unit and drive through the mowing process without actually mowing. Tell him when he will begin to cut, stop cutting, and turn. By using a dry-run approach, turf and equipment damage caused by inexperience can be avoided. Now is the time for the employee to establish the habit of constantly checking what work he has done. Explain how the reels and bedknives work. Show him what a proper cut looks like and what to watch for when a cutting unit is out of adjustment. Tell him also to watch for hydraulic fluid on the green and show him pictures of this problem so he can identify it. By constantly checking his work, the mower operator will soon discover a leaking hydraulic line well before six greens or more are mowed. The employee should be told, at this time, what to do in the event of a hydraulic leak. He should know whom to contact and where the proper materials are stored in case of trouble.

ONLY AFTER the employee is thoroughly comfortable with the mechanics of mowing should he actually move to the real thing. Send him out with an experienced person the first three or four times to show him the most effective way around the golf course and to help him with any problems. This can be a critical point in an employee's career. While he doesn't need the careful watching he needed while learning, he should feel free to come to the supervisor and mechanic whenever he has a problem. He should also be told when he is doing a good job. This builds his confidence and makes him a more valuable employee. At the same time, the employee should understand that he will be accountable for the job he does. This will also improve his performance.

Without a doubt, the most valuable assets in any golf course maintenance operation are the personnel on the crew. Therefore, it stands to reason that, if they are treated and trained properly, they will gain great respect and pride in the job they do. Quality personnel will significantly affect equipment operating costs and productivity while minimizing expensive machine down time and repairs. But selecting and training personnel is not easy; therefore, it is one of the qualities found in great golf course superintendents.

Management by supervision.

Ideas on Management

by NATHAN B. HALE,
Retired Country Club Manager, Salt Lake City, Utah

MANAGEMENT is generally considered as "directing and motivating others." It is, however, much more than this. Good management is almost like having a sixth sense. It is having a feel for things; knowing when to change policies and directions, when to expand and push forward, when to conserve or cut back. It is the capability to work well with others.

In addition, managing well is understanding and having rapport or consideration for employees and fellow workers. It is knowing which persons to hire and which to let go. Management is all this and a lot more.

In club work management has the added dimension of constantly changing boards of directors and committeemen. There are times when this may be even further complicated by a club having three heads or managers: a club manager, a golf professional, and a golf course superintendent.

Management styles vary widely, almost as widely as there are different kinds of people. Even so, they will generally fall into three broad categories: management by default, management by example, and management by supervision.

Management by default is just what it says. Each employee is allowed very wide latitude to handle his job as he may feel is right. He succeeds or fails on his own. This type of management generally has no place today. The sad thing is that much of this is still going on, probably more than we are willing to admit.

Two examples come to mind. First, just last year a club manager who was obviously incapable hid behind members of the staff, insisting they make all decisions. In truth they completely ran the club. In just a few months the club lost direction, and capable employees went elsewhere, simply disillusioned by lack of direction. Member activity and participation dropped noticeably, and the manager had to be replaced.

Second, a superintendent who had a passion for miniature gas motors would sit for hours in his office working on motors and radio-controlled airplanes. His employees were left on their own or were directed by a good foreman, but one who had also been left on his own. The work was handled after a fashion, but the employees who hid out, those who played around, and those who really didn't know what to do finally cost the superintendent his job. It is doubtful if anything good can be said for this type of management.

MANAGEMENT by example has a lot going for it, although it, too, has some drawbacks. An employee knows the boss knows what he is talking about when he sees him running machinery, making repairs, and down in the trenches repairing water lines and wiring connections, etc. Often, however, the employee never really learns what to do, since the boss continues doing it all. Naturally the men will stand and only watch if the boss will let them. The most capable, qualified maintenance man I have known in 40 years has this problem. He is so qualified that, as assistants come and go, he continues to do it all. As a result, he seldom has ever taken a day off or a vacation because there is no one to do his job.

Let's not overlook, however, that management by example can teach a lot.

ABOUT THE AUTHOR: Nate Hale has been in golf and country club management for 35 years. He served as manager or general manager for three clubs, and he knows the requirements and responsibilities of the job. In the Rocky Mountain region, he served as CMAA Regional Director and has held other offices on both the state and national levels. He is now retired and lives in Salt Lake City, Utah.

It can and should teach such things as honesty, dependability, proper appearance, proper language, and how to work well with others. Example can also teach interest in and concern for others. What better way for a person to learn good work habits and good work ethics, than by the example of his boss? The best employer I ever had taught me I didn't have to ask him what to do. I soon learned his answer would be, "What is right, what is fair."

Management by supervision is often difficult for a person who is a hard-working do-it-yourselfer. This method requires delegation, and to delegate properly takes considerable effort. Giving someone a job, making sure he knows how to do it, permitting him the freedom and authority to accomplish it, and supervising when needed but not interfering, is proper delegation. Note that this does not mean abdication of responsibility or supervision if needed. Delegating everything and doing nothing is back to management by default. There is a line between the two, and one must be careful to note that line. Top executives generally use a combination of management by supervision and delegation. Running a club properly also requires a combination: that of management by example and management by supervision, including delegation.

AS A CLUB manager for many years before becoming a general manager, I found that managing was unquestionably much easier and things ran smoother when I was a general manager. Why? The golf course superintendent and I spent many hours considering this. We came to the conclusion that a general manager did make things easier for both men if both would assume their proper roles. For either a club manager or superintendent to act independently of the other will undoubtedly cause nothing but chaos. The superintendent has to be the authority regarding the golf course. He knows it, and he runs it. The superintendent, with the general manager, budget and approve spending. The general manager can remove many problems that come with committees and committeemen. He can attend some of the time-consuming meetings and leave the superintendent more free to run his course and his crew. By the manager and superintendent working together, each cognizant of the other's needs, both can be successful executives in their respective fields. The general manager has to understand this role and not interfere with the superintendent.

Regardless of whether the club has a general manager or is trying to function with three heads, someone has to assume the responsibility of coordinating everything with board members and committees. It is their club, they are the representatives of the membership who pay the bills and they unquestionably have the final say. One problem is that they are ever-changing and the business where they have been successful influences their thinking and actions. This can be most frustrating at times, and it becomes necessary to educate each new man every year. The most successful club managers and superintendents I know set up specific appointments early in each new year to meet with the new committeemen, go over financial matters in detail, review problem areas in the operation, cover the long-range projects, and most of all give each man a detailed extended tour of the entire plant and its operation. If this is done, and each new individual is asked for ideas and suggestions and honestly comes to feel his help is desired, you will find that the biggest problem is solved.

Obviously this has barely scratched the surface of management techniques. From my experience, the following list of suggestions can be most helpful.

Give Credit Where Credit is Due: Taking credit for another's ideas or work is dishonest. More than this, it destroys initiative and loyalty. Building others up will automatically build you.

Don't Be Afraid of Change: Everyone is for progress but some are afraid of change. Keep new ideas flowing. Continually propose changes and improvements. If only a small percentage of your suggestions are accepted, it is good. By keeping the boards and committees so busy with new ideas, the superintendent and manager can direct their energies productively.

You Determine the Atmosphere Around You: This doesn't mean you have to wear a perpetual grin, but no one likes to be around a grouch. Pleasant surroundings and a pleasant atmosphere attract pleasant people.

Work Well With Others: More people are fired or held back for lack of this quality than any other. I lost the best job I ever had because I overlooked this. A smooth-running organization is fun to run.

You Are Good or Bad by Comparison: The best is the best because he is better than anyone else. If you are only the best of the worst, you still aren't good.

Lead the Way: Don't be afraid to pay the highest wages — if they are justified. Be proud to have others look up to you as the leader. Success attracts the best of everything.

A capable, qualified manager is almost priceless. The wonderful thing is that we can all become better managers if we are willing to put forth the effort.

Growth of Bentgrass as Affected by Nitrogen, Soil pH and Age of Stand

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OUR STUDY WAS DESIGNED to evaluate the growth of Penncross creeping bentgrass as affected by soil pH and thatch-mat accumulation under different rates of different nitrogen sources.

How efficiently creeping bentgrass plants absorb nitrogen from the soil, and how efficiently they use nitrogen fertilizer has been studied under northern conditions where growth occurs only during the warmer seasons of the year. In the Southwest, in contrast, bentgrass grows the year around; it grows best during the cool season. Heat stress in mid-summer is a severe problem. A seasonal pattern of root decline from summer heat stress is common to both

regions, but it is accentuated in the Southwest and affected more by nitrogen excess.

Creeping bentgrass is best adapted to slightly acid soil (pH 6.0 - 6.8). Typical Southwestern desert soils range from 7.5 to 8.5, and some sands used in green construction may have pH values above 8.0.

Bentgrass growth is also affected by thatch and mat. If too much thatch is present, roots tend to be restricted to the organic layer and have little contact with the soil below. In addition, the organic layer of mat and thatch has a high cation exchange capacity and a high nitrogen demand from microorganisms living in it, restricting immediate availability of nitrogen to the grass and affecting the fate of the nitrogen that has been applied.

The study was done on a green that was constructed in 1970 with 12 inches of washed mortar sand laid over two inches of washed concrete sand that, in turn, was laid over four inches of washed pea gravel. The green was seeded to Penncross creeping bentgrass in December, 1970. In 1974, tile lines were installed in the subsurface soil by using a sod cutter to remove the turf, installing the tile, backfilling with washed mortar sand to grade, and reseeding with Penncross bentgrass.

Early in 1977, a series of plots was cut from the original green, and the top 10 inches of sand was removed. New mortar sand was then added to grade, and acid washed sand was applied to half of each plot, providing a pH of 6.5 on one-half and 8.2 on the other. These plots were then seeded with Penncross bentgrass. By following this procedure, we had established bentgrass of three ages available for testing and, hence, three levels of thatch-mat accumulation, plus two pH levels in the youngest stands. Four nitrogen fertilizers at four rates were applied to the different aged plots. Initial applications were made in October, 1977. The nitrogen sources were: ammonium sulfate (21% nitrogen), urea (46% nitrogen), sulfur-coated urea (38% nitrogen), and isobutylidene urea (IBDU — 31% nitrogen). Fertilizers were applied each October and November and again from February through April. Applications were equivalent to 0, ¼, ½, and 1 pound of actual nitrogen per 1,000 square feet every two weeks, with ammonium sulfate and urea applied at that frequency. The sulfur-coated urea and IBDU were applied every eight weeks. All possible combinations of these differential treatments were included in each of two replicates, providing a total of 128 plots; 64 plots in each replicate. Plot sizes were 2½ x 7 feet, with the 1977 plots further split into 2½ x 3½ feet by the pH differential.

EACH PLOT was regularly rated for quality on a score of 1 to 9, with 9 best. Ratings were independently made by each of three individuals, and their scores were averaged. In addition, clippings were analyzed for chlorophyll content, and root measurements were made from plugs. Ratings were made in May and June, 1978; January, February, April, and November, 1979; and January, 1980. Chlorophyll content was determined from samples taken in April and November, 1979. Root measurements were made in August and December, 1979.

Data obtained are summarized in *Tables 1-3*. Turf quality increased with nitrogen level and stand age, as might be expected. Plots treated with sulfur-coated urea and IBDU fertilizers were consistently lower in quality than those treated with ammonium sulfate, and they were usually less so than those receiving urea. An important factor in lowered quality with the sulfur-coated urea was the fact that granule size of the material available to us was too large to be used on greens. Many pellets were cut by the mower because they had not worked down into

TABLE 1.

Average Turf Quality Ratings (1-9-9 Best) 5/3/78 - 1/28/80 for Penncross Creeping Bentgrass as Affected by N Rates, N Sources, and Age of Stand.

N Rates (lb/1,000 ft²/2 weeks)	0	¼	½	1
Quality ratings[1]	2.9a	5.3b	6.4c	7.0d
Nitrogen sources	IBDU	SCU	U	AS
Quality ratings[1]	5.0a	5.0a	5.6b	6.0c
Year stand established	1977	1974	1970	
Quality ratings[1]	4.8a	5.8b	6.0b	

[1]Statistical analysis indicates odds of 19:1 or better that differences between values with different letters would not occur by chance.

TABLE 2.

Average Chlorophyll Content (ppm) of Clippings Sampled in April and November, 1979, as Affected by N Levels, N Sources, and Age of Stand.

N levels (lb/1,000 ft²/2 weeks)	0	¼	½	1
Chlorophyll content	3.6a	4.8b	6.0c	6.4d
Nitrogen sources	IBDU	AS	SCU	U
Chlorophyll content	4.4a	4.8b	5.3b	6.1c
Year stand established	1977	1974	1970	
Chlorophyll content	4.7a	5.3b	5.5b	

TABLE 3.

Average Root Lengths in mm (25.4 mm = 1 inch) for Plugs Taken in August and December, 1979, as Affected by N Levels, N Sources, and Age of Stand.

N levels (lb/1,000ft²/2 weeks)	0	¼	½	1
Root length	107a	101a	92b	87b
Nitrogen sources	IBDU	U	AS	SCU
Root length	94a	94a	96a	102a
Year stand established	1977	1974	1970	
Root length	105a	92b	77c	

the grass. Wherever pellets were cut, the nitrogen was released, and this created an unattractive set of green polkadots. Nitrogen released by the IBDU under our conditions appeared variable, varying from little to too much. During the summer of 1978, the highest two levels of IBDU application apparently released excess nitrogen, burning back the plots and providing only limited recovery in quality later.

Acidifying the sand used to establish the 1977 plots significantly increased turfgrass quality, raising the average rating from 4.8 to 5.1. However, quality ratings of the two older plot series were significantly above 5.1 at 5.8 and 6.0.

Quality ratings were subjective evaluations considering density, texture, apparent vigor, and putting quality, as well as color. Chlorophyll analyses should be a means of quantitatively expressing color, with high chlorophyll values suggesting darker green. The values in *Table 2* show that adding nitrogen at increasing levels increased chlorophyll content, although the range was not as wide as the quality ratings might have suggested. Older stands also had clippings with higher chlorophyll content, again with less range than in quality ratings. Chlorophyll values for the different fertilizer sources, however, did not reflect the ratings, with ammonium sulfate and sulfur-coated urea midway between IBDU and urea. The mottled appearance of the sulfur-coated urea plots reduced quality ratings but did not affect total chlorophyll. The acidified portions of the 1977 plots had higher average chlorophyll values (5.4 ppm) than their pairs with unchanged sand. Chlorophyll levels of the older plots were significantly greater than those of the acidified sand plots established in 1977.

ONE OF THE reasons for this comparison of different ages of stand was the increased root depth displayed by newly established grass, compared with older stands. This had been demonstrated by Eckhardt[1] on this green, and the 1970 and 1974 plots were inheritances from his study. Our data in *Table 3* show that higher rates of nitrogen reduced root growth, but nitrogen sources had no significant effect. There was a significant effect of age, however, with the youngest stand much longer-rooted than either of the older ones. Deepest roots were those in the acidified sand (112 mm vs 105). Our data indicate that although newly seeded plots did have deeper roots, the best quality turf was that of the older stands fertilized at ½ to 1 pound of nitrogen per 1,000 square feet every two weeks during the cooler time of the year. Those rates of nitrogen were most effective when they were applied biweekly as ammonium sulfate, with a relatively poor showing by sulfur-coated urea and IBDU. Although no saving time performance bonus occurred with the latter two, the better performance of the older stands probably includes a component due to nitrogen retention and slow release by organic material in thatch.

[1]Eckhardt, James H., 1975. Root decline of sodded, seeded, and mature bentgrass turf as affected by nitrogen and temperature. M.S. Thesis, University of Arizona.

MR. SUPERINTENDENT — MR. GREEN CHAIRMAN

Here's One Way to Improve More Than Your Lie!

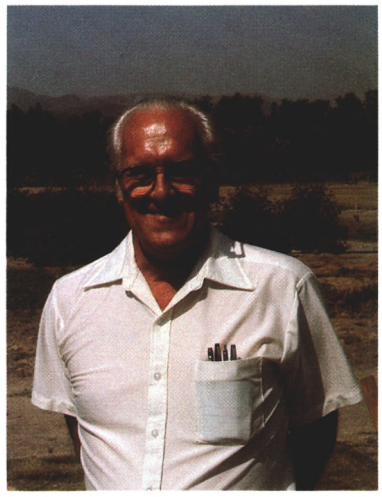
MOST GOLF COURSE superintendents want and deserve greater recognition of their role in golf. Most green chairmen want to improve the quality and playability of their home courses. On rare occasions both interests realize their individual goals and, at the same time, contribute to the future of golf. What's more, they will also improve the quality of life. The joint Golf Course Superintendents of America and the USGA Green Section campaign to raise and sustain major support for development of better turfgrasses for golf will do just that!

In January, 1984, USGA President James R. Hand and GCSAA President James W. Timmerman joined together in calling on every green chairman, club official, and golf course superintendent to contact his own Board of Governors and ask the club, surely one of the future beneficiaries of this essential research, to support the program now. A fund-raising formula, developed last year by the membership at Baltusrol Golf Club, Springfield, New Jersey, established a donation of $2 a year to the USGA Foundation, Inc., from each golf member. These funds are to be used solely for turfgrass research. If but 800 clubs would contribute $600, $800, or $1,000 annually (depending on the number of golf memberships), success in the search for better turfgrasses would be assured.

Research of this kind, particularly in plant breeding and cultural studies, takes time and considerable funding. Researchers must have assurances that enough financing will be available to complete a project once it is begun. Planning, overseeing, and responsibility in this undertaking rest with the USGA Green Section Research Committee (see January/February, 1984, issue of the GREEN SECTION RECORD). The committee is comprised of nine leading U.S. turfgrass researchers and other specialists, including James R. Prusa, Associate Executive Director of the GCSAA. Present plans are based on at least a 10-year effort to develop turfgrasses for golf that require minimal maintenance and very little water. It will be a concentrated, cooperative, nationwide effort to focus on those problems critical to golf's future. The expertise and technology to develop better turfgrasses exists. Long-range funding is needed now.

WON'T YOU, the green chairman and golf course superintendent, do your part? Go to your Board of Governors and explain the problems, the increasing maintenance costs and limited capabilities of present golfing turfs, the water crisis that inevitably lies ahead, and the long-range need for research to improve all golfing turfgrasses. Tell them of the joint GCSAA and USGA research effort and how your club and all of golf will benefit. Assure them of accountability and progress reports to be sent periodically to all clubs supporting this effort.

Only if you become directly and actively involved and thereby involve your club in this worthwhile venture, will it succeed. Complete the attached card and return it to the USGA Foundation Inc., Box 5000, Far Hills, New Jersey 07931, or write to the USGA Foundation for further details. Become an active partner in the USGA mission to help preserve, protect, and promote the best interest of golf. Get things rolling at your club — NOW — for better turfgrasses and more enjoyable golf tomorrow.



Dr. Victor B. Youngner's Death — A Great Loss to All in Golfing Turf

IN MID-APRIL of 1984, the sudden death of Dr. Victor B. Youngner, Professor of Agronomy, University of California at Riverside, was a shock and great loss to the golf turfgrass profession. Dr. Youngner was an outstanding scientist, plant breeder, and geneticist who had contributed significantly to the advancement of turfgrass science in the last 25 years. He was to be the principal investigator in the new zoysiagrass breeding project sponsored by the Green Section Research Committee. He had recently released his own new zoysiagrass, "El Toro," one of several he had developed through his research.

A Fellow in the American Society of Agronomy; listed in *Who's Who in the West, American Men & Women of Science*; Gamma Sigma Delta Agricultural Honor Society, and "Man of the Year" Award by *Landscape West Magazine* — Dr. Youngner served on the USGA Green Section Committee since 1958.

TURF TWISTERS

I WONDER

Question: My club wants me to plant flowers to beautify several areas on the course, some of which may conceivably come into play. The Green Committee says we can mark the area so the golfer will receive a free drop. I wonder about this idea and also what your opinion may be. (Pennsylvania)

Answer: It would be best to keep the flower beds away from areas where a golf ball may land. If the Committee insists, mark the area as Ground Under Repair and not as an obstruction.

ABOUT COLORED SHOES

Question: I would like to obtain several copies of the Golf Shoe Study which appeared in the September/October, 1983, issue of the GREEN SECTION RECORD. Are reprints available? (New Jersey)

Answer: Yes, color reprints are available in any quantity for $1 each by contacting USGA Green Section, Golf House, Far Hills, New Jersey 07931.

AND 100% PURE SAND GREENS

Question: I have three new greens on the golf course I just took over, and they were rebuilt (two years ago) with 100 percent pure sand at a university's recommendations. They now have very little grass cover and have not played at all like the other 15 greens on the course. The members are not happy. What can and should be done? (California)

Answer: Straight, 100 percent sand greens are not highly favored by the Green Section. Such greens have presented serious turf management problems in fertilization and irrigation, not to mention playing qualities. But that is after the fact. Short of another complete rebuilding (this time to USGA Green Section Specifications), two possibilities for improvement come to mind:

1. Obtain a chemical soil test to determine pH and nutrient levels for phosphorus, potassium, calcium, and magnesium. Correct any deficiencies. Furthermore, if the sand has high permeability, an increase in the frequency of nitrogen (and perhaps all nutrients) applications should help. There is little nutrient or moisture retention in pure sands. With more frequent fertilization, expect higher growth rates. With more growth, grass will gradually build its own soil as organic levels increase. Over a period of time, this will improve not only nutrient and moisture retention, but playing qualities as well.
2. In similar cases to yours, the use of calcine clay or other moisture-holding materials has helped droughty, weak greens. It is important to work the material into open aeration holes and not apply it as a surface topdressing. One or two such treatments this year should help the situation.