

SEPTEMBER 1967

# USGA GREEN SECTION RECORD

A Publication on Turf Management  
by the United States Golf Association







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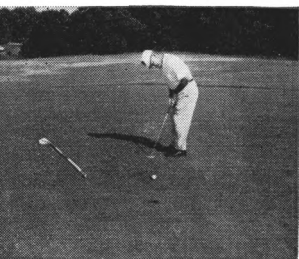
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**Cover Photo:** The low hand-capper likes the fast, true roll of Tifdwarf. Jimmy Dudley, ex-University of Georgia golfer, tries his skill on bermuda mowed at 5/32 of an inch.

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# Tifdwarf—Bermudagrass For Championship Greens



*Low handicappers like the fast, true roll of the ball when Tifdwarf greens are managed properly.*

by **JAMES BURTON MONCRIEF**, Southeastern Agronomist, USGA Green Section

"That's an excellent practice green, Ed. What variety of bent are you using?"

"Thanks for the compliment, but it's not bent," replied Ed Godwin, Superintendent of the Birmingham Country Club. "It's Tifdwarf bermudagrass, a new grass developed by the United States Department of Agriculture and the Georgia Coastal Plain Experiment Station and released in April, 1965."

"I can't believe it. It's not like any bermuda I've played on before. Putts so much like bent I can't tell the difference."

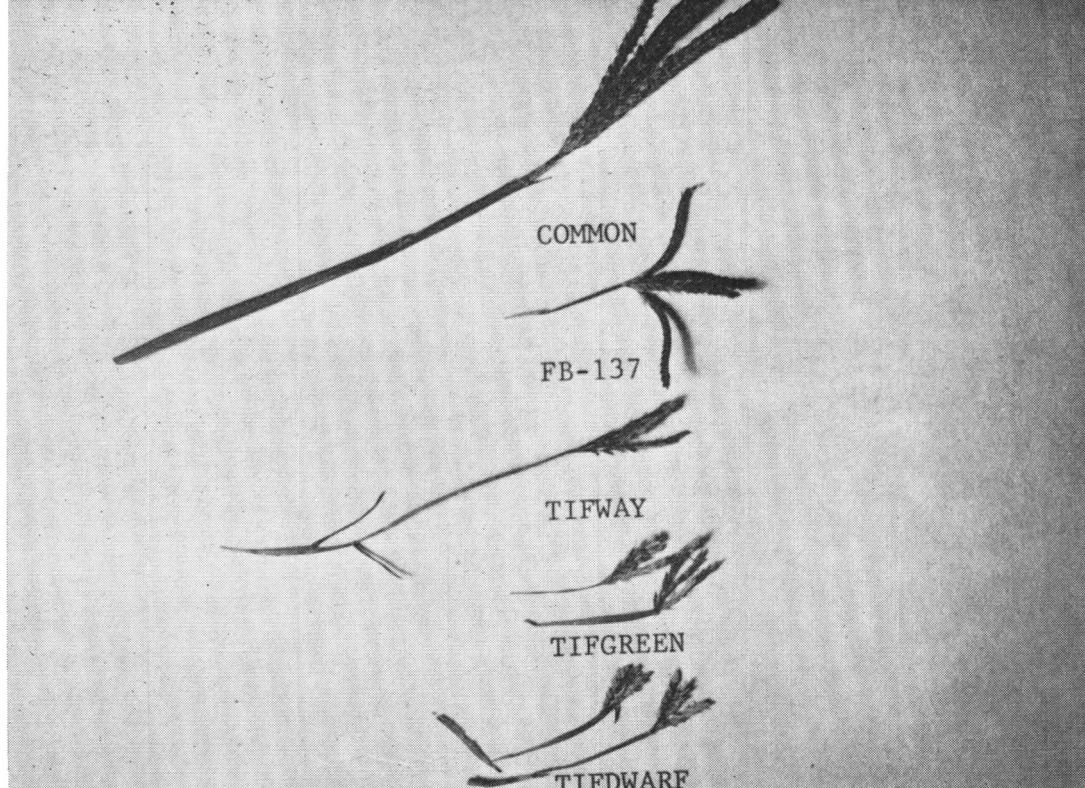
These were the comments of a group of northern golfers playing in the 1965 Birmingham (Ala.) Invitational Tournament. The same

was true during the Southern Amateur of July, 1966.

In still another case, a 36-hole coast-resort club has 18 holes in Tifgreen and another 18 in Tifdwarf. Many guests of this resort are from country clubs with bent greens. The superintendent reports that the better golfers prefer the Tifdwarf greens because they are faster and give a truer roll. My last visit to this club found the Tifdwarf greens being maintained at 2/16 inch, a cutting height too low for Tifgreen (Tifton 328). These greens were too fast for the high handicapper.

On the Hollywood Lakes Country Club course near Miami, which had only nine holes in





*A comparison of various bermudagrass seed heads. Tifdwarf has shorter leaves, stems, internodes and fewer seed heads than the others.*

Tifdwarf, players liked the new grass so well that they preferred to replay the Tifdwarf 'nine' to complete their 18 holes.

During the past year, we have talked with many golf course superintendents who have nothing but praise for Tifdwarf, if it is properly managed. They like its dark green color, its few seed heads, its tolerance of close mowing, and its ability to stay green under the stress of late summer weather when Tifgreen may go off color. Most of all, they like the compliments of players who find properly groomed Tifdwarf greens comparable to the good bentgrass greens of the North.\*

#### **TIFDWARF'S ORIGIN**

The exact origin of Tifdwarf will probably never be known. The source of material for the Georgia Coastal Plain Experiment Station came from the No. 12 green at Florence Country Club, Florence, S.C., and from the No. 2 green of the Plantation Course, Sea Island Golf Club, Sea Island, Ga. The source for a commercial nursery came from No. 6 green at Glen Arven Country Club, Thomasville, Ga., in 1962. According to research, the grasses are the same regardless of where they originated. No doubt

they are the result of a mutation that was distributed with the original Tifgreen stolons made available in the mid 1950's. Tifdwarf could easily have originated at the Georgia Coastal Experiment Station. "Tif" is an abbreviation of Tifton and "dwarf" describes its small size.

Three years of research under the supervision of Dr. Glen Burton and graduate students, and two years of field testing in comparison with Tifgreen, have shown this grass to have some desirable characteristics that will give superior putting surfaces if managed properly.

Some feel that Tifdwarf was released too soon, and that it was not thoroughly researched. The results before it was released show that it was equal or superior to Tifgreen in all required putting green characteristics. At the present time, more than 1,000 greens have been planted with Tifdwarf.

#### **COLOR AND COLD HARDINESS**

Color is one of the outstanding characteristics of Tifdwarf. In fact, it causes an unusual attraction to sod webworm moths.

During cold weather, it turns a purplish color that some find unattractive. Although it goes off color easily, it has been shown to be slightly

\*Glenn W. Burton and James B. Moncrief; "Tifdwarf Bermudagrass, Tops for Golf Greens," *The Georgia Agriculturist*, April 1967, p. 5.





*Tifdwarf (left) is gaining with the home owner. There's less mowing to be done.*

more winter hardy than Tifgreen in tests conducted by Dr A. A. Hanson and Dr. Felix Juska in the U.S.D.A. turf plots at Beltsville, Md.

Observation this spring, has shown that Tifdwarf responds in a similar manner to Tifgreen under poor drainage conditions, cold weather, and heavy traffic. It starts to recover from winter dormancy about 10 to 11 days earlier than Tifgreen. It should be overseeded for putting green use if the location is subject to frost or slightly above frost weather conditions.

#### **PLANTING OF GREENS**

Greens should be properly constructed for best results regardless of the type of grass used. Merely changing the grass species will not always solve the problem. If drainage is not adequate, it must be improved. Many times a local sandy loam will be satisfactory and can result in a big saving to the club. Tifdwarf is the same as Tifgreen in that proper construction is necessary for best results.

Planting rates vary greatly from four to 10 bushels per 1,000 square feet. Since the component parts of the grass are so small, a square yard of sod will plant a much larger area than other bermudagrasses. For the first three weeks, Tifdwarf seems to compare with Tifgreen in its development. However, unless forced with high rates of nitrogen (three to four pounds of N

per 1,000 square feet per month), it soon slows down in its growth process.

#### **FERTILIZATION**

A pH of 6.0 to 6.5 has been desirable but the grass will no doubt tolerate a much wider range.

At first, one to two pounds of N per 1,000 square feet, along with adequate phosphorus and potassium was considered sufficient. Now some of the best playing surfaces are receiving more nitrogen, especially during the early developmental stages. Tifdwarf has responded to a more constant and complete fertilization than Tifgreen. A 4-1-2 ratio is most desirable. It can be a low maintenance grass in that a greener color can be kept with less fertilizer, but the most enthusiastic users of Tifdwarf suggest higher rates for best results.

#### **TOP-DRESSING AND WATERING**

The grass grows so close to the ground that minimum top-dressing is required to true the surface. Soil free of weed should be used at all times. Do not overwater. Use only enough irrigation to prevent wilting. The wise use of water can mean the difference in good turf, even with Tifdwarf.

#### **MOWING**

Since the grass grows so close to the ground, Tifdwarf can be mowed at 3/16 inch all sum-



mer without turning off-color as Tifgreen often does. In some cases, it has been mowed at 2/16 inch and the better golfers like it at this height. However, the green surface must be perfectly smooth or scalping will surely result. Tifdwarf will provide putting surfaces second to none at 2/16-inch cut, but it must be mowed at least five to six times a week and the cup frequently changed if traffic is heavy.

The high handicapper does not necessarily like the fast, 2/16-inch green. The ball may easily be puttied right off the putting surface.

There will be about half as many clippings from Tifdwarf as from Tifgreen. This is the main reason why so many clubs mow but three times a week. This saves much time and has a great advantage where week-end labor is a problem. More leaves are left on the grass than for Tifgreen, and this might account for the more numerous roots when compared to Tifgreen under the same conditions. If the cup is not changed often, traffic causes off-colored areas and roughness that takes too long for recovery.

#### **DISEASES AND OTHER PESTS**

In results observed so far, there seems to be very little difference between Tifgreen and Tifdwarf in disease susceptibility or disease resistance. These observations have been confined to the Southeastern states.

The insect problem is very similar to Tifgreen except for the sod webworms mentioned earlier. The moths pass other grasses to lay their eggs in Tifdwarf. New greens should be sprayed with an insecticide at least the third week after planting.

One commercial nursery in the Southeast became interested in Tifdwarf because it showed a greener color when there was a high nematode population than Tifgreen could tolerate. It seems possible that the intense color is due to the root system being about twice that of Tifgreen. This is being studied along with nematode resistance. These would be ideal characteristics for a grass in many locations. However, the latest observation does not show Tifdwarf to be any more resistant to nematodes than Tifgreen.

#### **WEEDS**

A strong, vigorous grass is one of the best defenses in weed control, and Tifdwarf is no exception. Its response is very similar to that of Tifgreen in susceptibility to herbicide appli-

cations. There have been some reports, however, indicating that a different herbicide response has been noted, but full details are not currently available.

#### **OVERSEEDING**

Comments on the practice of fall overseeding of Tifdwarf have varied widely. They range from "no trouble at all" to "some very real problems." As always, the best policy is to have the seed come in contact with the soil whenever possible. A seed mixture has proven favorable but is not essential. Ryegrass has given good results in overseeding, but so have the smaller seeded grasses as well.

There has been an interesting observation this spring. It was reported that the overseeding on Tifdwarf did not thin out as fast as it did on Tifgreen under the same growing conditions. However, some now state that Tifgreen had winter grass as long as Tifdwarf. This will be an interesting comparison to make during the next several years.

#### **OTHER USES—FAIRWAYS**

A few courses are trying the grass on fairways and tees even though it was originally released for greens. After the grass has completely covered the fairways, mowing frequency will be an interesting point to watch. Tifdwarf grows so slowly that it could very well be mowed at one-half-inch a month! It has not been used as a fairway grass long enough for us to make a firm statement. However, we can say it is a most unusual grass for fairway use.

#### **LAWNS**

Tifdwarf seems to have some interesting possibilities as a lawn grass. When it was released for putting green use in April, 1965, many home owners planted their lawns with it and they seem to be very happy with the results. It will require more pesticides than other bermudagrasses for lawn use.

Many people continue to look for a grass that will not have to be mowed, and Tifdwarf may be just the answer. The plots at Tifton are dethatched in the spring just before the grass begins to grow, and the debris is removed. The lowering of a lawn mower can remove thatch collected in one year. Some plots have been maintained at 1/2-inch height of cut and mowed once a month. Others have been mowed at one inch cut monthly and seem to need dethatching





*Most golfers like the deeper green color of Tifdwarf but must adjust to the faster putting surface.*

only in the spring.

Several companies are already considering the sale of a complete maintenance program to the home owner. Dethatching, insecticides, fungicide, herbicides, and fertilization in the spring could become a package deal. The home owner would irrigate whenever needed. Perhaps this idea is not far-fetched with American ingenuity and know-how.

Tifdwarf has shown considerable shade tolerance compared with other bermudagrasses. However, the shade would no doubt have to be partial shade, not dense.

#### SUMMARY

The development of Tifdwarf is another step forward in efforts to improve bermudagrass greens where bentgrass is not used. This grass, correctly managed, can provide a putting surface similar to bent. It gives the superintendent a wider choice of grasses for Southern greens. It has a great potential as a lawn grass, and undoubtedly other uses will be found, such as for bowling greens and tennis courts. Tifdwarf responds to a wide range of maintenance practices. What it is used for and the results expected will dictate the management program.

#### TURF BOOK AVAILABLE

The Book "Turf Management," a popular educational printing of all matters pertaining to turf, is available at \$10.95 per copy from the USGA, 40 East 38th Street, New York, N.Y. 10016; the USGA Green Section Regional Offices; the McGraw-Hill Book Co., 330 West 42nd Street, New York, N.Y. 10036, or at local bookstores.

"Turf Management" is a complete and authoritative book written by Professor H. Burton Musser and sponsored by the USGA. The author is Professor Emeritus of Agronomy at Pennsylvania State University.





*Effects of vertical mowing of bermuda turf in the fall in Southern California on Poa annua establishment. Photographed in January. Area next to street with dense stand of Poa annua was partially dethatched with a vertical mower in November. Area next to fence containing a few scattered clumps was not dethatched.*

# Vertical Mowing — Aerification — and Poa Annua Invasion

by DR. V. B. YOUNGNER, University of California, Riverside

Turf weed problems can be related frequently to specific management practices. Slight errors in timing of a maintenance operation or improper use of equipment may result in a weed population explosion. This is certainly true for annual bluegrass, *Poa annua*, a weedy grass that thrives under many conditions that may weaken or destroy the desirable turf grasses. Elimination of annual bluegrass from golf greens seldom may be possible, but attention to a few practices can reduce the problem greatly.

Often faulty methods are used because of an inadequate knowledge of the life history and ecology of the weed plants. *Poa annua* populations in golf greens increase and control

methods fail when certain characteristics of the plant are not considered. In much of the United States, heaviest germination of annual bluegrass seeds takes place in the fall. While germination may continue through the winter in regions of mild winter climate such as California, it will be at a much lower rate.

However, in cold-winter regions heavy germination may occur also in the spring. Very little seed germinates during the warm weather from late spring to early fall. Time of germination and length of the germination period can be determined for any area by a little observation.

*Poa annua* seeds require moisture, moderate temperature (optimum about 70°F.), light and

air for germination. Seedlings are poor competitors in a dense turf of perennial grasses.

Flowering begins a few weeks after seed germination, when plants may consist of only four or five tillers, and continues thereafter within a wide range of temperatures and photoperiods. A single plant, therefore, can produce seed continuously for many months. This seed does not germinate immediately, but lies dormant in the soil and thatch for several months, usually until fall. Thus, large quantities of seed, which may be produced by only a few plants, will be ready to germinate as soon as favorable conditions are provided.

### VERTICAL MOWING AND AERIFICATION

Vertical mowing and aerification are necessary management practices for high quality golf greens. Moreover, they are effective means to keep *Poa annua* in check by maintaining a vigorous bentgrass turf. However, performing these operations during the wrong time of the year can have the opposite effect. Disturbing the turf by any means, so as to expose the seed that is almost certain to be in the thatch or soil to light and air, at a time when temperature and moisture conditions are favorable for germination will increase the *Poa annua* population.

There are perhaps few times in the year when these operations will not have some effect on germination, but it is obvious that they should be avoided if possible during the normal time of highest germination rate.

A few years ago a simple experiment on the UCLA campus demonstrated clearly the effects of fall vertical mowing on the subsequent *Poa annua* population. A long narrow plot of U-3 bermudagrass turf which had contained some *Poa annua* in past seasons was divided in half longitudinally. The thatch was partially removed from one half in the fall, using a vertical mower, while the other half was left untouched. Following vertical mowing the entire area was watered as necessary to keep the soil constantly moist. No seed was planted.

Within 10 days after vertical mowing, numerous annual bluegrass seedlings were observed in the dethatched area. A month later this entire area was covered with a solid stand of *Poa annua*, but there were only a few scattered plants in the untreated part.

The following autumn the experiment was repeated, reversing the two treatments. As in the previous year, the area on which the vertical

mower was used contained a dense stand of *Poa annua* in contrast to the untreated area, which had a thin, scattered population. Thus, the dense population always developed on the disturbed area regardless of the condition the previous year.

### TIMING IS IMPORTANT

The lesson should be obvious. While this study was conducted on bermuda turf, the principle illustrated would apply to any turf including bentgrass greens. The same result, although perhaps to a lesser degree, could be expected from fall aerification which would promote *Poa annua* germination in the aerifier holes. This has been observed in one instance where the annual bluegrass plants were evenly spaced in the turf, corresponding to the former location of aerifier holes.

What should you do if the turf condition necessitates vertical mowing, aerification or spiking at an unfavorable time in respect to annual bluegrass? A logical suggestion seems to be to follow immediately with an application of a preemergence herbicide for *Poa annua* such as Bensulide (brand names are Betasan and Presan) or standard lead arsenate. By so doing, many seedlings will be killed shortly after germination.

Germinating seeds are highly vulnerable to drying. Therefore, permitting the soil to dry as much as possible at the surface between irrigations will assist also in reducing the stand. In fact, this is a good practice to follow throughout the year to reduce weed infestation.

Chemical control of *Poa annua* in bentgrass greens is seldom as successful as desired. Often this is the result of poor timing of herbicide applications. If heavy seed germination occurs in the fall, it is illogical to expect control from a late fall or spring treatment. The weed killer must be in the soil at a toxic level prior to seed germination. Where germination may extend over a long period, supplementary herbicide applications may be required to maintain this toxic level throughout the germination period.

There are, as yet, no effective post-emergence annual bluegrass herbicides that are safe for bentgrass greens. As many *Poa annua* variants are perennial rather than annual, spreading vegetatively year after year, the necessity for preventative management becomes more apparent. Once perennial types have become established in a green, the choice must be between living with them or complete renovation.



# Why the Nitrogen Race?

by ALEXANDER M. RADKO, Eastern Director, USGA Green Section

**G**reens comprise but a small portion of the total course but there is no question of their importance to golf. Half the total strokes of a perfect par round are played on the putting surface and approximately 25% of the total maintenance budget is allotted to the care of greens.

Isn't this the crux of the matter? They receive the most play, and so wise superintendents know that they must gear their maintenance practices so that greens excel. When greens are right, players glow and all is well in Golfville!

In reality then, shouldn't greens be in championship condition for most of the season?

What makes a championship green? Let's compare notes. It must:

1. *Be firm but resilient so that it will hold a shot played from a reasonable distance when that shot is properly executed.*
2. *Be fast enough so that the ball will roll freely when properly struck with a putter.*
3. *Be free of excess grain and heavy leaf growth.*
4. *Be of such density that the ball will roll smooth and true.*

5. *Be uniform in texture so that the ball will roll the same from any direction on like terrain.*

This is a big order for a small plant, and indeed each putting green is established from thousands of small plants which mature to make up the total green. By nature, all bentgrasses are not similarly fine-bladed grasses. Management also can alter the appearance and performance of any plant. Putting green grasses are no exception.

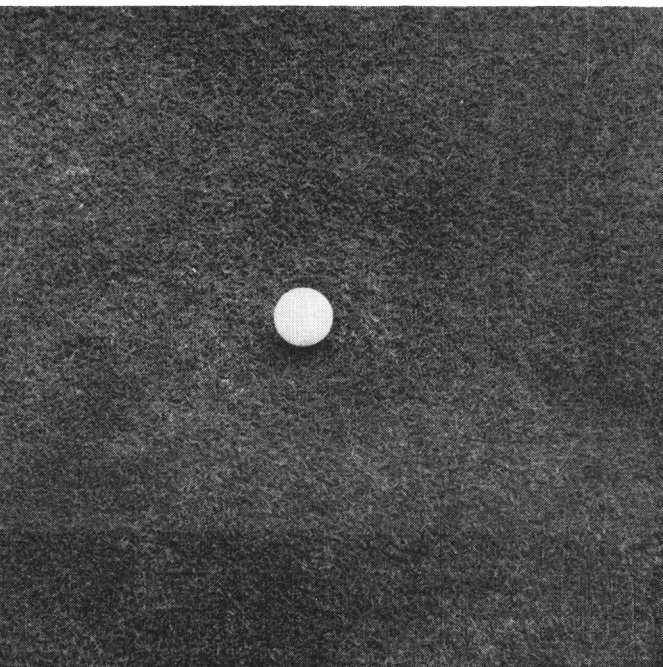
This article will briefly discuss one of the most important factors—the role of NITROGEN management. There is no question but that correct nitrogen feeding is an important phase of every putting green management program.

It has been said that nitrogen is the key element in good turf production, and this is true. Unfortunately, too many interpret this to mean that if nitrogen is so all-fired important, and if a little is good, a lot is a lot better. This, of course, is untrue. There is no substitute for experience and observation when it comes to correct nitrogen applications.

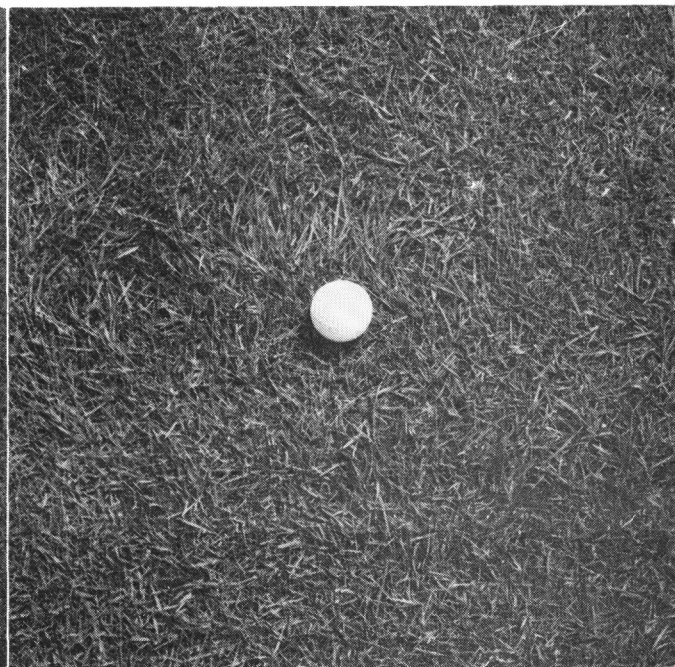
What, then, is the role of nitrogen in putting green management?

1. *It provides color—the upper safe limits provide a deeper, darker green than*

*Better managed creeping bentgrass—a thin-bladed growth—a desirable putting surface.*



*Grainy, stemmy growth of a creeping bentgrass—thick-bladed growth—an undesirable putting surface.*



*This is the same grass (Merion bluegrass), but — heavily fertilized on the right and lightly fertilized on the left. Note the thicker blades where nitrogen levels are highest.*



*the lower rates.*

*(High nitrogen—Good)*

2. *It encourages leaf growth—the upper limits provide more vegetative growth than the lower limits.*

*(High nitrogen—Bad)*

3. *It discourages root growth at the upper safe limits while the lower safe rates encourage far better root growth.*

*(High nitrogen—Bad)*

4. *It provides a soft, rank growth at the upper safe limits and a hardy, healthier growth at the lower limits.*

*(High nitrogen—Bad)*

5. *The higher rates encourage Poa annua invasion far more than the greens fed on the low side.*

*(High nitrogen—Bad)*

6. *The higher rates require more critical water management than moderate rates.*

*(High nitrogen—Bad)*

Except for color, then, is there any argument for keeping nitrogen levels at the highest safe point? A definite and resounding “no” is the answer!

It has been said many times that golf is not played on color, and this is especially true of the putting surface—color doesn't affect a putt one iota. What, then, is a safe rate of application? In the Northeast a number of turf people recommend application of approximately 8 to 12 pounds per 1,000 square feet yearly. This, in my judgment, is much too high as a steady yearly diet. New greens could get by safely with these higher amounts for the first four or five years only because a large per-

centage of the nitrogen applied leaches through the new soil; not all of the nitrogen finds its way into the plant. After four or five years, however, with weathering, compaction, thatch and mat buildup, and a dense turf cover, it seems reasonable to assume that more and more of the nitrogen action tends to take place in the upper fraction of the soil profile. As this occurs, it becomes ever so much more important to alter the nitrogen feeding program downward—not only in terms of the total amount applied but—equally important—in terms of how much per application.

Of course, there are exceptions to all rules but, in general, putting surfaces would fare much better and would be far better playing surfaces if they were kept on the hungry side and fertilized moderately. This is critical to the maintenance of putting green bentgrasses and to preservation of their narrow blades. Heavy amounts of fertilizer cause blades to become thick and rank, and once they exhibit lush growth characteristics, it is extremely difficult, if not impossible, to thin them down again within the same growing season. This then forces excessive use of all kinds of machines—thatcher, grain removers, and aeration tools. It becomes a continuous cycle of roughing-up the greens to keep them in the condition that they were in before they were fed so heavily with nitrogen.

Thus, moderation is the byword in nitrogen management. Greens maintained this way allow some room for safety, while greens maintained at the high nitrogen level can only deteriorate. It will happen especially quickly during conditions of adversity or stress.



Better putting surfaces are a reality when the turf is on the lean and hungry side, they putt smoother and faster, they are more nearly true, they are less likely to become severely infested with *Poa annua*, they are less subject to wilt, and they do not build up a heavy mat or thatch so rapidly. The late Prof. L. R. Dickinson, one of the prominent pioneers in the fine turf-grass field, said it in a nutshell:

"Let the little grass plant grow, don't **make** it grow!"

Putting green turfgrasses should be managed so they will retain their thin blade char-

acteristics, a retention of its dwarf characteristics; not a continuous forcing and fattening process that leads to more and more problems in maintenance. If you are troubled by your present program, cut your nitrogen feeding program in half as a start and then experiment to find your own desirable level. This refers to bentgrasses, not bermudagrasses. You will do better by applying very light applications more frequently than you will if you apply larger quantities infrequently.

Then sit back and watch the smiles as the ball rings, rolls . . . and (?) rattles.

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## Rodent Control

by DR. MARVIN H. FERGUSON, Mid-Continent Director, USGA Green Section

Old-timers speak about a slightly fraudulent mail order scheme that was practiced in the early days of newspaper advertising. The ad would offer a moneyback guarantee that the equipment for sale would absolutely kill bugs and spiders if the buyer would follow directions. The cost of such equipment with printed instructions usually was about one dollar. When the customer's bug killing kit arrived, he found it consisted of two small blocks of wood and these instructions, "Catch the bug and place him on one of these blocks. Then squash him with the other one."

Effective and positive? Yes. Practical and efficient? No.

The practice of rodent control on the golf course comes close to being at the same stage of advancement. There are easier ways to control rodents if one wishes to undertake a full scale attack on all rodent pests. Such a large undertaking usually requires such skills and precautions that most clubs would be well advised to hire a custom eradicator, or to enlist the aid of the state fish and wildlife service.

Most rodent infestations on the golf course are not serious enough to warrant an extensive control program. The usual approach is to catch and kill, or to poison the offenders one at a time.

Moles and pocket gophers are the most troublesome of the animals that inhabit golf

courses. Ground squirrels are frequently found, but they seldom cause damage on the most heavily used portion of the course. In arid regions, and exceptionally dry years, jack rabbits may come for miles to feed on lush putting greens. They have been known to eat bentgrass turf literally into the ground.

### RABBITS

Of the pests mentioned, only rabbits inflict damage by actually eating the turf. A repellent material such as thiram, which can be sprayed on the turf, can be quite effective. Moles, gophers, and ground squirrels are nuisances because of their burrowing habits.

### MOLES

Moles feed on insects such as beetle grubs and on earthworms. They tunnel through the soil in search of food and raise small "runs" and mounds in moist, soft earth. Little damage occurs unless the raised soil dries out, or unless the area is mowed and scalped before the raised area has been depressed.

The most effective way to keep moles out of the golf course is to do a good job of eliminating grubs and worms. Chlordane, used at the rate of 8 to 10 pounds of active ingredient per acre, or dieldrin used at the rate of 5 or 6 pounds active ingredient per acre will control beetle grubs and reduce the earthworm popu-



*The new and the old. A new gopher mound is hard on fairway mowers. An old one smothers the grass.*

lation for a period of 5 years or more. In the absence of food, the mole will seldom be a problem. The few that may occur can be trapped with devices available at most farm supply stores.

### **GOPHERS**

Pocket gophers feed on roots, tubers, grains, and other vegetable matter. They do not normally harm grass roots, but the mounds of earth thrown out of their tunnels can be a decided nuisance. Where they occur in large numbers, gophers can cause such unevenness of the ground (even in the rough) that mowing is very difficult.

There are two main methods of ridding an area of gophers—trapping and poisoning. Poisoning is done by introducing poisoned grain into the burrows. Usually, thallium or strychnine compounds are used in making the bait. Wheat, barley, sorghum, or peanuts may be treated with the poison. Inasmuch as most users will need relatively small amounts, it is best to buy prepared baits from feed supply stores or from professional exterminators. These are extremely dangerous materials and should never be left where they might be encountered by children or pets.

### **GOPHER MACHINES**

The poison bait is introduced into individual burrows by probing the run near where

a fresh mound has been thrown up. About one teaspoonful of bait in one spot is sufficient. In the case of large area infestations, mechanical "burrow-builders" may be used. This tractor-mounted machine consists of an elongated oval "torpedo" or "mole" at the end of a chisel which is pulled through moist soil at a depth of about six inches. Poison grain is introduced into these mechanically dug burrows. Gophers will follow these runs where they intercept their own and will find the poison grain. Mechanical burrow builders would likely be used on a golf course only in rough areas or as a perimeter treatment as an attempt to prevent invasion by gophers.

Various types of smoke and fume bombs, cyanide crystals, and even carbon monoxide injectors which attach to tractor exhausts are among the control devices sometimes employed to kill gophers in the burrows.

### **OTHER RODENTS**

Although skunks and armadillos are not rodents, they sometimes root up turf. The prevention of such damage depends upon ridding the turf of insects.

Rats and mice are seldom a matter of concern around the golf course, except in seed storage areas or around the clubhouse. Anti-coagulant type poison baits are very effective and extraordinarily safe to use if simple precautions are followed.

This discussion may be summarized by saying that if you have a serious rodent problem, seek professional help. If there is only a scattered infestation, employ your trapping and hunting skills to destroy the individual offender.

*The beginning (or ending) of a rodent's run!*





# Random Sampling

by HOLMAN M. GRIFFIN, Agronomist, USGA Green Section

During the course of any year, turf people attend a varied assortment of conferences and meetings from which much useful information may be gleaned. I use the term gleaned because we must separate the grain (useful information) from the chaff (misinformation). Even so, it is interesting to note that even misinformation can sometimes be helpful by giving someone a useful idea.

Here are some random samples of information picked up during recent meetings which seem noteworthy.

## *Merion and Improved Bluegrasses*

Merion Kentucky Bluegrass has many faults, but it is still the standard by which other bluegrass strains and mixtures are measured. The main fault of Merion is the genetic uniformity of all plants in a stand of turf. When one plant gets into trouble from one of the serious pathogens, all other plants in the stand are susceptible and usually the whole area is in danger.

Improved bluegrass varieties may not be too far off, and many researchers feel that mixtures will provide a better answer than a single genetic strain. Improved varieties of fescue, bentgrass and ryegrass are also being tested, and show promise for the Northern turf areas.

## *Seed and Water Treatments*

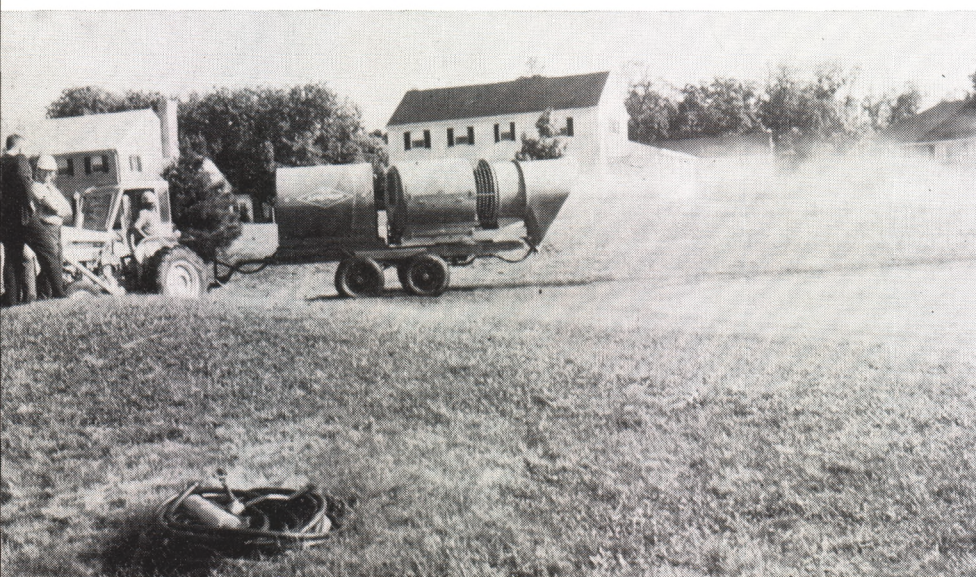
Dr. Herb Cole, Pathologist at Penn State University, urges seed treatment with fungicides to prevent seed-borne diseases. Many commercial growers now treat their seed before planting and it seems golf course superintendents could benefit by the same procedure.

If you are thinking about treating your water supply for aquatic weeds but have some doubts about turf injury from chemical residual in the water, try spraying the water on tomato plants and observing the reaction on these sensitive plants before using it on the turf.

## *Fungicide and Herbicide News*

Air blast sprayers are seeing some limited use on golf courses for applying insecticides and fungicides, but they are quite expensive and downright dangerous in applying herbicides. This type of sprayer can also be used to blow away leaves in the fall, dry dew off greens, and other incidental chores. With a little imagination, you may be able to justify the cost.

Herbicide injury to turf is increased by high temperatures and atmospheric conditions which allow them to dry slowly on the leaf. Careful calibration of spray equipment and proper timing are essential for good results.



*Air blast sprayer  
being used on  
greens.*

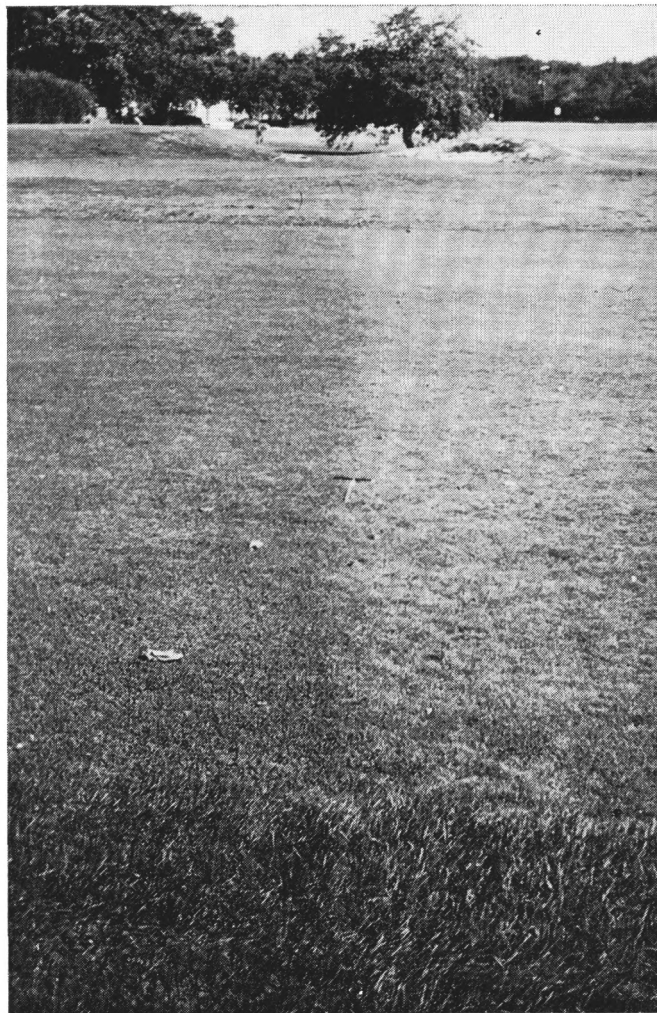
Many manufacturers include a wetting agent in their fungicide material, and adding more may reduce their effectiveness, especially against leaf disease. Too much reduction in the surface tension of water droplets can cause the material to drain off the leaf immediately and into the soil without leaving enough chemical residue on the leaf to do the job. Wetting agents can do a job for us if properly used, but that extra pinch for good measure is just as bad here as it is with other chemicals.

Liquid polyethylene or improved "stickers" may provide some help in increasing fungicide effectiveness when and if they are marketed to turf growers. Also in the "when and if" department are the systematic fungicides—a type of fungicide protecting the plant against disease by its circulation within the plant's system. Such fungicides, now being sought by the research departments of several major companies, could be a major breakthrough in combating turf disease.

### On The Way Out?

"Careful, you could be replaced," is the admonition placed on a card stuck in a piece of polypropylene synthetic turf on the desk of a turf man. Synthetics may well have a place on certain areas of golf courses, but I hardly think they are going to replace anyone. This "bogus bluegrass," as it might be called humorously, may be a definite aid rather than a threat to some turf growers with impossible traffic situations on the course.

These are only samplings of information available at turf meetings around the country. You can surely pick up a few useful random samples of your own.



*Fungicide injury. Turf on left not sprayed. Turf on right sprayed with a very light rate of hormone type fungicide but under adverse weather conditions. It is weak and loaded with disease.*

## COMING EVENTS

### NORTHWEST TURFGRASS CONFERENCE

September 20-22, 1967, Harrison Hot Springs Hotel, Harrison Hot Springs, British Columbia, Canada  
Chairman—Dr. Roy L. Goss

### ARIZONA TURFGRASS CONFERENCE

September 25, 1967, University of Arizona, Tucson, Arizona  
Chairman—Dr. W. R. Kneebone

### UTAH-IDAHO TURFGRASS CONFERENCE

October 2-3, 1967, Salt Lake City Garden Center, Salt Lake City, Utah  
Chairman—Mr. Deloy Wilson

### TEXAS TURFGRASS CONFERENCE

December 4-6, 1967, Texas A & M University, College Station, Texas

### WISCONSIN WINTER SYMPOSIUM

December 13-14, 1967, Milwaukee, Wisconsin  
Chairman—Mr. D. E. Hornibrook, Wisconsin  
GCSA, 1044 Laurel Court, Neenah, Wisconsin

### VIRGINIA TURFGRASS CONFERENCE

January 23-24, 1968, Golden Triangle Motel, Norfolk, Virginia  
Chairman—R. E. Schmidt, Virginia Polytechnic Institute

### CORNELL TURFGRASS CONFERENCE

February 26-29, 1968, New York State College of Agriculture, Ithaca, New York  
Chairman—Dr. J. F. Cornman



# TURF TWISTERS

## FLATTENING FURROWS

**Question:** Our golf course was built on farm land where the furrow rows were not removed. Consequently some fairways are extremely bumpy. Can these furrows be removed by a heavy roller? (New Hampshire)

**Answer:** No amount of rolling will help—the furrows can only be effectively removed by lifting the sod, re-grading the soil, and replacing the sod.

## SANDING BUNKERS

**Question:** We are considering placing bunkers on our golf course. Is there a recommended granule size for the sand to be used? Our golf course is also subject to constant strong winds during the spring and early summer months. (Idaho)

**Answer:** The USGA recommends a coarse grade of sand for all bunkers. Concrete sand might be your best choice because of the wind problem, but brick or plaster sand is most commonly used. A sand with many pebbles should be avoided if possible—not only for the golfers' sake but the mowers' sake as well.

## GROWING FAIRWAYS

**Question:** Late last fall I applied 2,4-D to fairways, and they exhibited abnormal growth. In fact, they looked like they were fertilized. Does weed killer have this effect on turf growth? (New York)

**Answer:** Yes, a hormone type herbicide may stimulate growth of any plant that it comes in contact with. Broadleaved weeds when sprayed with 2,4-D die because they "outgrow" themselves. This may also have a stimulating effect on grasses; they could grow so quickly that they appear to have been fertilized. This late forced growth could also increase chances of winter injury.