



Better Turf for Better Golf

TURF MANAGEMENT

from the USGA Green Section

TRENDS IN GOLF COURSE MAINTENANCE

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DEMANDS for more nearly perfect playing conditions on the part of golfers, and insistence upon economical maintenance by boards of governors, sometimes provide a considerable squeeze for the golf course superintendent. The conscientious superintendent seeks ways to provide the best possible playing conditions within the limits of his maintenance budget.

Such pressure, applied constantly, does not produce revolutionary changes in maintenance practice, but it does force gradual changes. Because superintendents participate in educational conferences, field days, and group meetings, ideas are exchanged and items of information which lead to changes in practice are disseminated. Most of these changes represent minor departures from previous practice. Thus, a better method of carrying out any particular operation soon finds acceptance throughout a region.

Of course, not all changes can be put into effect on all courses even though they may be changes for the better. Individuality of golf courses requires that maintenance practices vary to suit the particular needs of a course. Nevertheless, one may observe trends in the changing maintenance methods.

Considerable change has been brought

about by research. Public research agencies have contributed greatly to the basic knowledge or the principles which underlie the practices used. Industry, through its research efforts, is constantly producing new machinery and materials, largely tailored to fill some specific need on the golf courses. Some of the contributions of research have almost had a revolutionary impact upon maintenance. Recent examples of these contributions are found among the pre-emergence herbicides and in machinery for vertical mowing.

It may be well to note some of the trends concerned with practices now considered to be standard. Some of these tendencies toward different techniques are well-defined. Others are so gradual as to be barely discernible.

Fertilization

In recent years new materials have been produced which have had an effect upon fertilizer usage. This is particularly true in the case of nitrogen carriers. Urea-formaldehyde products which release nitrogen slowly are now being marketed and it is expected that these materials will affect fertilizer practice. There still is much to be learned about the behavior of these materials on different grasses and in different seasons. They provide several advantages.

Nitrogen is released slowly; they are clean and easy to handle; and they are high analysis materials, thus reducing handling and shipping costs per unit of plant food.

High analysis soluble fertilizers have also come to be used in increasing amounts on golf courses. The soluble or liquid fertilizer picture has changed quite rapidly since improved techniques in the manufacture of liquid materials has enabled their makers to compete more favorably in terms of price than was possible a few years ago. The development of urea plants and improved methods of combining liquid phosphoric acid with anhydrous ammonia has made these materials relatively plentiful and relatively cheap. Storage and transportation of the liquid materials offer the biggest drawback to their usage.

There has been a general trend for a good many years toward the use of higher analysis materials. This trend has been observed in the entire fertilizer field. Insofar as turf is concerned, there has been a greater use of materials relatively high in nitrogen as compared to the contents of phosphorus and potash. On putting greens, especially, there has been a tendency to use less phosphorus since it has become known that bentgrass uses phosphorus in relatively small amounts compared to its need for nitrogen.

In much of the Southwest there has been a movement toward the use of very light and very frequent applications of fertilizer on putting greens. Many golf courses are finding that they have excellent results by applying approximately $\frac{1}{4}$ pound of nitrogen per 1,000 square feet each week. This method of applying fertilizer to putting greens requires a little more labor and a little more time, but it contributes to a uniform rate of growth and there is never a great build-up of nitrogen in the soil. Therefore, if one runs into a period of weather favorable to disease, he can simply skip one or two applications of fertilizer until the weather returns to more nearly normal. This method has been practiced in the use of organic as well as inorganic materials.

COMING EVENTS

1956

August 7:

Rutgers Turf Field Day
Rutgers University
New Brunswick, N. J.

August 15-16:

25th Annual Golf Course Superintendents Field Days
University of Rhode Island
Kingston, R. I.
Silver Jubilee, evening of Aug. 15
Point Judith Country Club
Narragansett, R. I.

September 25:

St. Louis District Golf Assn. Field Day
St. Louis, Mo.

September 26-27:

Northwest Turfgrass Conference
Washington State College
Pullman, Washington Prof. A. G. Law

September 28-29:

Utah Turfgrass Conference
Utah Copper Golf Course
Magna, Utah J. W. Richardson

October 1-2:

Rocky Mountain Turfgrass Conference
Colorado A & M College
Fort Collins, Colo. Prof. G. A. Beach

October 4-5:

New Mexico Turfgrass Conference
New Mexico College of Agriculture & Mechanic Arts
State College, N. M. Prof. C. E. Watson

November 12-16:

American Society of Agronomy Meetings
Cincinnati, Ohio

Grasses

One of the peculiar things about turf-grasses, as compared to other agricultural crops, is the fact that relatively few species and very few strains or varieties have been used for growing turf. This is true despite the fact that there are many types of turf grown under many varying climatic and soil conditions. This situation is changing rapidly. A great many new strains are being developed and older strains which have proved to be superior types are being planted more widely. It is expected that this tendency toward the use of a greater number of strains is likely to continue. One of the factors that has deterred some users from growing the improved strains of bentgrass and bermuda

is the fact that most of the improved strains must be planted vegetatively. Vegetative propagation certainly is a disadvantage. However, several fairly satisfactory methods of vegetative propagation are available to the grower, and while vegetative planting may be somewhat more laborious and more expensive, the superiority of improved strains more than offsets the difficulties involved.

As vegetative strains come into greater usage, there is an increasing need for certification programs in all the states. Many of the golf course superintendents of the United States have a strain of Washington bent which they have grown on their golf courses. It is believed that if all the strains of Washington bent that are being grown in the United States were brought together, one might find a great diversity of types among them. The situation concerning Cohansey (C-7) bent has become almost as bad. Because of its distinctive color, it is generally thought that any bentgrass with a pale green color must be a type of Cohansey bent; consequently, there are many different grasses being propagated under this name. As more and more vegetatively propagated grasses come to be used, certification programs within the states will become a greater necessity.

U-3 Bermudagrass and Zoysia are producing a considerable impact upon the turf of golf courses in the transition zone between the areas of Bermudagrass adaptation and the areas in which cool season grasses are normally grown. These grasses also are presently propagated only by vegetative material. It is anticipated that Zoysia may be propagated by seed in the future.

Watering

Changes which have come about in the practice of watering are rather difficult to define. As a result of research and education efforts within recent years, there has come to be a better understanding of the water requirements of grasses and of the dangers attendant in overwatering. Watering practices, however, still defy

precise definition. Soils must be kept moist, but they must not be kept so wet that the water in the pore spaces of the soil excludes the air from those pore spaces. While it is not possible to describe in well defined terms the advances that have been made in watering practice, it is believed that attention to research and education in this particular phase of turf management has promoted greater vigilance and greater attention to the water needs of turf. This increased vigilance has contributed greatly to the proper use of water within the last few years.

Disease Control

Diseases continue to be one of the major problems in the maintenance of putting greens. Diseases which caused great concern twenty years ago have been controlled fairly effectively by modern fungicides. Brown patch and dollar spot are no longer the scourge they once were. However, there are many other diseases being found on putting greens. Some of these may be organisms not previously found on turf, while others may result from mutant strains of fungi previously thought to be nonpathogenic that have become capable of attacking putting green turf. The fact that we are finding different organisms attacking putting green grasses may be partly due to the fact that we are now able to identify them more quickly and positively.

It is quite common to find several organisms attacking grasses at the same time. This is particularly true in the case of *Helminthosporium* spp., *Curvularia* spp., and *Pythium* spp. This multiple occurrence of diseases has led in some instances to the multiple use of fungicides. It is not uncommon to find superintendents using a mercury compound, a cadmium compound and an organic fungicide all at the same time. Care must be used in the formulation of such a "shot gun" mixture because of the fact that some of the fungicidal materials are incompatible. However, this practice has worked well for numerous superintendents.

Industry and some of the state institutions are working on what they term broad spectrum fungicides which are designed to control more than one disease organism. Experience with these materials has not yet been sufficient to permit a prediction of their widespread use. It is anticipated, however, that fungicides of this type will find considerable use and that they will be effective against the several organisms that may be found occurring simultaneously.

Weed Control

Weed control on golf courses underwent a revolutionary change when 2,4-D was developed. Since that time, there have been numerous hormone-type weed killers developed for specific purposes. One of the newer contributions to weed control has been the development of pre-emergence herbicides. These materials are not yet in widespread use on golf courses, but some of them are being used to a limited extent to combat goosegrass or crowfoot on putting greens, and research work is under way to determine their effectiveness in combating *Poa annua*.

Maleic hydrazide, another of the growth regulating materials, has found a place of usefulness in spraying areas which must be trimmed by hand. Bunker edges and grass growing under benches, around trees and around immovable objects, may be slowed down by applications of this material.

Temporary soil sterilization is frequently necessary for the weed-free establishment of new seedings. It has been the common practice for several years to use methyl bromide as a fumigant for temporary soil sterilization. This method works very well, except for the fact that some sort of airtight tent is required to keep the fumigant in contact with the soil until sterilization has been effected. A new material developed fairly recently appears to do a satisfactory job of soil sterilization without the necessity for using an airtight tent. This material is Sodium N-methyl dithiocarbamate. This material is applied

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Winmesa Farms Company, Phoenix, Ariz.

as a soil drench and, as it volatilizes, it kills weed seeds, nematodes, and fungi in the soil. Because of the newness of this product, it has not yet found extensive use.

Mowing

The basic elements of mowing practice have undergone relatively little change in recent years. The development of the horizontally revolving blade, or "whirl wind type" of mower, has enabled golf course superintendents to mow roughs with much greater efficiency than was possible with the use of the sickle bar. The development of a vertical mower for the purpose of removing grain and thatch from putting greens has been considered a significant contribution to turf maintenance.

There appears to be a general trend toward larger and more closely mowed tees. Some superintendents believe that a closely mowed, well-groomed tee invites more respect and care on the part of the player to avoid damage. The mowing of collars of greens at an intermediate height is becoming a more widespread practice. In many cases collars are mowed from $\frac{3}{8}$ "

to $\frac{1}{2}$ ", whereas putting greens are mowed from $\frac{3}{16}$ " to $\frac{1}{4}$ ". This close mowing of collars is in keeping with a tendency to devote more attention to the collars of putting greens. This is an area that has been neglected and collars are poor during late summer throughout much of the country. Better mowing practices and greater attention to the watering and control of diseases in these areas certainly appears to be in order. The improvement of the area immediately around the putting green actually has the effect of making the putting green seem larger.

Cultivation

Cultivation may be considered a newcomer among the standard maintenance practices. While some hollow tined forking, and some spike disking (by a hand operated disk) had been practiced for many years, it was not until about 1946 that the first machine for thorough, large scale, cultivation of soil under turf was developed. The rapid adoption of this practice by golf course superintendents throughout the nation was nothing short of remarkable. Cultivation has been found to be useful for thatch control on putting greens, for the elimination of compaction, and for the improvement of water infiltration. Superintendents have been so zealous in their practice of cultivation that golfers have sometimes despaired of ever having any smooth putting greens to play on.

While most grass growers feel that it is hard to overdo the matter of cultivation, there are times that grass is not growing rapidly when cultivation may leave scars which are slow to heal. During these periods the superintendent seems likely to come to the use of a little less drastic cultivation technique. Power drawn disk spikers are presently available which will do a reasonably good job of penetrating thatch and surface compaction and of increasing the rate of water infiltration without seriously marring the putting surface. The use of such machinery may come to be used to a greater extent during difficult periods, leaving the more thorough

cultivation methods for the seasons when grass is growing rapidly and when scars will heal in a relatively short time.

Topdressing

There is a general tendency on the part of the American people to follow any given trend too far. This may have occurred in connection with the practice of topdressing. Twenty-five years ago it was customary for topdressing to be done rather frequently. In recent years, less topdressing has been done and the trend has grown to the point where many golf course superintendents have felt that topdressing probably was no longer necessary. It appears likely that this "anti-topdressing" movement may have gone too far in some cases. It is almost certain that a moderate amount of topdressing would be helpful to many golf greens. Topdressing certainly can be used to true the surfaces of putting greens. It appears to provide some help in combating a build-up of thatch on putting greens and the use of a sandy topdressing material appears to improve the quality of the putting green, insofar as its ability to hold a golf shot is concerned. Probably there will never be a time when topdressing is practiced to the extent that it was two decades ago, but it appears certain that it will be practiced to a greater extent in the future than it has been in the last decade.

Labor Management

Labor management is one of the truly difficult problems for golf course superintendents. As industry has granted increased benefits and shorter hours to working men it has become more difficult for golf courses to maintain an adequate labor crew, working long hours at relatively low pay. In some cities golf course labor forces are affiliated with trade unions. It is quite difficult to plan golf course work, which consists of many different types of work, when workmen are classified so that they are only permitted to do certain jobs and are only permitted to work a certain number of hours per week. The difficulties of labor management have contributed

greatly to the increased cost of golf course maintenance. There is perhaps no other problem which requires more study and more understanding.

Work Planning

One of the golf course superintendent's most important tasks is the thorough planning of his work, insuring the most efficient use of his crew. It is believed that more golf course superintendents are preparing their own budgets at the present time than in the past. This appears to be a good thing for the golf course superintendent because the very necessity for thinking through his year's program helps him in laying plans for efficient use of his labor.

Needs

The changes in practices discussed have contributed to excellent turf. They have contributed to efficient maintenance. In many cases these changes have resulted in the cheaper performance of some operation. However, turf maintenance is not

becoming cheaper. One of the disturbing factors about golf course maintenance is its ever rising cost.

There is only one way to provide good maintenance at a reasonable cost. That way is through greater efficiency. We need improved methods, improved machinery, better and more precise herbicides and fungicides, and more capable men. Education and research provide the key. It is estimated that industry spent for research in 1955 (4 billion dollars) a sum equalling 1% of the national economy for 1955 (400 billion dollars). Golf courses spent for research, an amount equalling approximately 3/100 of 1% of the estimated cost of golf course maintenance for the year 1955. A thirty-fold increase in our research efforts would go a long way toward increasing the efficiency of golf course operation to a point comparable to the efficiency of American industry. If every golf club in this country were to set aside 1% of its annual maintenance budget for research, there can be little doubt that increased maintenance efficiency would repay this cost many times over.

MAINTENANCE MANUALS ARE MEANT TO BE READ

By CECIL PUTTY

President, Catto & Putty, San Antonio, Texas

Maintenance and parts manuals are provided with every major piece of equipment that is purchased by a golf course superintendent. Have you ever read one of them? Experience indicates that most people neglect to read them and quite often neglect to file them. The maintenance manual should be read thoroughly before the equipment is ever put into operation. It shows how to operate the piece of machinery, the adjustments that need to be made, the points which need to be lubricated, the frequency with which they need to be lubricated, and it usually contains a catalog of spare parts.

Equipment manufacturers go to considerable lengths to determine the best

method of operation for their machine, its lubrication needs, and the proper adjustments for most efficient operation. Most pieces of equipment are thoroughly engineered to do a specific job. However, proper adjustment and operation in accordance with the design and capabilities of the machine are necessary if it is to be effective and efficient. Failure on the operator's part to read the maintenance and operation manual is very likely to result in a reduction in the efficiency of the machinery, simply because recommended procedures have not been followed. By all means, read the manual that comes with your equipment and then file it so that it may be used as a ready reference in case repair or replacement parts are needed.

From a talk presented at the Central Texas Regional Meeting of the Texas Turfgrass Association.