NOVEMBER 1963

USGA GREEN SECTION RECORD

A Publication on Turf Management
by the United States Golf Association

KEEPING THE PLAYERS INFORMED

Lee Bowman, superintendent at Cedar Crest Golf Club in Dallas, believes that players who are informed will appreciate efforts to improve the course and will not complain about the use of temporary greens. *(See page 1.)*

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For Whom Do You Manage?

A Message to Golf Course Superintendents

By DAVID M. LILLY

"For whom do you manage?"

The obvious answer is: "For the club or the park system that pays my salary." But like most obvious answers, it does not tell the whole truth.

To discover who your real bosses are, let us translate your job into business terms. The position of golf course superintendent is equivalent, in a business, to one of the officers of a corporation. You are part of the management team and, as such, answerable to the stockholders, the true owners of a corporation.

Stockholders, as long as the dividends keep rolling in, are very pleasant people who remain discreetly away and make an appearance only at the annual meeting. The stockholders may also be customers for the products or services offered by the corporation, but generally they form a very small if significant portion of the customers.

Let's see how your situation compares with that of the usual corporation officer. Your stockholders are the members of your golf club; your customers are these same members. This is one case where the customer is always right. You know he is because he also is your boss.

In one way, this is a desirable arrangement. In a corporation the stockholders are interested in a healthy profit on their invested capital. To make sure of the good health of the profit, they insist on the lowest possible operating costs. The customers, on the other hand, want the best product they can obtain—for the lowest possible price. Management is caught between these two opposing forces.

For you, however, the stockholder and the customer are one and the same. If he wants new or extra services, he knows it will cost him more money.

There is, then, for the golf course superintendent no real conflict of interest. At least, there should not be. Your job is to develop and maintain satisfactory turfgrass. How you do the job is your concern, as long as you remain within the confines set by club policy. How well you succeed is the concern of your customer-stockholder, the golfer.

In order to manage turf for the golfer, we ought to recognize that he appears in a variety of forms. Dr. J. M. Adam of Detroit recently described one type of golfer whom you know very well and have probably met most often in your nightmares.

Needless to say, that type is not familiar with the superintendent's problims. He expects, when he steps on the first tee, to find tees, fairways and greens cut perfectly, traps raked, and everything in top condition. He does not care what fertilizer is used; he is unaware that there are fungi and insects that attack grass. He does not even realize that an organism known as a nematode is lying in wait to destroy all the grass on the golf course.

Our golfer does not realize that greens have to be aerified and spiked or topdressed. But he does know that each time he has an important client or valued friend out for a game, the greens invariably are being torn up by a machine that punches them full of holes, and then covered with a dark soil mixture that sticks to his feet and makes it impossible to putt accurately.

He may not realize or care that you

are on a strict budget, but he is convinced that he pays enough in dues to have the finest of playing conditions. His list of complaints is long and includes: lack of water in the ball washer; absence of a score card or towel, or presence of a dirty towel; workmen watering or mowing on a green or fairway; no bench at the tee; limbs, paper or other trash on the course.

Many of these "beefs" are little things, but they add up to a substantial part of the golfer's picture of his course. That is a point we are apt to forget. It is his course. He is a stockholder, and the whole point of the operation is to keep him satisfied and playing golf.

The purpose of this discussion is not to tell you how to manage; rather, it is to highlight areas peculiar to your profession and to emphasize the uniqueness of your position as a manager of an operation in which owners and customers are one and the same. This is true whether you are employed by a private or a public golf course.

Perhaps another way of looking at your position is to place yourself in the shoes of the sole owner of a private or semi-private course. As an owner-operator, you must compete with all other clubs in the area for business, for customers, for golfers. This must be done in such a manner that you produce a reasonable profit—first, as salary for your time; secondly, as a return on your investment. Efficient management and improvement of your assets is mandatory.

As O. J. Noer has so often said, "The golf course is no place to save money." Such a philosophy automatically would lead you to certain decisions. For example, you would purchase equipment and materials on the basis of their quality and known performance. You could not afford to risk the purchase of inferior products or products of doubtful benefit. You would purchase as economically as possible just as long as the cheaper product or material was consistent with the quality demanded. The key here is that you must *know.*

Similarly, you could not afford to experiment on your greens. If experimentation were necessary, this would be done on a nursery area. Even better, you might let the producer prove performance and the state experiment station evaluate.

Many other examples might be cited to illustrate the viewpoint of the owner-operator whose very livelihood depends on attracting and serving customers with a satisfactory product—a golf course in such a condition that it is the first course the customer wants to play.

The advancement of golf course maintenance practices over the last 10 to 15 years has been revolutionary. Today's golfer expects, in fact demands, a degree of conditioning or manicuring that would have been virtually impossible to attain a decade or so ago. The fact that you have kept abreast of developments and still hold a position as golf course superintendent is, in itself, a tribute to your managerial abilities. When it is also recognized that many of the management practices you appy are in *direct conflict with sound agronomic principles,* it is easy to understand why you hold an important position on the golf course management team. Unfortunately, your customer may not recognize or appreciate this cardinal point.

As a customer, he does not recognize or care that bluegrass fairways or tees demand a height of cut of 1 1/2 inches. He wants to play from a tee cut at 1/2 inch, and he does not expect a cuppy lie on the fairway. He wants his

fairway cut at 1/2 to 3/4 inch. From an agronomic standpoint, this simply means substituting bentgrass for bluegrass on tees and fairways.

It is your responsibility, as manager in charge of maintaining turfgrass, to take the steps necessary to provide weed-free turf that plays in accordance with the golfers' demands. Further, it is your responsibility to advise those for whom you manage (through their duly elected representatives) what will be the consequences of subjecting bluegrass tees and fairways to a 1/2 inch height of cut. This involves a presentation of why a grass like bent must be introduced, what this will mean in terms of additional maintenance, and how this will require an increase in budget. At this point, the "owners" must decide whether, in order to play at the height of cut which as customers they have demanded, they are ready to provide the additional capital required to support the project.

It is equally important that you study and evaluate your entire operation in order to ensure that every phase is being accomplished in the most efficient manner. It may be opportune to prepare a careful cost analysis to determine if now is the time to automate your irrigation system and to purchase hydraulically operated mowers and other equipment that will cut more acres per day per man.

The point is that it is your responsibility to keep the *owners* apprised of the impact that the *customers'* demands have on the over-all operation. Certainly, you should not permit the continued low cutting of bluegrass, nor should you permit reseeding of these areas with more bluegrass and fescue without calling the situation to the attention of those for whom you manage.

You may think that such a situation would not occur in this day and age—yet, Dr. Smith, reporting in a survey conducted by Charles Chapman, of Detroit, wrote: "The study showed that in spite of the well-known fact that bluegrasses and fescues do not thrive with short cutting heights, or 40 clubs surveyed in one of the major metropolitan areas, 10 with substantial percentages of bluegrass and three with fescue on their fairways cut them at 3/4 of an inch or less. One course, with 100 percent bluegrass fairways, was cutting at 1/2 inch. Two courses who cut their fairways at 3/4 of an inch reseeded them in 1961 with bluegrass. The same paradox exhibited itself on tees, where 10 clubs with major proportions of bluegrass were cutting their tees at 1/2 inch to 3/4 inch."

Another case in point has to do with play in late fall-early winter and late winter-early spring. From an agronomic standpoint, play at such times may be quite damaging, especially if frost is present or if the ground is partially frozen. All of the damage may not be visible immediately. Some, such as that resulting from soil compaction, may not become apparent until midsummer.

Prevention of all traffic during these periods would eliminate any problems, but there are some who like to play then. Again, you as the golf course superintendent have certain responsibilities and obligations in this respect. You should (1) thoroughly acquaint the owners with the potential damage from uncontrolled traffic; (2) budget funds to provide for additional maintenance required to correct injury and to bring this course into top playing condition in as short a time as possible the following spring; and (3) prepare and present programs for diverting play to temporary greens (where such are feasible), for absolute

control of traffic during periods of adversity, and for re-routing traffic to avoid damage to critical areas.

Once such information is made available to the "owners," they must make the decision affecting themselves as players. You, as manager, must then abide by the owners' decision and do the best with what is available. For even if you were the owner-manager, as we discussed earlier, you still would have to decide whether you could risk denying good customers the privilege of playing in order to protect your turf.

In summary, always remember that the customer is the "King of the Marketplace." Continued customer preference for a service or for a product is the key to a successful business—whether it be a golf course or the manufacture of automobiles—recognizing, of course, that the product of service must be satisfactorily produced at a profit.

The golf course superintendent is unique in the respect that the customers he serves also are the owners. There are both advantages and disadvantages in such a situation. As customer, the golfer does not care how you do your job. As owner, he expects the maximum benefit from his investment. But first of all, and most of all, he expects to play golf under the best conditions possible.

Because you know "for whom you manage," you must know that your job is not to provide the best turf but the best *playing* turf.

Bermudagrass in the Northeast

By **HOLMAN M. GRIFFIN,** Northeastern Agronomist, Green Section, The United States Golf Association

Since 1938, U-3 bermudagrass has found favor and has been used more and more as a fairway and tee grass in the transition zone of the Northeast. This grass is adapted to the northern extremes of the bermudagrass region where other bermuda strains winterkill, and it works well in the southern extremes of the bluegrass-fescue-bentgrass region where cool-season grasses do poorly in summer.

Although climatic factors handed U-3 bermudagrass a severe setback in many areas last winter, this grass remains a good answer to the difficult problem of what to grow where winters are too cold for warm-season grasses and the summers too hot for cool-season grasses.

Because of increasing interest in U-3 bermudagrass, is might be well to consider the maintenance program it requires. U-3 is not unlike other bermudagrasses except for its cold hardiness and medium texture. It makes its maximum growth during the hot summer months when crabgrass is a serious pest in the cool-season grasses, and forms a dense, vigorous turf that discourages weed invasion of any type.

U-3 is seldom damaged by insects or disease and is highly resistant to damage from herbicides, fungicides, and insecticides. Occasional attacks of grubs, cutworms or sod webworms are easily controlled with standard insecticides on the market.

Most serious of the U-3 problems is the thatch condition which develops if this material is not removed. Cutting heights above 3/4 inch tend to cause a fluffy condition and encourage thatch.

Removal of thatch is a time-consuming and laborious task but results are rewarding. The vertical mower and the thatching machine are most fre-

quently used for direct thatch removal, but aeration, frequent mowing, and liming where needed all help to discourage thatch formation. These practices are best accomplished when bermudagrass is actively growing, as disturbing the soil at other times encourages weed invasion. In some instances a drag has been helpful on fairways when they are dry to break up clippings and get them down through the grass into contact with the soil.

Bermudagrass begins to grow when temperature reaches 50° F. or above and will continue to grow even at cooler night temperatures provided the daytime temperatures are sufficiently high, 70° F. or above. From this point in early spring when U-3 begins to grow, it needs feeding and will require about 1 pound of nitrogen per 1,000 square feet at 20 to 30-day intervals for the period when it is actively growing. No quick release or soluble nitrogen should be applied to the grass for approximately three weeks before frost to allow the grass to harden off before it becomes dormant.

Normally about 4 to 5 pounds of nitrogen per 1,000 square feet per season is sufficient and approximately one-half of this amount should be supplied in the form of a complete fertilizer containing phosphorus and potash. For best results the complete fertilizers should be applied in spring and fall. The spring application will increase root growth and make the plant more vigorous to compete with spring weeds, and the fall application will strengthen the plant going into winter.

Although the U-3 is a drought-tolerant grass as compared with the cool-season grasses normally grown in this area, good watering practices are essential. When watering U-3, adequate moisture should be applied to soak into the soil to a depth of 6 or 8 inches, and no more water should be applied until the turf begins to exhibit signs of moisture stress during the warmest part of the day. Too much water can cause shallow rooting with resulting droughty turf and may cause rotting of roots and rhizomes under conditions of poor drainage.

During the past few years many different methods of planting U-3 bermudagrass have been used and there are numerous machines manufactured for this purpose. U-3 is propagated by vegetative means only and may be planted by strip sodding, plugging or sprigging. Of the three methods, sprigging is by far the most popular because it gives the most efficient use of planting material, produces a fast cover and offers very little interference to play. Ideally, sprigs should be chopped up into lengths which have a minimum of three nodes and planted so that about one-third of the sprig remains above ground. Since air spaces around the sprig can cause rotting of the sprig, it is necessary to insure firm contact with the soil.

U-3 probably will find its greatest use throughout the "crabgrass belt" but there are indications that it will do well beyond this point. It would be foolish to disregard the possibility of winterkill in the northern extremes of the bermudagrass zone; however, this condition is not usually produced by cold weather alone. U-3 bermudagrass has withstood freezing tests to 28° below zero, so from this we can only suspect that actual winterkill must come from a poor combination of climatic factors such as cold weather and a lack of moisture such as experienced in the Philadelphia area this year.

We would do well to remember that U-3 is not a miracle grass, but with good management practices we can expect a very rewarding turf.

A Checklist Against Adversity

By **JAMES L. HOLMES,** Mid-Western Agronomist, Green Section, The United States Golf Association.

There have been numerous "checklists" with regard to anticipating turf maladies resulting from various fungi, nematodes, and men. Such lists are merely guides, as both authors and users are well aware that fungi, nematodes, and many men do not have the necessary facilities to read and understand such lists.

Nonetheless, quite accurate predictions can be made concerning factors likely to exist under a given set of conditions, and the influence of these factors on the wellbeing of the turf. One of the simplest systems of checklisting, and perhaps the most accurate, is concerned with the seasons of the year. Of course, a knowledge of the disease syndrome is necessary. Let's establish the distinct seasons, then check-list what can be expected when adversity comes:

I. Cold—Wet
II. Cold—Dry
III. Cool to Warm—Wet
IV. Cool to Warm—Dry
V. Warm to Hot—Wet
VI. Warm to Hot—Dry
VII. The Entire Season

I. SEASON: COLD—WET.

A. Fungi: The checklist for proper procedure here is more accurate and well understood than it is for any other season because the environment can be more closely predicted.

1. Insure drainage, both surface and sub-surface. Puddled water (or ice) can be devastating.

2. Do not allow greens to "go into winter" in a lush, overfed condition. Preferably turf should be slightly on the hungry side.

3. Continue regular short height of cut until turf growth ceases.

4. Most golf course superintendents advocate an early fall aeration. This should be done early enough so that *Poa annua* is not encouraged at the expense of bent, and early enough to insure that aerator holes will heal prior to cold weather.

5. Thoroughly irrigate greens prior to closing and draining the watering system.

6. Apply a snow mold preventive fungicide according to manufacturer's recommendations. Make a second application during a mid-winter thaw.

7. Do not allow a continuous ice sheet (from the soil upward) to remain in place for longer than 21 days. If an ice sheet is present for this length of time, it must be removed. Under extreme cold conditions, mechanical removal is recommended. Loose snow cover or an ice cover which has a layer of snow beneath is not considered dangerous.

8. Apply the snow mold fungicide again when turf begins to grow in the spring. This application may be of far greater importance than realized by many.

9. Commence mowing as soon as turf initiates growth.

10. As is the case at all times, follow proper maintenance practices.

B. Nematodes:

1. Eelworms are either dormant or in the egg stage during cold weather. To date our knowledge indicates that nothing can be done in regard to their control at this time. However, if topdressing is prepared during cold months, it should be sterilized if at all possible. If soil is too cold for sterilization, it should be treated as soon as the soil temperature allows.

C. Man

1. The "adversity checklist" here usually concerns a biped known as *homo sapiens* carrying a sled or toboggan. Various practices designed to counteract this malady have been employed, such as fences, brush piles, mean dogs, and shot guns, usually with limited success. Winter sport enthusiasts can be extremely damaging to greens and other turf areas. Good fences are about the best deterrent. Occasionally law enforcement officials are employed.

2. Turf can be damaged excessively if play is allowed when the soil has thawed to a depth of 1 or 2 inches. Either play should be restricted at these times or alternate tees and greens should be made available. An excellent practice to follow is "keep as much traffic as possible off greens and tees during cold—freezing weather."

II. SEASON: COLD—DRY

A. Fungi: If one could be assured that an open, dry winter were ahead, there would be much less need for taking the many precautions listed in Fungi-Wet above. However, there is never a guarantee of this, so such precautions must be taken. Furthermore, where open, dry winters are frequent:

1. Either place snow fence in proper places around greens, or pile brush on greens, or both. Considerable work has been done with regard to placing clear plastic on putting surfaces when drought conditions are expected. This definitely eliminates desiccation damage. However, few clubs have been able to afford this practice except in limited, small areas such as on a newly established green.

2. If desiccation has been a frequent problem in the past, the superintendent should see to it that a large, mobile water tank is available. During extreme drought a minimum of 250 gallons and preferably 500 gallons of water should be applied to each green. Two such applications may be necessary under severe conditions.

3. Many superintendents will operate their watering system earlier than considered safe if desiccation is severe. The course is watered, then the system is redrained if necessary, in order to avoid freeze damage. They believe such a practice is preferable to taking the chance of losing considerable turf.

B. Nematodes and Man behave about the same under both wet and dry conditions. Man is not as active and thus not as damaging in the absence of ice or snow for sledding. Numerous nematodes may be killed if drought is severe.

III. SEASON: COOL TO WARM OR WARM TO COOL—WET

A. Fungi: Diseases which result from attacks by fungi are considerably more damaging in a wet enviroment. Actually all the fungi known to be pathogenic on bentgrass can be and are active under these environmental conditions. The most commonly devastating are the genera of *Sclerotinia*, *Corticium*, *Fusarium*, *Gloeocercospora*, and *Helminthosporium*.

1. In order to cope with attacks by these fungi, the turf specialist must recognize the various symptoms, be familiar with chemical control procedures and apply fungicides as needed. An adequate preventive fungicide program is as important during this period as any other season of the year.

2. Drainage, both surface and subsurface, is paramount. If drainage is not adequate, steps must be taken to insure it.

3. The soil must contain adequate

oxygen (air) to allow proper physiological root and biological activities. The soil also must be sufficiently "loose" so the root exploration and growth are not impeded. If the soil is "tight" and compacted it must be loosened. Many tilling tools are available for this purpose.

4. An excess of organic matter (mat-thatch-grain) encourages disease development, so it must be avoided. If excess material is present, it can be removed through mechanical means and by encouraging biological activity.

5. Nutrient levels should be balanced and adequate. Soil tests are usually required every 2 to 5 years. These are helpful in determining proper fertilizer programs. An excess, dearth or imbalance of plant nutrients can encourage disease activity.

6. Check constantly to assure that bentgrass turf areas are not being overwatered. This is a common mistake and encourages disease activity.

7. Tree root competition and shade weaken turf and predispose it to the ravages of parasitic fungi. If it can be determined that trees are a factor in the disease syndrome, corrections should be made.

B. Nematodes: The spring season or just when roots have initiated vigorous growth is the time to attack the nematodes. Both wet and dry environmental conditions are included here.

1. Presence of parasitic nematodes must first be established, then the estimated number. Obviously, nothing should be done if there are no parasites present. Extract pint soil samples from the entire area in question. A ½-inch soil corer is excellent for this purpose. Take cores to a depth of 4 to 5 inches. Mail or take them immediately to a qualified nematologist (most land grant colleges now employ such men) and have him report the counts of parasites present. If a sufficiently large population is detected, it is suggested that test areas of 200 to 500 square feet be established as follows:

a. Aerate soil.

b. Apply ½ the recommended rate of nematocide. Nematocides currently in use are: Fumazone, Nemagon, and VC-13.

c. Water-in deeply and thoroughly.

d. In 1 week to 10 days apply the remaining ½ dose. Water-in thoroughly.

The following fall and again the following spring extract soil samples from the treated areas and from adjacent non-treated areas. Submit these samples to the nematologist in order to determine degree of control. Also, maintain a visual check to determine any continuous improvement in treated areas. If control is evident, treat entire areas.

2. The first indication of nematode-infested grass could be considered as lethargic turf or that which remained consistently diseased and "poorly" regardless of the maintenance programs followed. It is likely that nematodes are responsible for considerably more troubles in turf maintenance than attributed to them.

C. Man: Many items in the disease checklist which appear on the detrimental side of the ledger can be attributed to men. Examples are:

1. Dull mowing equipment. Mishandling of machinery and careless behavior by workmen fall into this category. Scalping is the first thing that comes to mind; surely everyone recognizes the weakening or damage to turf which results from scalping. The use of equipment in the wrong place follows as a close second. If a superintendent wishes to maintain fine bentgrass (or *Poa annua*) tees,

he had best keep his fairway mowers on the fairways. During periods of stress all heavy equipment should be kept off the greens except in cases of absolute necessity.

2. Excessive play, especially during periods of surplus moisture, encourages disease activity. However, it is your problem as to just what you are going to do about it.

IV. SEASON: COOL TO WARM-DRY

A. Fungi: Potential damage as a result of fungi activity is considerably decreased during periods of dry weather as stated under the Cold-Fungi-Dry heading. Here again, though, one cannot be absolutely certain that dry conditions will continue indefinitely. Therefore, the checklist specifies that all necessary precautions should be followed, regardless.

1. If the superintendent is careful not to overwater greens and tees during periods of drought, he may become careless about applying fungicides. However, the exception to the rule is the evidence of *Helminthosporium*. This particular fungus is frequently damaging on high, dry areas. Therefore, a word of caution—do not become complacent when dealing with these "chlorophyll-less" plants.

B. Nematodes and Men are going to behave about the same whether it is dry or wet under conditions of golf course management.

V. SEASON: WARM TO HOT-WET

This includes the hot months when stress to turf is most severe.

A. Fungi: As higher temperatures and excess moisture encourage development of fungi and discourage development of bentgrass, all known precautions must be taken to insure healthy, vigorously growing turf and to discourage development of fungi.

1. As previously stated, if adequate surface and sub-surface drainage is not assured, this condition must be corrected. Adequate drainage is of paramount importance.

2. Be familiar with both the fungi known to be damaging at this time of year (which includes practically all of the fungi known to be parasitic on grass) and the chemical control means for these fungi. An adequate supply of fungicides must be on hand.

3. Follow a regular preventive fungicide program during these periods of stress.

4. All maintenance practices become more exacting at these times. Errors in judgment or mishandling of chemicals and equipment are compounded.

5. Major improvement or major change should not be made at this time (with the exception of improving drainage if it is apparent that this must be done). Maintenance practices should be designed primarily to keep turf growing in as healthy condition as possible.

6. If it is apparent that disease activity is gaining the upper hand, obtain the services of an authority on turf diseases.

B. Nematodes:

1. Samples can be taken at this time of year in order to determine the degree of infestation if there is reason to believe parasitic nematodes are active. However, to the best of our knowledge at the present time, treatment should be delayed until the following spring.

C. Man:

1. Workmen should be made aware that turf is in its most susceptible stage during hot-wet periods. They should be taught to operate accordingly.

VI. SEASON: WARM TO HOT-DRY

A. Fungi-Nematodes-Man: All three

of the factors are included here as the checklists for both wet and dry and should be the same when the weather is hot. Of course, the superintendent can become somewhat less careful when the weather is dry.

VII. THE ENTIRE SEASON

The entire picture is considered here. There are certain things the superintendent should checklist and be cognizant of throughout the year, such as:

1. Equipment must be constantly in good, dependable, working order. For example, if the spray machine used to treat greens were to break down on the Fourth of July, it must be either repaired or replaced immediately. Therefore, parts which experience indicates are subject to breakage should be stocked.

2. The work force should be trained and kept constantly aware of its role in the over-all course maintenance picture, especially when adversity comes.

3. An adequate supply of pesticides should be on hand, as well as necessary spare parts.

4. A friendly, understanding relationship should be maintained between members (players) and the superintendent. Obviously, such a relationship will be extremely helpful to both players and superintendent, if adversity does come.

5. Keep a constant check for signs of turf weakness or symptoms of disease activity. If it becomes obvious that a specific area regularly shows disease symptoms, the source should be determined and a plan for correction formulated and carried to completion.

6. Specifically staying on top of the job and **the use of good common sense begins and ends all checklists.**

We have been discussing primarily bentgrass tees and greens. However, many clubs reached such a high level of turf maintenance that bentgrass fairways are receiving similar treatment. The practice of applying fungicides to fairway areas and in general following similar programs as for greens is increasing. If one expects to maintain bentgrass—*Poa annua* turf in the fine condition expected by many, it is becoming apparent that these extra steps are necessary.

COMING EVENTS

December 2-4

Oklahoma Turfgrass Conference
Oklahoma State University
Stillwater, Oklahoma

December 9-11

Turfgrass Conference
Texas A&M University
College Station, Texas

January 6-7, 1964

Turfgrass Conference
Mid-Atlantic Association of Golf Course Supts. & University of Maryland
Lord Baltimore Hotel
Baltimore, Maryland

January 8-9, 1964

Turfgrass Conference
Nebraska Center for Continuing Education
University of Nebraska
Lincoln, Nebraska

January 14-15, 1964

Virginia Turf Conference
John Marshall Hotel
Richmond, Virginia

January 24, 1964

United States Golf Association
Green Section Educational Turf Conference
Biltmore Hotel
New York City, N. Y.

February 10-14, 1964

GCSAA's International Turfgrass Conference and Show
Philadelphia Sheraton Hotel
Philadelphia, Pennsylvania

February 24-25, 1964

Southern Turfgrass Conference
Memphis, Tennessee

February 24-27, 1964

Turfgrass Conference
Cornell University
Ithaca, New York

Soil Testing Service Offered by Green Section

The Green Section of the United States Golf Association is now providing a soil testing service for USGA Member Clubs. The service consists of laboratory studies of sands, soils, and organic materials, the synthesis of trial mixtures, and recommendation of a suitable mixture for putting green construction. A complete study and recommendation of this kind will be available for $100.

Some clubs may wish to have additional services performed. After materials are mixed according to the club's methods, it may be desirable to have samples of the mixture checked to determine uniformity of the mix. Such samples may be checked at a cost of $25 each. Hydrometer analysis of soils by the Bouyoucous method will be $25 and sieve analysis of sands will be $10 per sample.

These laboratory services will be performed by a commercial laboratory under a contractual agreement. The laboratory results will be checked by Green Section staff members before being forwarded to the club.

Green Section "Specifications" Greens

In September, 1960, the Green Section staff produced an article entitled "Specifications for a Method of Putting Green Construction." This article was based upon a considerable body of research information derived through the study of soil physical properties under putting green conditions.

One of the fundamental premises upon which this method of construction is based is a laboratory study of the materials which are to be incorporated in the soil mixture. **Without such a study the green cannot conform to the specifications outlined.**

Many greens have been built from the data obtained from a laboratory study of soils made for a neighboring course. In other words, the XYZ club builds its greens according to the analysis made on the soil materials of the ABC club. Yet there may be considerable differences in the sand, the soil, or the organic material used by the two courses. Because seemingly small differences in soil materials may sometimes produce very significant differences in the behavior of a mixture, such practices as "borrowing" a neighbor's formula can be misleading and may result in a completely unsatisfactory putting green.

It is the firm belief of the Green Section staff that one is better off to use no part of the Green Section specifications unless he intends to follow them precisely. The various components are designed to work together with all the other parts. Unless all parts are put together properly, one invites trouble. If any reader is not completely informed about the Green Section specifications, he may acquire a reprint of the article from any Green Section office.

What is Needed?

A laboratory analysis will require a minimum of one gallon of sand, soil, and organic matter available to your club. If there is a choice of sands, soils, and organic materials, send samples of each together with a note indicating your preference on account of cost, easy accessibility, etc. The laboratory will attempt to use your preferred materials in the recommended mixture.

All materials should be packaged securely. Plastic bags inside cardboard cartons or metal cans are satisfactory. Do not put moist soil or sand in a paper bag - it rarely arrives intact.

Where to Send?

Soil materials should be addressed to:

USGA Green Section
Southwestern Office
Texas A&M University
College Station, Texas

Time Required

Because the Green Section staff members are traveling during a considerable part of the year, please allow at least three weeks for a report on materials submitted for testing. Usually less time will be required, but the analytical procedures require a minimum of one week even when everything works properly the first time. Anticipate your need for analysis sufficiently to allow time for the testing work to be done completely and thoroughly, and for Green Section members to study the results before relaying them to you.

New Fertilizer Labels Coming

Courtesy ASA Farm Press News

Plant food users in several parts of the country noticed two sets of numbers explaining plant nutrient (plant food) guarantees on their fertilizer bags last spring. The system, called **Dual Labeling,** is aimed at a gradual change to a uniform method of expressing primary plant nutrients. The present system is a **Mixture** of elemental and oxide values (N—P_2O_5—K_2O). The new method will guarantee **all** nutrients in the elemental form (N—P—K), according to the American Society of Agronomy.

With dual labeling, a fertilizer tag with the numbers 5—20—20 may also have a set of numbers like 5—8.7—16.6. The latter refers to the actual percentage by weight of nitrogen, phosphorus, and potassium guaranteed in fertilizer material.

The present oxide system of labeling phosphorus and potassium makes percentages of these plant nutrients look higher than they really are, because it includes the weight of oxygen combined with the elements. The elemental system is more meaningful and accurate and will eliminate some confusion. It will make the method of reporting phosphorus and potassium conform to that of nitrogen, which has long been reported in the elemental form.

A number of universities have started or will soon start reporting soil test results in **both** elemental and oxide values for phosphorus and potassium. This is part of the educational program planned by several universities, and an example of a national approach needed from industry and colleges. Simple fertilizer scales will make it easy to convert elemental to oxide values and vice versa.

Currently, fertilizer is labeled as required by law in each state. All states require fertilizer manufacturers to print a guaranteed analysis or chemical composition on the fertilizer bag and/or attached tag. In all states the analysis of complete fertilizers is expressed in percentage by weight in the order of N—P_2O_5—K_2O.

Inaccuracies Of Present Form

Nitrogen is legally expressed on the elemental basis as "total nitrogen" (N). Phosphorus is legally expressed

on the oxide basis as "available phosphoric acid." This term, phosphoric acid, designates the available "phosphorus pentoxide" (P_2O_5). Potassium also is legally expressed on the oxide basis as "soluble potash." The term potash designates the soluble "potassium oxide" (K_2O).

But, in reality, there is no P_2O_5 or K_2O in fertilizers. Phosphorus exists most commonly as monocalcium phosphate but also as dicalcium phosphate, tricalcium phosphate, calcium metaphosphate or one of the ammonium phosphates. Potassium ordinarily is in the form of potassium chloride or potassium sulfate.

The oxide is not the basic functional unit from either a physical or chemical standpoint. Furthermore, P_2O_5 and K_2O are not involved in plant nutrition. Plant roots absorb most of their phosphorus in the form of an orthophosphate ion, $H_2PO_4^-$, and most of their potassium as the elemental potassium ion, K^+.

Current oxide labeling of phosphorus and potassium makes percentages of these two plant nutrients look higher than they are. The chemical compound P_2O_5 contains 5 oxygen atoms for each 2 phosphorus atoms and has a molecular weight of 141.95 of which only 61.95 parts are actual P. The chemical compound K_2O contains 1 oxygen for each 2 potassium atoms and has a molecular weight of 94.2 of which only 78.2 parts are actual K. Oxygen's weight of 16 therefore makes up the difference in weight (see footnote below Table 1).

Nutrients cannot be put into fertilizers as N, P, and K elements, but as chemical compounds which are stable. That's why we do not and cannot have fertilizers containing 100 percent plant nutrients. But, with the current system of expressing P and K as oxides, high-analysis fertilizers of the future could have an analysis of more than 100 percent of plant nutrients (plant food).

The important information in a fertilizer guarantee is the actual amount of plant nutrient in the bag. For this purpose the elemental system is best.

CONVERSION MADE EASY

P_2O_5—K_2O conversion Table in Either Percent or Pounds*

This percent or pounds as the Oxide gives	This percent or pounds as P	and	This percent or pounds as K	This percent or pounds as the Element gives	This percent or pounds as P_2O_5	and	This percent or pounds as K_2O
1	0.44		.83	1	2.29		1.20
5	2.18		4.15	5	11.45		6.01
8	3.49		6.64	8	18.32		9.62
10	4.37		8.30	10	22.90		12.03
12	5.24		9.96	12	27.48		14.43
14	6.11		11.62	14	32.06		16.84
18	7.86		14.94	18	41.23		21.65
20	8.73		16.60	20	45.81		24.05

* Weight of 1 atom: Phosphorus (P) = 30.975; Potassium (K) = 39.1; Oxygen (O) = 16.0

Weight of 1 molecule of the compound:

P_2O_5			K_2O		
2 phosphorous atoms	=	61.95	2 potassium atoms	=	78.2
+5 oxygen atoms	=	80.00	+1 oxygen atom	=	16.0
		141.95			94.2

USGA GREEN SECTION RECORD
40 East 38th Street, New York 16, N. Y

TURF TWISTERS

SAND LAYER AND ROOTING

Question: Most of our putting greens have a thin sand layer about an inch below the surface. The bentgrass roots go only as deep as the sand layer. I have been watering real often. My chairman says I am watering too much. How can I manage these greens and how can I answer my chairman's criticism? (INDIANA)

Answer: You do have a serious problem, indeed. It is a tribute to your skill and ability that you kept these greens through the summer. Turf with a shallow root system certainly must be watered frequently. However, it won't need much water at each application.

The real solution to your problem is to break up the layer. We suggest you aerify these greens a couple of times in spring and again in the fall of each year. The layer is so shallow that the machine will penetrate to this depth easily. Then break up the soil cores and mat them in as a topdressing. These operations should be done in cool weather only and at a time when grass is growing rapidly enough to heal the scars quickly.

Beginning in the spring, try to extend the period between irrigations as much as possible. A little moisture stress sometimes creates a condition conducive to a more profuse root system. As weather warms up you will have to decrease the interval between irrigations.

Show your chairman the layer and explain the reason for your frequent irrigation. He's lucky you kept the greens. We hope he'll recognize his good fortune.

SEEDLINGS AND TRAFFIC

Question: When we plant our winter grass on Tifgreen greens, we get a good stand except in the center of the greens where we need it most. The greens are all seeded just alike. Why does this happen? (ARKANSAS)

Answer: Chances are good that traffic has damaged the young seedlings around the normal "cupping area." The cup location always should be moved frequently, but this is especially important when new seedlings are trying to develop.

While seedlings are young, we suggest you set that flagstick closer to the edge of the green. You can set it within about 15 feet of the edge of most greens without having an unfair location. Then rotate the position around the outer portion of the green. The center still will get more than its share of the wear.