HAVE YOU A SOUND FAIRWAY PROGRAM?

By O. J. NOER

MOST clubs are fertilizer conscious, but very few are actually fertilizer minded. This minority rightly places fertilization in the same category as other obvious necessities, such as grass cutting, and thus automatically include an annually recurring item in the budget to cover the cost of fertilization. This necessitates a planned program extending over a period of years and when more clubs adopt a similar policy, better fairway turf will result. In most districts information now at hand is sufficient to serve as the basis of a workable plan.

An extreme example forcibly demonstrates the waste and disaster which result from a fundamentally unsound program. During the past several years one club fertilized each year and reseeded several times, yet today fairway turf is no better, if not poorer, than before the work started. Fairways consist almost entirely of clover and weeds. Failure to overcome the damaging effect of seepage water, and the unwise choice of grass underlie dismal failure. In this case, drainage should have preceded fertilization and reseeding, and instead of pure fescue, it would have been wiser to include some bent.

Careful inspection of fairways should precede formulation of a definite program. Drainage; turf coverage and grass varieties; physical condition and chemical soil composition; should receive especial emphasis, for an effective and economical plan must be predicated upon an intimate knowledge of these important factors.

Most clubs provide for the obvious drainage needs, but neglect to detect the damaging effects of seepage water, and in northerly sections overlook the detrimental effects of almost imperceptible pockets and depressions.

Seepage Hits in Spring and Fall

The injurious effect of seepage water is most likely in early spring or late fall when soils approach saturation, and occurs along the lower slopes of hillsides. Bluegrass and fescue are affected most, but bents ordinarily withstand considerable surplus water. Improved drainage is a prerequisite to turf improvement. Tile lines should be placed at right angles to the direction of seepage flow, sufficiently deep to effectively intercept surplus water, and trenches should be back-filled with pea gravel, or cinders, to within 8 to 12 inches of the surface. In any necessary reseeding, the mixture should include seaside or other suitable bent.

In northerly districts, additional tile will not prevent the loss of bluegrass and fescue in slight depressions and pockets. Loss occurs when deep frost prevents tile from functioning. The permanent solution is to encourage native bents by stolon plantings, or reseeding with suitable bents.

Bluegrass and fescue never make permanent turf in low-lying areas where the surface is only slightly above adjacent bodies of water. Tile lines are usless unless the entire area is covered with soil to a depth of several feet. If insufficient funds prevent top-soiling, the only alternative is to attempt the use of moisture tolerant bent.

Choose Seed Adaptable to Course

Grasses suited to local soil and climate eventually predominate, irrespective of the original seed mixture used. The dominant grasses may have been minor constituents, or even omitted from the mixture. In the latter instance, grasses native to the locality invade and eventually predominate. Grave errors in the choice of the original seed mixture are confined to a very few rare instances, so the necessity for reseeding to introduce suitable

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EXPERTS TO TALK

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grasses is a remote possibility. It is far more common to find restricted areas which are poorly turfed, due to unfavorable soil moisture conditions, such as the moist areas already described. They are less common in regions where native bent is prevalent, and on the older courses because previous to the war reasonable prices permitted the more general use of some bent in fairway mixtures. Should inspection disclose the absence of bent, the wise procedure calls for gradual introduction of this grass by seeding or stolon planting.

Fescue and bent grasses can withstand greater soil acidity, and need less phosphoric acid than Kentucky bluegrass, so a knowledge of the typical fairway turf population is indispensible before deciding upon feeding procedure.

Need for Food Depends on Soil Texture

Based on texture or physical conditions, soils exhibit striking differences in their need for, and ability to retain, fertilizer and lime. Hence, texture has a definite bearing upon the use of both materials. These differences may be illustrated by contrasting the lighter sandy soils with the heavier loam and clay soils. Sandy soils are notoriously low in nitrogen, and may be deficient in phosphoric acid and potash. The heavier soils are often low in nitrogen, especially so if light-colored; may be low in phosphoric acid, but usually contain a plentiful supply of potash. Since the danger of nitrogen and lime loss from leaching is greatest with the sandy soils, it is customary practice to apply both at somewhat lighter rates but at more frequent intervals on these soils. There is one other striking difference. Less lime is required on sandy soils than on heavy soils of equal reaction, to produce the same degree of change; and likewise less phosphoric acid and potash are needed to produce an equivalent response in rate and quantity of growth.

There is no denying the fact that a trustworthy chemical determination of soil deficiencies would greatly simplify the selection of a suitable fertilizer. The present tendency is to place too much emphasis and confidence in the newly developed rapid methods. This applies to some technical workers as well as fertilizer salesmen. The lure of a complete chemical test is certainly appealing, but some of the methods are wholly unreliable, and with others confusion arises in the interpretation of findings.

In the statement of results, most methods employ such terms as very low, low, medium, doubtful, and high, with various intermediate designations. The unfortunate tendency is to place many fairway soils in the low or doubtful class, even though field trials do not reveal acute need for these elements. Some of the better methods appear to have a promising future, but their present usefulness is impaired for want of definite correlation with actual fertilizer experience on fairways. Until this has been accomplished, clubs should avoid indiscriminate soil testing. Aside from acidity determinations, such tests should be made by an experienced analyst, thoroughly familiar with the advantages and shortcomings of the different methods, and capable of interpreting the findings.

Thorough testing for soil reaction is strongly urged. Most of the rapid methods are so simple that a skillful operator is not essential. Field testing on the fairways is often advantageous, for soils may show distinct differences in acidity with depth. Should marked acidity be confined to the first several inches, less lime is needed than when the underlying soil is also acid.

Laboratory Soil Tests Are Vital

No other determinations should be made on the grounds. Representative soil samples should be collected, to a uniform depth of two or three inches, and placed in the hands of a competent analyst.

Besides acidity, a reliable determination of available phosphorus is helpful, but is of doubtful value where lead arsenate has been used, because arsenates develop the same color as phosphates in all tests.

Tests for potash are least satisfactory, for even the better methods tend to show need for potash, which is not supported by field experience. Unless tests show a very low supply of potash, the general and extensive use of potash should await actual trials on limited fairway areas.

None of the present methods are reliable guides for nitrogen needs on turf grasses. Its use should be based upon in-

spection of the turf. Sparse grass, light color, and slow rate of growth are unmistakable signs. Pronounced clover or weeds and presence of moss are confirming indicators.

With this information at hand, possible need for lime, phosphoric acid and potash should be decided first, because major use of these materials is not a yearly necessity. Applications at two to four year intervals are ample. Finally, a plan for annual nitrogen feeding completes the program.

Often Best to Test Lime Need

Need for lime should be based on soil reaction. The critical reaction for bluegrass is probably pH 5.5 to 6.0, and for fescue and bent between 5.0 and 5.5. Hence lime is not advised on neutral and very slightly acid soils. Only when soils are definitely more acid than the above reactions, is need for lime definitely indicated. With borderline soils which approach these limits, no serious harm will result from delaying extensive applications until its need has been definitely established by preliminary tests on trial strips. The beneficial effects are usually most striking in midsummer, and show in ability of turf to withstand drought. Amount of lime to use depends upon degree of acidity, soil texture, and kind of grass, and is best applied in fall or early spring. If possible, it should precede generous use of phosphate by several months, and should never be used simultaneously with lead arsenate, because lime reduces the effectiveness of the arsenate. When both are needed, apply the lime well in advance of the lead arsenate.

The following table, predicated upon the use of a high grade limestone of reasonable fineness can be used as a rough guide.

RECOMMENDED RATES OF GROUND LIMESTONE FOR FAIRWAYS

Pounds per Acre, Based on Soil Texture, Degree of Acidity, and Variety of Grass.

Soil Texture	Soil Acidity	Lime, Llbs. per Acre Kentucky Blue-grass	Fescue and Bent
Sands and Sandy Loams	Slight Acidity	1000	None
	Medium Acidity	2000	1000
	Strong Acidity	3000	2000
Loams, Silt Loams, Clay Loams and Clays	Slight Acidity	2000	None
	Medium Acidity	3000	2000
	Strong Acidity	4000	3000

Soils differ in their need for phosphoric acid. Based on content of available phosphorus, as determined by a trustworthy method, soils can be divided into definite classes. Where the soil supply is very low, heavy initial rates are best, probably because of fixation which occurs in all soils. With heavy rates deeper penetration should occur, and more phosphoric acid should remain in available form. Besides soil content of available phosphorus, texture of soil and kind of grass determine rate of application. The following table, based on the use of the Truog method, gives effect to all these and can be used as a rough guide. The recommended quantities are predicated upon the use of 20% superphosphate. Other fertilizers should supply an equivalent quantity of phosphoric acid. Phospate can be applied in early spring or in fall, and two to four years can elapse before additional applications are needed.

RECOMMENDED RATES FOR 20% SUPERPHOSPHATE ON FAIRWAYS

Pounds per Acre, Based on Soil Texture, Available Phosphorus by the Truog Method, and Variety of Grass.

Soil Texture	Avail. Phos. Per Acre Truog Method	Recommended Rate 20% Superphos. Ky. Blue-grass	Fescue and Bent
Sands and Sandy Loams	0 —25	200—300	100—200
	25—50	100—200	0—100
	50—75	0— 75	None
	75+	None	None
Loams, Silt and Clay Loams, Clays	0 —25	400—600	200—400
	25—50	200—400	100—200
	50—75	0—200	None
	75+	None	None

With the possible exception of peat muck, and poor sandy soils, potash is seldom needed on fairways. Sandy loam and heavier soils contain from 20,000 to 40,000 lbs. of actual potash in the surface soil layer where maximum root growth occurs, and since clippings are not removed, their potash is released and restored to the soil in available form during decay. In the rare cases where potash is deficient, rates of application should approximate 100 to 200 lbs. of 50 percent potash fertilizer, or should supply from 50 to 100 lbs. of actual potash per acre. At these rates one application will suffice for two to four years. Applications can be made in spring or fall. The excessive use of potash should be avoided because of its tendency to encourage clover.

Nitrogen is the key to successful fair-

way management, because grasses never spread on nitrogen impoverished soil. Annual nitrogen feeding is customary practice, because, unlike phosphoric acid and potash, appreciable nitrogen loss may occur from excessive leaching, and may also result from denitrification.

Rate and frequency of application depend upon turf coverage, soil impoverishment, and local climatic conditions.

On nitrogen-starved turf, where coverage is sparse and soil impoverished, heavy feeding is justified, spring and fall, until turf of desired density is secured, and then rates can be reduced to a bare maintenance level. This general rule requires slight modification in extreme northern latitudes, and also along the southern fringe of the region adapted to northern grasses. Excessive late fall feeding may aggravate winter-kill in more northerly regions, so heavier spring fertilization with somewhat lighter rates in the fall should be best. Crab grass is a very serious pest in districts such as Philadelphia, Cincinnati, St. Louis, Kansas City, etc., so major nitrogen feeding should be in the fall, with spring rates reduced to quantities which will not build soil reserves to increase crab grass growth in July and August.

On impoverished soils from 80 to 100 lbs. or more of actual nitrogen should be applied spring and fall until turf attains desired density. After that, annual rates can be reduced to 50 to 80 lbs. of nitrogen per acre each year.

True organics can be applied even at the higher rates in a single application, but when soluble materials are used the fertilizer should be divided into two equal applications, and applied at intervals of 7 to 10 days.

Frank Danelli Is President of Midwest Greenkeepers Association

FRANK DANELLI, Northmoor CC, was elected president of the Midwest Greenkeepers Assn., succeeding C. A. Tregillus, Mill Road farm, at the association's annual meeting. Other officials elected: Fred Ingwerson, Bunker Hill, first v-pres.; Stanley Arendt, Meadow Grove, second v-pres.; Harold Clemens, Sunset Ridge, secy-treas. Directors elected: C. A. Tregillus, John MacGregor, J. T. Langell.

The organization recorded another active year of extensive and definite value to the clubs represented in its membership. The practical, helpful character of the monthly meetings, Tregillus noted in his final address as president, had been of such monetary value to golf courses that attendance at the meetings should be considered a privilege by every greenkeeper in the Chicago area.

Andy Gillett won the Midwest golf trophy. Gillett attributed his success to the excellence of the greens over which he putted to make up for deficiencies in other departments of his game.

Plan Two-Day Greenkeeping Conference This Month at U. of Wisconsin

HORTICULTURAL department, University of Wisconsin, again sponsors a two-day conference for greenkeepers, green-chairmen and others interested in turf culture, to be held this year on February 27 and 28. Principal speakers in the well-rounded program will be John Monteith Jr. of the USGA Green Section, and O. J. Noer, Sewerage Commission's maintenance consultant.

Greensmen, club officials, and others having an interest in the problems of fine turf culture are urged to attend. James G. Moore, of the Horticultural dept. of the University is the man in charge.

Amherst Greens Course Draws Record Enrollment

A WINTER course for Greenkeepers at the nation's oldest school for greenkeepers and golf maintenance men is now in session at Massachusetts State College, Amherst, Mass. The school, which will run until March 16, has drawn a record enrollment this year with students registered from ten states and Canada.

The courses are so arranged that all the factors of successful turf management are discussed individually, and particularly in their relation to one another. The course of study at the school includes the following subjects essential to the modern greenkeeper and general maintenance man:

Landscape Appreciation, Botany for the Greenkeeper, Water Systems (with particular reference to the relation of size of pipe, pressure, and nozzles to the flow and delivery of water), Drainage, Equipment and Supplies, Managerial Problems, Grasses and Turf Culture, Cost Keeping and Analysis, Soils and Fertilizers, and a study of plant diseases and insect pests.

A very large and complete model of a golf course is maintained to serve as a laboratory and provide students with first hand knowledge of their studies.