Needs of Soil Determine Plan Of Fairway Fertilizing

By O. J. NOER

BESIDES the architectural features of the course, playability of turf on fairway and greens govern player approval. At present competition for members is so severe that only those clubs with a favorable lay-out and good turf are able to maintain reasonably satisfactory membership. Obviously these will be the first to restore full quotas and will be the ones to survive should there be too many courses in a given district.

During the past several years dwindling revenues have forced curtailment in maintenance budgets. Each succeeding year pressure is exerted to force a further reduction in the budget. There is danger of the pendulum swinging too far, for some officials ignore or fail to appreciate the fact that there is a limit below which it is impossible to maintain even the standard of turf demanded by the average golfer. When the rude awkening comes, it will be too late, for restoration of turf is also a slow process and expenditures far in excess of those saved during the regime of mounting economy will be inevitable. Then some of those now being praised for their zeal in reducing expenditures will be rightly censored. This is not a plea for unreasonable or unjustified maintenance expenditures. It is the duty of those charged with course maintenance to cooperate by dispensing with unnecessary frills and emphasize only those practices which are essential for the maintenance of good turf.

At one time fairways received scant attention aside from mowing, and golfers were content so long as greens were good. But when a few enterprising clubs demonstrated that fairways could be developed to a point where uniformly good lies could he assured, golfers began to insist upon fairway improvement.

Some clubs faced the problem by instituting sensible programs of improvement extending over several years and were rewarded with desirable fairway turf. Others, failing to appreciate the underlying fundamentals followed haphazard methods, or blindly followed the procedure of some neighboring successful club without considering necessary modifications because of differences in turf, or soil. They were either disappointed or may have effected improvement at needless expense.

Good Fairways for All

Occasionally the statement is made that only the more affluent clubs can afford turf improvement on fairways. The fallacy of this has been demonstrated by many of the smaller clubs. Where funds prevent treatment of entire fairways, the first 100 to 150 yards in front of tees were ignored, or efforts were first concentrated on the more important landing areas and approaches, and when these proved satisfactory, improvement was extended to the intervening areas.

Method and procedure are the controlling factors once the decision is made to improve fairways. It is an established fact that the desirable grasses spread to form dense sod if climate, moisture, and soil are favorable. Failure to spread in spring and fall when temperatures and moisture are favorable for growth is indisputable evidence that soil deficiencies in plant food are the underlying cause of poor fairway turf. Obviously the correct and economical remedy is systematic feeding with materials which supply soil deficiencies whatever they may be.

Where turf is uniform but thin, reseeding need not accompany fertilization, except in vary rare cases where varieties of grass unsuited to local soil and climate were used originally. If the established grass fails to spread for want of sufficient plant food, it is folly to expect the tender young seedling to compete successfully with the existing grass for the limited supply of soil nutrients. Under these conditions the cost of seeding is useless expense because fertilization will effect desired improvement. Where large bare spots exist reseeding is warranted and in such cases fertilization should precede seeding.

Some few turn to irrigation as the sole means of fairway improvement. Water

eliminates moisture as a growth retarding factor, but unless fertilization accompanies its use, poor fairways will become badly infested with clover, and in some districts crab grass and other weeds will become serious problems. Feeding to produce dense turf, with sufficient nitrogen to suppress clover must accompany irrigation or disappointment will be the inevitable result. By reducing the total quantity of water required during the season, fertilization will effect a partial saving in the season's cost for water. On unwatered courses fertilization tends to lengthen the growing season so effects of drought are not so extended or so severe.

The huge expense of topdressing fairways eliminates this as an economical method of supplying needed plant food. Besides there is the grave danger of introducing crab grass and other objectionable weeds which will more than overcome any benefits of topdressing. Even where small cuppy depressions are numerous, topdressing is unnecessary for they will disappear as the grass spreads under the urge of feeding. Manure, besides being difficult to obtain, is costly when the expense of hauling and spreading is considered. Fairways are unplayable in the late fall and early spring, and there is the further damage of introducing clover and weeds. More rapid improvement at less cost can be obtained with more concentrated materials. The truth of this statement has been demonstrated on many golf courses where well conceived systematic programs have been followed.

Determining Fertilizing Plan

Turf condition, variety of grass and soil properties, such as reaction, texture, and content of available plant food determine frequency of fertilizer application as well as kind of fertilizer and best rates of application.

Thin turf infested with moss and weeds requires heavier initial rates of application and at more frequent intervals than dense turf. After desirable turf is obtained, both rate and frequency of application can be reduced for then it becomes a matter of supplying just sufficient plant food to maintain growth and turf density.

Where dandelions are numerous, their control by spraying with iron sulphate need not precede fertilization. It is more economical to proceed with the fertilizer program and stimulate existing grass to spread, for there are notable instances where the decrease in dandelions has been sufficient to eliminate the necessity of spraying to effect their control.

There is reason to support the belief that fescue and bent require less plant food, especially phosphoric acid, than Kentucky bluegrass, and that they will also grow satisfactorily in soils too acid to support blue grass. So where phosphoric acid and lime are required, lighter rates of application will suffice for fescue and bent than are needed for Kentucky bluegrass.

On a few courses poa annua is the predominating fairway grass. In the midsummer months of July and August it is prone to kill out badly, as the result of either too little or too much water. On such fairways it may be wise to apply most of the nitrogen in the fall with the hope that the grass will go into the following summer with sturdier leaves than if heavy nitrogen feeding is done in the late spring. When nitrogen is used on this grass in the spring, rates should be lighter than for the other grasses so major effects will be dissipated before hot weather sets in.

Limestone Application

On fairways the effects of soil acidity are most pronounced in midsummer. The effects of drought first appear and are most pronounced where soils are too acid. All evidence points to the fact that the judicious use of lime is warranted on fairways and that rates can be selected which will produce beneficial effect without unduly increasing clover provided fertilizers containing sufficient nitrogen are also used. Rates of application depend upon degree of acidity, kind of grass, and texture of soil. It is obvious that the more acid the soil the larger the quantity of lime needed, but few realize that less lime is needed on sandy soils than on heavier soils of the same acidity to produce the same change in reaction. For all practical purposes, more lime should be used on lime-loving bluegrass than on fescue and bent which tolerate more acidity.

Ground limestone of reasonable fineness is the safest and best form of lime to use. The use of a dolomitic limestone containing some magnesium may be advisable to eliminate any possibility of magnesium deficiency. Yearly application of lime is hardly necessary, and at present it is believed an application every two to four years is ample.

The figures in Table I can be used as a rough guide in determining rates of application. It is supposed that the use of

TABLE I.

SUGGESTED AMOUNTS OF LIMESTONE IN POUNDS PER ACRE, FOR SOIL TEXTURES AND GRASSES INDICATED

Texture of Soil	Degree Soil Acidity	Pounds Lime Per Acre	
		Kentucky Bluegrass	*Fescue and Bent*
Sandy, 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

a high grade limestone of reasonable fineness is contemplated.

For all practical purposes, soil deficiencies in plant food are confined to one or more of the plant nutrients, nitrogen, phosphoric acid, and potash.

With the possible exception of poor sands, mucks, and peats, the soil supply of potassium is adequate on fairways. The surface soil contains from 20,000 to 40,000 pounds of actual potash, and the supply of available potash is constantly augmented by the decay of clippings. Its generous use should be avoided because of the danger of stimulating clover.

Phosphorus Need

Some soils are low in available phosphorus. This is more apt to occur in the eastern states than in the middle west. Fortunately, there are fairly trustworthy tests for determining available soil phosphorus, which can be used provided lead arsenate has not been applied to control grubs and worms.

One reason for the fact that marked response from phosphate applications are not obtained, is due to the fact that soluble phosphates are fixed in the soil close to the surface. Then too, the soil supply of available phosphorus is constantly augmented by the decay of clippings. In cases where responses are obtained, the effects resemble those of lime, in that the grass withstands midsummer heat better.

Grasses differ either in their need for phosphoric acid or in their feeding power for this element. Fescues and bent thrive in soil too low in available phosphorus to support bluegrass, and Bermuda in the south appears to require but little phosphoric acid. This means that where phosphates are needed, lower rates suffice for fescue, bent, and Bermuda than are required for Kentucky bluegrass.

Soil texture, supply of available soil phosphorus, and kind of grass should be considered in determining rate at which phosphates should be used. Sandy soils require less phosphate than heavy soils, and lighter rates are warranted in fescue and bent than for Kentucky bluegrass. These factors are all taken into account in Table II, which may be used as a rough guide in determining amount of phosphate to use. The amounts indicated are for 20% superphosphate, and if other materials are substituted, they should be applied in amounts to supply the approximate amount of phosphoric acid contained in 20% superphosphate.

It is suggested that the heavier rates be used where available soil phosphorus approaches the lower limit, and the lower rates where the available phosphorus approaches the upper limit.

In making the test for available soil phosphorus, samples should be collected to a depth of 3 inches, but supplementary determinations on the surface inch are warranted, especially if phosphates have been used in the past, because most of the applied phosphorus remains in this soil layer.

Annual applications of phosphate are seldom needed. The rates suggested above should suffice for 2 to 4 years, and interim feeding can be confined to nitrogen.

Need for nitrogen can be determined most readily by inspection of the turf. It produces green color, and active growth, besides being the element which encourages the grass to spread, and is responsible for control of clover and weeds. If the turf is not growing vigorously, and where poor color and clover is prevalent, the evidence points to need for nitrogen.

How Much Fertilizer

Until good turf is formed, spring and fall applications of nitrogen are warranted in amounts sufficient to encourage active growth. Where soluble materials are used, not more than 200 lbs. per acre should be applied at one time because of

TABLE II.

SUGGESTED RATES FOR APPLYING 20 PER CENT SUPERPHOSPHATE

Texture of Soil	Pounds Available Phosphorus Truog Method	Pounds Per Acre 20% Superphosphate — *Kentucky Bluegrass*	Pounds Per Acre 20% Superphosphate — *Fescue and bent*
Sands and Sandy Loams	0-25	200-300	100-200
	25-50	100-200	0-100
	50-75	0-100	None
	75 +	None	None
Loams, Silt Loams, Clay Loams, and Clays.	0-25	300-400	200-300
	25-50	200-300	100-200
	50-75	100-200	None
	75 +	None	None

the danger of burning the turf. Organics can be used at rates of 1,000 to 1,500 lbs. per acre. Where quick results are desired, a combination of 1,000 to 1,200 lbs. organic with 75 to 150 lbs. of sulphate of ammonia or ammonium phosphate can be used. After the effects of the soluble nitrogen disappear, the organic will continue to supply available nitrogen and thus promote a more uniform and continuous growth. The ammonium phosphate is advised only where phosphoric acid is needed in addition to nitrogen.

From a practical aspect, before proceeding with a program, a survey should be made to determine kind of predominating grass, texture of soil, together with degree of acidity, and content of available soil phosphorus. If the soil is too acid, steps should be taken to apply the required lime. The application of fertilizers containing sulphate of ammonia or ammonium phosphate should not immediately follow the use of lime because of the danger of releasing free ammonia. Besides burning the turf, it may result in loss of nitrogen by volatilization of the gaseous ammonia.

When tests show the soil supply of available phosphorus to be low, phosphates should be used at the approximate rates suggested in Table II. This will suffice for 2 to 4 years, and in the interim nitrogen feeding can be relied upon to produce desired results. Spring and fall applications should be made at reasonably heavy rates until turf of desired quality is obtained, then annual applications at reduced rates will suffice to maintain good fairways.

Figuring Your Costs

It is a simple matter to calculate the amounts of fertilizer required and their cost. Where fairways average 50 yds. wide, there is roughly an acre for each 100 yds. length, and when fairways average 60 yds. wide, each 80 yds. of length include an acre. So to figure approximate acreage simply deduct yardage of short holes, and length in front of each tee to be omitted, from the total course yardage; divide by 100 or 80 depending upon average width of fairways. Then knowing the kind of fertilizer to use and rates of application, it is a simple matter to arrive at the amount needed and the cost.

With a good spreader four men can complete fertilizer applications in from two to four days. Two of these are actually engaged in making the applications, and the other two in hauling the material from the barn onto the fairways.

Because fertilizers do not move laterally in the soil, uniform application is important. Careless methods leave tell-tale marks of disappointing turf in unfertilized strips or skipped areas, or may result in injury on localized areas where fertilizer was applied too heavy.

The two wheeled type fertilizer and lime spreader is best. A machine which will cover a strip 8 to 9 ft. wide, with a hopper capacity of 500 lbs. should be selected. Outlet spouts should be spaced close together, or fertilizer will fall in ribbon-like strips. This can be avoided by attaching grain seeder chains to the outside edge of the spreader board, directly below each outlet spout. Another effective method is to remove the spreader board and substitute a steel mat. It should be the same width as the hopper, and sufficiently long to drag on the ground for several feet behind the spreader. Both methods tend to overcome burning when soluble fertilizers are used, for they prevent fertilizer from adhering to the blades of grass.

Operators should be cautioned to overlap on each round, or unfertilized strips

several feet in width will result. Likewise the outlet spouts should be closed promptly by a man riding the hopper, whenever the machine is stopped so fertilizer will not continue to flow thru the spouts. Burned spots will result from the localized fertilizer dropped on these areas. Care should be exercised in filling the hopper for spilled fertilizer may produce an ugly and permanent burn. When soluble fertilizers are used, applications should not be made when the grass is wet or the ground very damp. Burns are sure to follow. It is also unwise to apply these materials during the hot spells of weather.

Factory calibration of fertilizer distributors is only approximately correct, and rates will vary with different materials. As a consequence, machines should be checked by applying a given amount on a definite area.

NEW STUFF

Manufacturers to Spur 1934 Sales With Improvements

THE WORD "new" has proved itself the jimmy to pry open purses of golfers during the last two years. "Cut price" has been a flop as a sales-maker.

With surplus stocks cleared out and lower end-of-season inventories than in the last 10 years of golf history, leading manufacturers are making the most of their opportunity to work this "new" selling point to the limit in 1934. The pro who doesn't build up his sales volume and standing by being the first to show the approved new stuff to his members is on his way out.

Here are some tips on 1934 lines, although considerable new development is being held under cover by manufacturers.

On balls, the 75c price will be back for top-grade American leaders. There probably will be three $1 imported balls on the American market. Exchange has a lot to do with it. One of the leading U. S. ball makers has a new feature of much interest preparing for the 1934 market. Worthington plans to follow up the introduction of its Tommy Armour 50c ball to the pro market with a 75c ball, sales of which will be confined to pros.

Restriction of top lines of clubs to pros, plus in some cases a limited number of price-maintaining stores, will be noted in the policies of most of the leading manufacturers. Other outlets will howl to beat hell. Pros who don't press this exclusive point will be sappy.

Spalding announces the top grades of both Bob Jones clubs with True-Temper semi-whippy shafts for 1934. Fellows who have tried them out babble with glee about selling and performance points.