National Green Section Tournaments Announced for 1925

The encouraging results from the National Green Section Tournament held last October have led the Executive Committee of the United States Golf Association to arrange for similar tournaments in 1925. A tournament for men is announced for Decoration Day, May 30, and a tournament for women will be held some time in June. Any player of any golf club in the United States or Canada who has a club handicap may compete. A silver cup will be awarded the winning players, and in case of a tie additional cups will be awarded. The competition will consist of an 18-hole match play round against the par of the course, the net handicap being based on seven-eighths of the regular stated handicap, the best scores against par being declared the national winners. A player may compete in these tournaments on another course, but the home club handicap must be used against the player's par of the course played upon, and the score returned must be entered on the records of the course visited. The entrance fee will be $1 per player, of which 75 cents is to be remitted to the United States Golf Association for the Green Section Endowment Fund and 25 cents is retained by the local club for a prize or prizes.

Fertilizers in Relation to Quality of Turf and to Weed Control*

By R. A. Oakley

Why do we fertilize putting greens? Broadly speaking, we do so under normal conditions to produce a vigorous growth of grass; under certain abnormal conditions to help grass recover from attacks of diseases and insect pests; and in general we fertilize turf to improve its quality. Let us understand clearly that the fertilizing of a putting green and the fertilizing of a hayfield are quite different propositions. In fertilizing meadows a large growth of hay plants is what is sought; in the case of putting greens it is quality of turf, which involves, in addition to vigor of growth and texture, freedom from weeds. It is important that this difference be fully appreciated.

For many years it has been known that the application of certain fertilizers or certain substances to the soil affects some plants favorably and others unfavorably when these plants are grown together in what we call mixtures or mixed cultures. The reasons for this are not all clear, but the facts seem to be unmistakable. This has led investigators to endeavor to find fertilizers that will favor the plants they wish to favor and at the same time discourage the ones they wish discouraged.

Twenty years ago the Rhode Island Experiment Station started a series of experiments to determine the difference in their effects on the bents and fescues of fertilizers having a tendency to produce an acid condition in the soil and those having a tendency to produce an alkaline condition. Plots of these grasses to which the fertilizers were applied were not kept in putting green condition, but they were kept so as fairly to approximate turf. In brief, the outstanding results of the tests were these: The plots fertilized with acid-reacting fertilizers produced cleaner—that is, more nearly weed-free turfs of the bents and of the fescues, than did those fertilized with alkaline-reacting fertilizers.

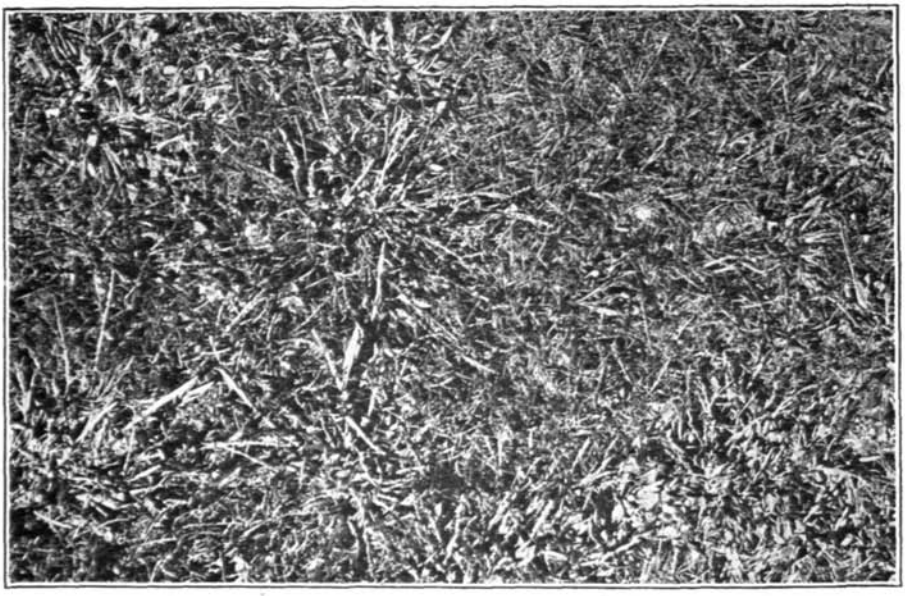
*A part of a paper read at the Annual Meeting of the Green Section, New York City, January 10, 1925.

In greenkeeping it had been shown that by the proper use of ammonium sulfate on bent or fescue greens white clover could be discouraged or eliminated. This fact and the results of the experiments at the Rhode Island Experiment Station and elsewhere led the Department of Agriculture, in cooperation with the Green Section, to conduct some simple experiments with acid- and alkaline-reacting fertilizers on turf kept in putting green condition. In September, 1921, a tract of land at Arlington Farm was prepared and sown with seed of Rhode Island bent. The soil of the tract is a poor stiff clay—really a brick-clay. A very thin but uniform stand of grass was obtained. In April, 1922, the area was laid off in plots 8 feet by 8 feet. Fertilizers were applied to all plots, except to a sufficient number which were left untreated as checks. There were duplicate plots of each fertilizer treatment, to reduce the likelihood of drawing erroneous conclusions from accidental effects. The chief object of the tests was to get more detailed information on the difference in effect between acid-reacting and alkaline-reacting fertilizers on the growth and quality of Rhode Island bent turf in putting green condition and on the incursion of weeds in this turf.

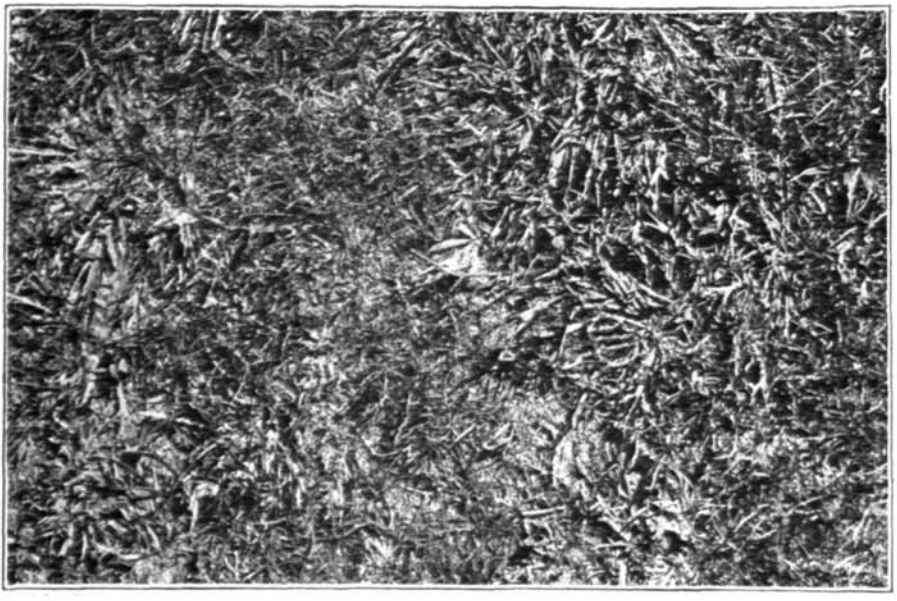
The fertilizers were applied approximately monthly during the growing season at the following rates for a single application to each plot of 64 square feet: ammonium sulfate, 6 ounces; ammonium phosphate, 6 ounces; nitrate of soda, 6 ounces; acid phosphate, 18 ounces; muriate of potash, 6 ounces; calcium cyanamid, 6 ounces; bone meal, 18 ounces; soybean meal, 18 ounces; cottonseed meal, 18 ounces; carbonate of lime, 36 ounces. This means that in the case of ammonium sulfate the total season's application was at the rate of approximately 15 pounds for each 1,000 square feet. Aside from the application of fertilizers, the plots were all treated alike. They were mowed and watered as one would mow and water a putting green. No weeds were removed at any time. The soil at the time the experiments were started was slightly acid.

The first striking development was the fact that the application of fertilizers containing rather quickly available nitrogen thickened the stand of grass greatly and did so in a very short time. This bears out the experience that good nitrogenous fertilizers properly applied will thicken thin stands of grass where reseeding alone will fail. At the present time all of the fertilizer plots with the exception of those having applications of cyanamid and those having lime have a better growth of grass upon them than the unfertilized plots. There is a great difference now between the ammonium sulfate and ammonium phosphate plots on one hand and the nitrate of soda and carbonate of lime plots on the other, in the number of weeds that has invaded them. The first two are nearly weed-free, while the last two are quite weedy. This was noticeable in the first summer (1922); more so in 1923, and still more so in 1924, when it became very striking indeed. There is an interesting difference between the nitrate of soda and the lime plots in the kinds of weeds that have invaded the turf. Goose grass, or silver-crab grass (*Eleusine indica*), is very abundant where nitrate of soda was applied, while the common crab grass (*Syntherisma sanguinale*) is equally abundant where lime was applied. The plots having applications of potash also were invaded by goose grass. There is relatively little white clover on the nitrate of soda plots at the present time, but it is quite abundant on the lime plots. This may be accidental. There is none on the ammonium sulfate or ammonium phosphate plots. There seems to be no accident about this.

The outstanding results of these tests may be summarized briefly as follows:

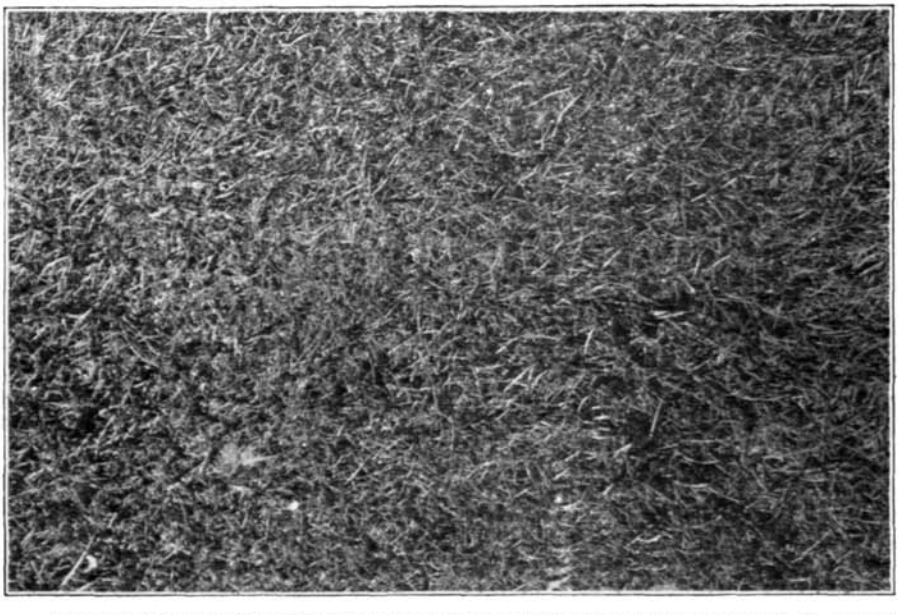


The plot shown in this photograph was treated with carbonate of lime at the approximate rate of 45 pounds to 1,000 square feet. Applications were made annually at this rate from 1922 to 1924 inclusive. It will be noted that the plot is very weedy and that it has much moss. The principal weeds in this plot were crab grass (Syntherisma sanguinale) and white clover.



The plot illustrated in this photograph was treated with nitrate of soda at the rate of approximately 15 pounds per 1,000 square feet annually, in five applications one month apart, from 1922 to 1924 inclusive. It will be noted that the plot is very weedy. The principal weed is goose grass or silver crab grass (Eleusine indica).

The plot shown in this photograph was given ammonium sulfate at the rate of approximately 15 pounds per 1,000 square feet, each year, from 1922 to 1924 inclusive. The fertilizer was applied in five applications, one month apart. Note the relative freedom from weeds as compared with the plot treated with lime and the one treated with nitrate of soda.



The plot shown in this photograph was given ammonium phosphate at the rate of approximately 15 pounds per 1,000 square feet annually in five applications, one month apart, for three years (1922 to 1924 inclusive). The fertilizer produced an acid condition in the soil as great as that produced by ammonium sulfate applied at the same rate. Note the freedom from weeds. This plot was the most nearly weed-free of all the plots in the series.

The turf on the ammonium sulfate and the ammonium phosphate plots is now and has been since the first summer practically weed-free and of good texture and otherwise of good quality.

The turf on the nitrate of soda, lime, and other alkaline-reacting fertilizer plots is now and has been since the first summer (1922) quite weedy, the important weeds being goose grass, crab grass, and white clover. Where lime alone was applied the turf has always been very poor and weedy. There is much moss on the limed plots—contrary to the popular notion that moss is an indication of acid soil and that lime is a panacea for all acid soil troubles.

The turf on the soybean meal and cottonseed meal plots is very good but somewhat weedy.

The addition of either acid phosphate or muriate of potash, or both, to plots treated also with ammonium sulfate or nitrate of soda did not give better turf than ammonium sulfate or nitrate of soda alone—in fact, not so good as ammonium sulfate alone—certainly not nearly so free from weeds. This indicates that in this case at least there is enough available phosphorus and potassium in the soil for the needs of the grass, a very significant point which should be borne in mind.

Another point worthy of mention is that earthworms are not in evidence on the plots where acid-reacting fertilizers were applied, while they are present in considerable numbers on the plots treated with alkaline-reacting fertilizers.

The best plots from the very beginning of the experiments are the plots to which ammonium phosphate was applied. The ammonium sulfate plots are nearly but not quite so good. Both series are remarkably good from the standpoint of vigor and texture of turf, and freedom from weeds.

At the end of the three-year period the soil of the plots to which ammonium sulfate and those to which ammonium phosphate were applied was appreciably more acid than at the beginning of the investigation, while the soil of the plots to which nitrate of soda and to which carbonate of lime were applied was appreciably more nearly alkaline than at the start. Generally speaking, the weediness of the plots in the series at this time is in direct relation to the alkalinity of the plots. In other words, the plots with the soil most highly acid are the ones freest from weeds.

The results of the Arlington experiments leave little doubt that for Rhode Island bent putting greens (and this is almost certain to be true also of creeping bent, velvet bent, and red fescue putting greens) such acid-reacting fertilizers as ammonium sulfate and ammonium phosphate are efficient and economical fertilizers to use, since they help to make vigorous turf of good texture and furthermore go far toward solving the weed problem. The evidence now seems clear that nitrate of soda, very commonly used on bent and fescue putting greens, is no more effective in inducing the growth of the grass than are ammonium sulfate or ammonium phosphate, while nitrate of soda produces conditions favoring some of the most troublesome northern putting green weeds.

The remarkable showing of ammonium phosphate has caused us to regard this fertilizer with considerable enthusiasm. It has performed consistently and well. From the showing it has made at Arlington it must be considered as a competitor of ammonium sulfate for bent or fescue putting greens. The price, of course, will be something of a factor in connection with its use. But leaving this out of consideration for the present,

it appears to be quite probable that on a basis of equivalent quantities of available nitrogen, ammonium phosphate will probably prove to be a better fertilizer for bent or fescue greens than ammonium sulfate. From other evidence it would appear that its superiority is due not to a need for added phosphorus but to the fact that phosphorus as a residue in the soil is better for the grass plants than is sulfur. Ammonium phosphate has not heretofore been available to golf clubs, but it is the understanding of the Green Section that it is now being placed on the market and will be available in ton lots or possibly smaller quantities.

Out of all the field investigations and experience, including that at Arlington and elsewhere, has come what appears to be a very simple course of procedure for the fertilizing of bent and fescue greens. Further studies (and they are being conducted now) may show the conclusions here to be in error, but as the case stands it seems sure that the most satisfactory fertilizer treatment from the standpoint of the turf and economy, involves the combined use of ammonium sulfate or ammonium phosphate, under provisions heretofore expressed regarding the latter, and suitable compost.

Just a few reasons why it is thought this combination is what should be used:

(1) Nitrogen is the outstanding fertilizer element for turf grasses. To be a good grass fertilizer a substance must be rich in nitrogen in a form available to the plant. Ammonium sulfate and ammonium phosphate are high in available nitrogen.

(2) It seems to be amply proved that the use of acid-reacting fertilizers goes far towards reducing the expense of weeding bent and fescue greens. Ammonium sulfate and ammonium phosphate appear to be the best acid-reacting nitrogenous fertilizers now available, price and other factors considered. Not only are they capable of acidifying soils but they promote a growth of grass which is satisfactory alike in vigor and texture.

(3) The addition of phosphorus and potassium does not appear to be at all necessary other than that added by the application of compost, which it is recommended be made in conjunction with ammonium sulfate or ammonium phosphate as included in the formula so often published in THE BULLETIN. The reasons here set forth should be seriously considered.

Attention is called again to the fact that the apparent superiority of ammonium phosphate over ammonium sulfate seems not to be due to the need for additional phosphorus. If nitrogen is the important fertilizer element to be supplied and the creation and maintenance of a rather highly acid condition in the soil is desirable in solving the weed problem, then it would appear that ammonium sulfate and ammonium phosphate are the most effective and economical fertilizers to use.

As for the use of compost, in addition to its many other functions, some of which are well known, it supplies suitable organic matter, which is probably much needed and tends to counteract any evil effect the long-continued use of acid-reacting inorganic fertilizers may have on the soil.

Let this suggestion be made to those who are thinking of buying some other fertilizer, mixed or otherwise, organic or inorganic, or to those who are importuned to buy some special kind, that they ask themselves or the salesmen these questions, provided, of course, they have bent or fescue greens:

Is it high in available nitrogen?

Is the price higher or lower, per unit of available nitrogen, than is that of ammonium sulfate?

Will it create an acid condition in the soil?

The chances are, if they put these questions frankly to themselves or to the salesmen, they will decide to buy ammonium sulfate or ammonium phosphate.

It is realized that there are certain new and apparently excellent fertilizers coming on the market. These may change the situation; but for the present, the course of treatment here outlined seems to be the one to follow. The Green Section has no desire to dogmatize on the subject of fertilizers for putting greens. It is still investigating, and, it is hoped, with an open mind; but it wishes readers of THE BULLETIN to have the benefit of its conclusions based upon work it has done and upon observations it has made.

Kerosene Emulsion in Combating Cutworms

In his letter of September 25, 1924, Mr. L. E. Lavis, superintendent, Timber Point Corporation, Great River, L. I., New York, writes as follows regarding the use of kerosene emulsion in combating cutworms:

"I knew that several of the greens located near the woods were infested with grubs of the common brown May beetles. When I applied the kerosene emulsion I noticed that several of the greens had a rather moth-eaten appearance. Upon applying the kerosene emulsion for the May beetles and upon watering it in very liberally, in many instances large numbers of cutworms came out on the turf, just having life enough left to get out in the sunlight and then die. However, all the cutworms were not dead, but it was a very easy matter to pick them up. Since applying the kerosene emulsion I have had no more trouble with the cutworms, but if I should I am going to use arsenate of lead, and at that time I will give you a comparison of the results."

The Best and Cheapest Way to Put Chemical Fertilizers on Putting Greens

By John J. McNamara, Pittsburgh Field Club, Aspinwall, Pa.

I have used chemical fertilizers, such as nitrate of soda and sulfate of ammonia, on the putting greens in many ways, including spreading them on the greens dry and watering them in, mixing them with sand and with soil in top-dressing, and dissolving them and applying with sprinkling cans. I find the best, cheapest, and safest way is to use a fertilizer distributor. The work is done by the men watering the greens, and it is done either during the day or at night, whenever it is thought that one or more greens need fertilizer. Using a wheelbarrow, the man takes to the green a supply of fertilizer, the fertilizer distributor, and a measure which will contain the quantity of fertilizer that should be applied to the green. If the sprinkler is to be moved twice to cover the green, the man divides into halves the quantity of fertilizer he has been instructed to apply to the green; if the sprinkler has to be moved three times to cover the green, he divides the specified quantity of fertilizer into three equal portions. In this way little time is lost by the men watering, and the green is fertilized and watered at the same time. Often these fertilizers contain many small lumps, which of course have to be put through a screen before they can be used with either sand or soil; but with the fertilizer distributor, no matter how lumpy the material is it can be dissolved in from 10 to 15 minutes. We also use the distributor in fertilizing our lawns and flower beds.