

QUESTIONS AND ANSWERS

All questions sent to the Green Section will be answered in a letter to the writer as promptly as possible. The more interesting of these questions, with concise answers, will appear in this column. If your experience leads you to disagree with any answer here given it is your privilege and duty to write to the Green Section. While most of the answers are of general application, it must be borne in mind that each recommendation is intended specifically for the locality designated at the end of the question.

Establishing Bermuda turf of fine texture.—Where can we obtain seed of the best kind of Bermuda grass for our putting greens? When we built our course we turfed the greens with Bermuda grass found growing wild on a river bank. Although this has served its purpose very well we feel that a much finer kind of Bermuda grass is available. The general opinion among golfers in Mexico seems to be that Bermuda grass is the only grass that is satisfactory for putting greens under subtropical conditions. As we are about to start a nursery we should like to obtain the most suitable seed. (Mexico)

ANSWER.—Most of the Bermuda grass seed on the market is grown in Arizona. This seed contains fine strains as well as coarse strains. We know of no one who has made selections of the finer strains and propagated them commercially. Such selections as we have made have not proven altogether successful for putting green purposes. We would recommend that you use Arizona seed in reseed-ing the putting greens, in order to select the finer strains of Bermuda grass which will no doubt appear following the use of this seed. Probably each patch of fine Bermuda which appears will be a distinct strain and will remain true as long as the reproduction is by runners or stolons, and not seed. After these patches have been watched for one or two seasons and are found to come close to the type of grass you desire, sod from one or more of them could be cut out and planted in nursery rows. The growth from this sod will all be of the same type, and you can continue growing this type as long as you wish by planting new nurseries. All further planting on the greens should be done with the strains you select and propagate.

Improving weedy fairways.—Our fairways, which are composed of Acapulco grass, carpet grass, Angleton grass, and Bermuda grass are in poor condition, being invaded by weeds of various kinds. We are sending you samples of what we consider our worst weeds. We wish to eradicate these weeds and to improve the turf. The samples of soil which we are forwarding are from the highland, where the soil is red and poor, and from the lowland, where the soil is rich and dark. (Cuba)

ANSWER.—In order to improve your fairways your program would seem to consist of heavy fertilizing and burning the weeds with sulphate of ammonia. The samples of weeds you forward are mostly leguminous plants and hence their control will depend somewhat on the maintenance of an adequate supply of nitrogen in the soil, since leguminous plants generally are subject to control by this method. The sulphate of ammonia can be used as a medium for burning the

weeds and hence checking their growth, while the nitrogen from the sulphate of ammonia will remain in the soil for some time and thus increase the growth of the grass. Grasses such as Bermuda, Acapulco, and carpet, which have heavy rootstock growth, will not be badly injured by the burning resulting from the use of the sulphate of ammonia.

The examination of the sample of your black soil from the lower areas indicates that it contains about 75 pounds of phosphoric acid to the acre, and the red soil from the higher areas about 25 pounds to the acre. The black soil has a pH value of 7.5, indicating that it is on the alkaline side, while the red soil runs from 6 to 6.2 in pH value, indicating that it is slightly acid. It appears that there is sufficient potash in both samples, but the black soil contains about twice as much potash as the red soil.

We would recommend, therefore, that your program open each year with the burning of the weeds with sulphate of ammonia. This should be done in April. Powdered sulphate of ammonia should be sprinkled by hand over the solid patches of weeds at the rate of from 10 to 15 pounds to 1,000 square feet. This should be done early in the morning when the dew is on the grass or when the grass is wet so that the chemical will stick to the weeds until its effect is produced. Some dealers sell fine forms of sulphate of ammonia free from lumps. A lumpy form could be used, however, if first powdered by rolling.

Following the burning of the weeds, heavy applications of some complete mixed fertilizer containing about equal amounts of nitrogen, phosphorus, and potash should be made. The turf should be disked at the time of fertilizing with a straight disk to facilitate the entrance of the mineral elements into the soil. The straight disk would not turn over or injure the existing turf. It would be best to apply the fertilizer in two applications, one application immediately after burning the weeds, and followed with another two or three weeks later, or after a rain coming shortly after the first application. This fertilization should induce a heavy growth of grass during the spring and summer months, and if the fairways could be fertilized again in September or October you should have a continued heavy growth of grass well into the winter. The fall application also should be split in half and made in two applications several weeks apart. By splitting the applications there is less likelihood of loss from heavy rains which you sometimes have in Cuba.

After the weedy patches have been burned with sulphate of ammonia, the fairways have been fertilized, and the new growth has begun, if the burned areas are not filling in fast enough, stolons of Acapulco grass or of Bermuda grass should be chopped or disked into these areas in order that they may fill in with grass before the weeds get a chance to become reestablished. In some cases it will be necessary to burn the same patches of weeds several times before the weed is killed out. Burning weedy patches with sulphate of ammonia is an effective treatment and one from which little damage can result to the turf.

Yellowing of turf in winter.—Our turf in winter is affected in a manner not specifically mentioned in your article *Turf Diseases and Their Control* in the Bulletin for August, 1932. The winter in Japan

is not very severe, and it seldom snows, but toward February, the coldest month of the year, the grass becomes frost-bitten and some parts of the green discolored, having a tinge of blackish brown, although as the weather becomes warmer the grass resumes its usual greenish color. The trouble is that there are a lot of "yellow blights" in winter in place of brownpatch in summer. The blade of the grass becomes yellowish in some sections, probably due to overfertilization or underfertilization. Your suggestions will be appreciated. (Japan)

ANSWER.—The general discoloration of grass in the winter months to which you refer and which is common throughout the United States is a natural response of the grass to cold. When warm weather returns the discoloration soon disappears. The yellowing which you mention is however probably something else. If it occurs in definite patches somewhat like the snowmold or brownpatch diseases, it may be caused by the snowmold fungus or a similar fungus active at low temperatures. If it is in more or less indefinite areas it might be caused by poor drainage. In some cases it is found that where there are little depressions in the surface, water may collect, and even though there may be no water covering the grass in these areas the soil may be entirely too wet, resulting in a poor root system, which often leads to the yellowing of grass blades over a large area. In such cases the injury is more or less confined to areas which are lower than others. If the yellowing occurs rather well scattered over the putting green it may be due to a deficiency of iron or some other fertilizing element in the soil. Sometimes a yellowing of grass is found, particularly in the fall, winter, and early spring, where a fertilizer too high in phosphoric acid, as for example bone meal, has been used. This has been explained as due in part at least to a chemical reaction in the soil whereby the phosphoric acid combines with the iron and makes it unavailable to the plant. If this is your difficulty you will find that the grass will quickly regain its color if you apply a little sulphate of iron in solution. It is suggested that you try the iron on a small area of one of your greens badly affected, and if improvement results as evidenced by a marked difference between the treated and untreated areas, the same treatment may well be given to the entire putting green. It is suggested also that you have the affected grass examined by a plant pathologist located at one of your universities with a view to identifying the cause of the yellowing.

Seeding rate for putting green mixtures.—We are advised to seed our putting greens with a mixture of colonial bent, velvet bent, and some red fescue. It is suggested that in order to get a quick growth of turf in a year we should sow this mixture at the rate of 3 ounces to a square yard. Is this rate of seeding in accordance with your recommendations? (New Zealand)

ANSWER.—Our experiments as well as results obtained in general practice in the United States and Canada give us data upon which we base our recommendations on rates of seeding. We recommend seeding bent on putting greens at the rate of from 3 to 5 pounds to 1,000 square feet, and fescue at the rate of from 10 to 15 pounds, provided the seed test shows a high percentage of germination. Therefore rates of seeding for mixtures of the two would come between the extremes, depending on the percentage of each kind of seed in the

mixture. It would seem that the rate you mention, which is equivalent to over 20 pounds to 1,000 square feet, is considerably more than necessary. In the United States we consider that the addition of fescue to bent for putting greens is wasteful, since bent soon crowds out the fescue under the close cutting demanded for putting greens.

Sugar-mill filter-press cake as a fertilizer.—We are sending you a sample of cachaza, which is the filter-press cake we can get from the sugar mills here at no cost other than that of hauling. It is almost pure organic matter and we believe it would be of some value as a base for mixed fertilizer. How could we use it to best advantage? (Cuba)

ANSWER.—Your sample of filter-press cake from the sugar mill contains about 2 per cent of nitrogen, 2.5 per cent of phosphoric acid, 1.13 per cent of potash, and 4 per cent of lime. It could be used to best advantage in combination with inorganic fertilizers. To make 100 pounds of such a combination containing about equal percentages of nitrogen, phosphorus, and potash we would suggest the following mixture: 40 pounds of cachaza, 10 pounds of muriate of potash, 28 pounds of 16-per-cent superphosphate, and 22 pounds of sulphate of ammonia. This will make a fertilizer with a formula of 5-5-5, meaning that it contains 5 per cent each of nitrogen, phosphorus, and potash. By varying the relative proportions, a fertilizer of different formula can be obtained if it seems desirable. You could purchase the muriate of potash, sulphate of ammonia, and superphosphate and have them mixed with the dry cachaza either on your own property or by some fertilizer dealer.

Benefit of lime to bent greens containing some clover.—We have some woods loam which we desire to apply to our bent greens, but as it is deficient in calcium we should not care to apply it unmixed with lime. Would the application of lime to our greens in this manner stimulate the growth of clover to a dangerous degree? (Virginia)

ANSWER.—Calcium and magnesium, which are contained in lime, are certain elements which soils require. Some grasses and weeds do decidedly better when ample lime is available in the soil. Usually lime increases the growth of clover. However, we have observed that, under close clipping, certain bent grasses, including Metropolitan bent, do not thrive so well when there is a deficiency of lime in the soil. The mere application of lime in order to give the bent what it requires will not of itself bring in clover. If however lime alone is applied the soil will soon become deficient in other elements, such as nitrogen, required by grass, and the grass will accordingly suffer. Clover, on the other hand, is able to draw upon the nitrogen in the air, a faculty not possessed by grasses; hence when nitrogen becomes deficient in the soil it does not affect the clover materially, and the clover commences to crowd out the grass. Our work has shown that where conditions are made favorable for the growth of grass, the grass will compete favorably with the clover regardless of whether lime is supplied or not; consequently as long as adequate nitrogenous fertilizing is maintained on putting greens there need be no undue worry regarding the use of lime. Since your woods earth is deficient in lime you should by all means mix some with the earth at some time previous to its use.

Proprietary remedies for brownpatch.—The only remedy we have used so far for brownpatch is. . . . We have used it almost exclusively as a curative measure. Hot, still nights constantly bring the threat of a new attack, and while we are now putting extra concentration on the idea of prevention we still had numerous attacks last summer. This year we are giving our bent greens a light spraying every two weeks in the hope that it may ward off the trouble. In the meantime we have noticed extensive advertisements of another remedy, called The dealers make rather extensive claims both as to its curative and preventive properties. Have you tried out this new preparation? (Tennessee)

ANSWER.—We have not tested the preparation which you mention due to the fact that the manufacturers have not furnished us any for the purpose. Our experience has been that companies which have something of merit are anxious to have us make a trial of their product whereas those who have doubts as to its value are hesitant to let us have any for our trials. We have recently obtained a sample for analysis, however, and have been informed by the analyst that the fungicidal ingredient of the preparation is corrosive sublimate. It also has some nitrogen to act as a fertilizer. This of course makes an expensive way to purchase fertilizer and corrosive sublimate.

Cost of seeded and stolon greens.—Is there any difference in original cost and maintenance costs between a bent green planted with stolons and one planted with seed? (New York)

ANSWER.—It costs less to plant a bent green with seed than with stolons provided the cost of the seed or the stolons is no greater than the present prevailing market price. Even when the stolons are secured from a nursery on the golf course, their production entails some cost in the preparation and care of the nursery, to which must be added the cost of cutting the stolons, distributing them, and topdressing them when planted. As regards maintenance costs, our observations indicate that turf produced from certain kinds of bent seed, including seaside bent, does not become as thickly matted, even after several years, as the popular strains of creeping bent generally planted from stolons. The reason for this is not altogether clear. For the above reason less topdressing is required as a rule on seaside bent greens planted with seed than, for example, on greens planted with stolons of the Washington or Metropolitan strains of creeping bent.

Cutting height for fairway turf.—What is the proper height for cutting fairways in midsummer? At that time of the year our fairways are often badly burned from drought, and the clay loam on which they are built becomes hard and baked. Our practice has been to cut the fairways at $\frac{3}{4}$ inch in spring and 1 inch in summer. (New York)

ANSWER.—Recent work which we have conducted concerning the best height of cut for fairways, Kentucky bluegrass fairways in particular, has indicated that for the best growth of grass the Kentucky bluegrass should be cut not closer than $1\frac{1}{2}$ inches. This is a little high, no doubt, for fairway purposes unless the fairways can be cut frequently enough to prevent the grass from growing much taller. It would be found that if the grass could be left that long it

would be conducive to a much thicker turf, and hence the ball might easily present a better lie than it would on turf cut at $\frac{3}{4}$ inch but much thinner. We would suggest that you commence to cut the turf in the early spring at $1\frac{1}{2}$ inches and continue through the summer with the 1-inch cut, and if necessary during the early fall, when blue-grass is growing vigorously. However we would allow the grass to go into the winter on a long cut; in other words, as the end of the fall growing season approaches we would allow the grass to grow to $1\frac{1}{2}$ inches. This gives the grass more of an opportunity to store up plant food to be carried through the winter and to obtain a good start in the early spring.

How can we control Bermuda grass in putting greens of bent grass? (Tennessee)

ANSWER.—It is probable that if the Bermuda grass is weeded out of the putting greens by hand as soon as it begins to appear in the spring, and a careful watch is maintained through the spring and summer to keep the greens clean, they may be effectively rid of the Bermuda grass. You will probably find that much of the Bermuda grass has winterkilled and that comparatively little will be left in the putting greens to weed out in the spring. Your conditions in Tennessee are doubtless similar to those in Oklahoma, where there are many beautiful putting greens of seaside creeping bent grass. In those putting greens the Bermuda grass starts out with only a few scattered patches in the spring, but by fall it has sometimes taken over large areas on the putting greens. The putting greens, however, are played on over winter and a great deal of the Bermuda grass winterkills so that by the following spring there are only a few scattered patches left. These patches again increase in the summer until gradually the Bermuda grass takes over more and more of the bent putting greens. The plants should therefore be removed before they have a chance to spread.

Unnecessary reseeding.—Our Washington creeping bent greens are in fine condition in spite of the summer drought we have experienced. Would you recommend reseeding these greens in the fall? If so, where can we obtain Washington creeping bent seed? (Ohio)

ANSWER.—Since your greens are in good condition it would be a waste of money to attempt to reseed them in the fall. Moreover, no seed of the Washington strain of creeping bent is available, as this strain must be planted by the stolon method; nor would other bent grasses, if seeded, match your turf of the Washington strain of creeping bent. With putting greens planted some years ago with fescue, redtop, or certain other grasses that are not permanent, it was necessary to reseed many greens in the fall; also the ravages of brown-patch and other diseases often made it necessary to reseed. Clubs now find that it is seldom necessary to reseed putting greens in the fall except when there has been some unusual damage. In spite of these changed conditions a great many individuals still have the reseeding habit and waste a great deal of money as a result. Where greens are planted by the stolon method any scars can be mended by planting stolons or by plugging in pieces of sod from a turf nursery. In your case there would seem to be no need for planting of any kind.



**Trouble is an ounce or a ton, depending on how
we take it.**

Francis Roy Cooper

