

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 given in this column, it is your privilege and duty to write to the Green Section.

While most of the answers are of general application, please bear in mind that each recommendation is intended specifically for the locality designated at the end of the question.

Fertilizers for Kentucky bluegrass and red fescue fairways on heavy clay soil; treatment of alkaline heavy clay soil for bent greens.—Our fairways are composed chiefly of Kentucky bluegrass and red fescue, with some annual bluegrass. The soil is alkaline. I have been informed that Kentucky bluegrass thrives best when a fertilizer high in phosphoric acid is used in addition to lime, the statement being that under such conditions the grass becomes so vigorous that weeds have no chance to invade the turf. On the strength of this statement we are considering the use this spring of a fertilizer high in phosphoric acid, and believe that such a fertilizer can be prepared at a reasonable cost by mixing 450 pounds of sewage sludge, 100 pounds of sulphate of ammonia, and 100 pounds of Ammo-Phos (11-48-0), giving us practically a 9-9-1/3 fertilizer. We would apply this at the rate of 650 pounds to the acre. Would this fertilizer be available for the grass during the hot, dry summer months if applied early in the spring? Is the phosphoric acid necessary, or could it be replaced by an additional 50 pounds of sulphate of ammonia? We used bone meal on our fairways last spring at the rate of 600 pounds to the acre. Will red fescue respond to phosphoric acid as bluegrass does? Will the bluegrass under this treatment crowd out dandelions, plantain, white clover, and chickweed when it is cut to fairway length?

When our greens were constructed five years ago quite a little of the subsoil was mixed with the top soil. This soil is a heavy yellow clay, impervious to water, and is covered with a thin layer of top soil. No tile was laid. By top-dressing since the greens were built, a layer of clay has been sandwiched in between two layers of sand, so that a plug cut from almost any place on the greens falls apart in three layers. The top or sod layer is usually about $\frac{3}{4}$ or $\frac{7}{8}$ inch thick. The turf consists of redbot, some mixed bent, red fescue, and annual bluegrass. Last season we top-dressed each green once a month with a mixture of one part each of top soil, mushroom soil (extra fine quality), and sharp river sand. Sulphate of ammonia was applied once a month also, and cottonseed meal was used twice during the season. The results were good. We plan to top-dress and fertilize on about the same schedule again this year. Should we use more phosphoric acid than we did last season? We started a bent nursery last fall and plan to change all our greens to this grass. But here is something which worries us. A Portland cement plant is located one-half mile southwest of our boundary line, and the course is getting an almost continuous bath of cement dust, very

heavy at times. Do you think we shall be able to make our soil acid enough for bent greens? The soil is strongly alkaline now. (Pennsylvania.)

ANSWER.—Some general experimental results, and many observations which have been made, tend to confirm the statement that Kentucky bluegrass thrives best when a fertilizer high in phosphoric acid is used in addition to lime. We have not sufficient definite results on this subject, however, to enable us to make specific recommendations regarding treatment of Kentucky bluegrass turf on golf courses. We have observed that bone meal (which is high in phosphoric acid and contains considerable lime) when disked into the soil before planting Kentucky bluegrass, has given good results. However, we realize that if Kentucky bluegrass turf is kept cut close it likely will not be able to crowd out various weeds, as it can when allowed to grow long or under its natural conditions. We would advise caution in applying phosphoric acid to established turf, as there is a chance that an excess of this fertilizer may greatly encourage the growth of clover and various weeds. Probably since your soil is quite alkaline now and is receiving lime in the shape of dust from a cement plant, it will not be necessary to add lime to your soil. Although sulphate of ammonia tends to make soil acid, it is an extremely long process even when frequent applications are made to a soil which is naturally neutral or on the alkaline side. Therefore we should not hesitate in your case to use sulphate of ammonia as often as desired. Some soils give exceptionally good results when either phosphoric acid or potash, or both, are used, and it is always safe to apply some of each to fairways until it appears certain that more is not required. The mixture which, as you state, gives a 9-9-1/3 fertilizer, appears to be all right. It might be well to compare it, however, with a mixture of 1,300 pounds of sewage sludge, poultry manure, or cottonseed meal (whichever material is the cheapest), 250 pounds of acid phosphate, 125 pounds of muriate of potash, and 325 pounds of sulphate of ammonia. This would give you a fertilizer of approximately 7 to 8 per cent nitrogen, 4 per cent phosphoric acid, and 4 per cent potash; and it might be a better fertilizer for your fairways in view of the fact that it contains almost as much nitrogen and is a little better balanced as far as the potash is concerned. The organic part of either of these mixtures should last for considerable time and serve as a carrier of the fertilizing elements applied as chemicals. The nitrogen from the sulphate would probably be used first, the other elements being released more slowly. It is necessary for every greenkeeper to become familiar with the requirements of his particular soil; and it is suggested that in making comparisons of fertilizers they be kept first of all on a similar nitrogen basis, since if one plot receives more nitrogen than another the results on the one may be very much better than on the other regardless of phosphorus or potash which may also have been added. Like considerations should of course be given also to the amounts of phosphorus and potash applied to various test plots, no matter in what form they are applied.

We are not sure that the requirements of fescue differ from the requirements of Kentucky bluegrass as far as phosphoric acid is concerned.

On your putting greens, if you use compost from time to time and occasionally apply a complete organic fertilizer, you should be adding

sufficient phosphorus and potash for the requirements. Since you obtained good results from top-dressing your greens and making applications of sulphate of ammonia, we see no reason why you should discontinue the practice. We should not advise you to use more phosphoric acid on your greens than you did last season. As we have indicated, the compost contains considerable of this fertilizing element. We suggest that you try out plots of vegetated bent under putting green conditions on your natural soil so as to satisfy yourself as to their behavior on soil which is so alkaline. We are inclined to think that unless any of the greens get an overdose of the dust from the cement plant, your continued applications of sulphate of ammonia will give satisfactory turf even though the soil is not made acid.

Effect and treatment of ice and snow covering greens.—About 9 of our creeping bent greens are covered all over with from 2 to 3 inches of solid ice with about 7 inches of snow on top of the ice. Will this be injurious to the grass, and if so what treatment would you suggest? (Illinois.)

ANSWER.—The formation of 2 to 3 inches of solid ice on your greens would of course occur only under exceptional conditions unless the ice were the result of slush forming from a covering of snow. If your greens have adequate surface drainage and subdrainage you need have no worry when the spring thaws arrive. Most injury to turf that is blamed on ice is due to alternate freezing and thawing in the spring, especially when the drainage is not perfect and the ground remains saturated. There is nothing much you can do now unless you find it possible to assist in getting the surface water off the greens as quickly as possible after each thaw. Sometimes banks of snow or slush at certain points prevent the escape of water resulting from the melting of the ice. In such cases a little work with a shovel may assist the escape of water from the green. It is also sometimes possible to deflect water from melting snow or ice from running onto a green.

Mulching with paper to control weeds in nursery rows.—Can paper mulch be used economically in the nursery to keep down weeds between the rows? (Ohio.)

ANSWER.—The paper mulch system is generally effective with seeded crops, but in commercial plantings holding the paper against wind damage is frequently quite a problem. The shifting of the paper away from the extending runners as proposed in your letter departs from any procedure in our experience. We would suggest that you use 36-inch paper in rows about 40 or more inches apart and hold the single sheet with 40-inch laths stapled with single-footed (7) wires, the laths running parallel to the rows. These laths could be moved much more easily than double-footed wires, and the paper could be folded back as desired from either row. It might be sufficient to move alternate strips at one date and the other strips at a later date. We do not know anything about the economical aspects of such a procedure, but feel that small trials with a few rolls of paper might well be worth the effort. During initial trials we would suggest the use of a fairly heavy paper. We shall be pleased to be advised as to the results obtained from any trials you may undertake, with particular emphasis on the problems which arise.

Let me but do my work from day to day,
In field or forest, at the desk or loom,
In roaring market-place or tranquil room;
Let me but find it in my heart to say,
When vagrant wishes beckon me astray,
“This is my work, my blessing, not my doom;
Of all who live I am the one by whom
This work can best be done in the right way.”

—Henry Van Dyke.