

aged by organic manures and ammonium salts and not encouraged by starved soils, sodium nitrate, or heavy manuring. On very acid soils it is discouraged by liming. [In the United States, sorrel seems conspicuously a plant of the poor soils. It is rarely troublesome in putting greens. On fairways it is usually on the starved spots.] Grass-leaved chickweed, at Rothamsted, was discouraged by ammonium salts and was encouraged by liming. [This weed is becoming increasingly plentiful on American golf courses, especially on putting greens. Apparently the best remedy is ammonium sulfate.]

**SUMMARY.**—In general, the Rothamsted results uphold the methods on golf courses now generally followed in America. Considerable allowance must be made in some cases, as the Rothamsted results are based on hay yields, not on the quality of the turf. This point deserves emphasis, as many greenkeepers assume that methods which are desirable in raising different crops, should be equally desirable in growing turf. No greater error can be made than to use such reasoning. If it were true, all plants should occur under any given condition in nature, and furthermore all plants should presumably be cultivated by the same methods. The fact that experiments on grain and hay crops do not necessarily apply to turf culture is not at all a criticism on the records of scientific agriculture. Nearly all of such contributions refer to crops and to some other end-result than turf. If one wants good crops of red clover or alfalfa, ordinarily lime must be used. If one is growing rhododendrons, lime, if used, is nearly always fatal.

### QUESTIONS AND ANSWERS

All questions sent to the Green Committee 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 each month. 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 Committee.

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.

**1. RIDDING TURF OF MUSHROOMS.**—We are sending you a specimen of mushrooms which at times are abundant in our turf and are exceedingly objectionable. We shall be glad to have your recommendations for getting rid of them. (Minnesota.)

**Answer.**—The mushroom you send is the most common of the fairy-ring fungi and is technically called *Marasmius oreades*. One of the common recommendations for destroying this mushroom is the use of iron sulfate in the strength of 1 pound to 1½ gallons of water, making 3 applications at intervals of 2 weeks. We are not certain, however, that this procedure will be advisable where the question of saving the turf must be considered, as there is a possibility that the iron sulfate will kill the grass also. We would therefore suggest that you experiment with it first on a small scale before undertaking a general treatment. Another plan would be to treat the mushroom growths heavily with Bordeaux mixture. This will not destroy the grass and will probably kill out the

mushrooms. We would suggest also that you spike or otherwise loosen the ground, as the white threads of the fungus which run through the soil have the effect of waterproofing it.

2. RESEEDING FESCUE-REDTOP GREENS WITH BENT SEED.—We should be glad to have your opinion as to the advisability of sowing German mixed bent seed on our putting greens, which already have a fairly thick turf composed of 70 per cent fescue and 30 per cent redtop. We do not wish to experiment, as our greens are fairly satisfactory. We are aiming to improve, rather than to experiment with what we now have. (New Hampshire.)

Answer.—Fescue greens or redtop greens, or a mixture of these two grasses, can be converted to creeping bent greens, and are much improved, by the sowing of German mixed bent seed on the established turf. This seeding is best done about the end of August, although in your latitude spring seeding ought to be satisfactory also. We would suggest that to each 1,000 square feet of putting surface you seed 2 pounds of German mixed bent seed this spring and an equal amount again at the end of next August. At the time this seed is sown it will be well to give a light top-dressing to the greens, which will serve in a measure to cover the seed.

3. NURSERY TREATMENT TO ENCOURAGE GROWTH OF CREEPING BENT STOLONS.—The creeping bent which we have started in our nursery appears to be making a satisfactory growth above ground but does not seem to be spreading to any extent under ground. I find many of the stolons have developed buds under the surface but they are very slow in making their appearance on top. Do you think it would be advisable to top-dress this growth above ground? (Illinois.)

Answer.—It is natural for creeping bent to grow above ground, and therefore the stolons should not be covered with a top-dressing if you want to increase them for planting purposes. A little dirt scattered on the loose runners will sometimes make them take root, but to cover the leaves of the grass would smother it.

4. IMMUNITY OF SELECTED STRAINS OF CREEPING BENT TO BROWN-PATCH DISEASE.—We have been told that there is a certain strain of creeping bent grass that is practically immune to the brown-patch disease. Is this the fact? (Ohio.)

Answer.—Some strains of creeping bent appear to be more susceptible to brown-patch disease than other strains. If you have more than one strain of creeping bent no doubt you will be able to observe which, if any, are relatively less susceptible to the disease.

5. DISADVANTAGE OF EXTENSIVE WATERING WHEN APPLYING AMMONIUM SULFATE.—It has seemed to us that we do not get as lasting an effect from ammonium sulfate as we should. In two or three weeks it seems to have gone. We water each green every other night. Do you think we use too much water in following up the sprinkling cans on this sandy soil, thereby putting the sulfate down below the grass roots? (Ohio.)

Answer.—This fertilizer is quick in action, but its beneficial effects are soon over with. This is true of any material that is readily soluble in water. For this reason it is not advisable to water so that there is much run-off from the greens.

6. INTRODUCING THE CREEPING BENT INTO OLD TURF.—In order to introduce creeping bent stolons into our present turf of fescue, bluegrass, and redtop, we propose to cut shallow furrows running east and west

into our field with an ordinary disk-harrow. Then we plan to put cut-up bent stolons into these furrows and top-dress the grass immediately, and then water them, there being adequate facilities for watering. Would you consider that this process would be successful? (New York.)

Answer.—There have been several attempts made to introduce creeping bent into old turf. We have had excellent results by plugging it into old redtop with a weeding knife. This past fall there were several putting greens treated in a little different way. The chopped and shredded creeping bent stolons were scattered over the green on top of the old turf and top-dressed with about  $\frac{1}{4}$ -inch of screened top-dressing and then kept well watered. The bent is growing fine at the present time and gives promise of being a successful procedure. We will know more about it next summer than we do now. We would advise you to try this on part of your field next fall. It will be a slow job to put the creeping bent stolons down in the cuts made by the disk-harrow, and we doubt if it is necessary to go to all that trouble.

7. KEEPING QUALITIES OF BORDEAUX MIXTURE.—Will Bordeaux mixture left on hand from last year be satisfactory for use in brown-patch control this coming season? (Minnesota.)

Answer.—Dry Bordeaux powder, if kept in air-tight containers, will not deteriorate, and should be as effective for brown-patch at any time as fresh material. The liquid Bordeaux, however, loses its effectiveness very soon after being mixed, and it is for this reason that Bordeaux powder is put on the market in dry form.

8. SALT IN WEED ERADICATION.—In the construction of our golf course we have been having considerable trouble in eliminating the cane-break growth. Kindly advise us if there is anything that could be used to destroy this weed without injuring the soil. (New York.)

Answer.—We would advise using ordinary salt to kill out the cane-break growth. Salt will kill any vegetation if applied heavily enough, and as it is soluble in water it is soon washed out of the soil, leaving no permanent injury. The minimum amount of salt to use effectively can be easily determined by experiment, as it requires only a day or two to ascertain its effects on plant growth. If you do not intend to seed before fall we would advise your using the salt in heavy applications so as to exterminate the canebreak completely, as it is generally a troublesome plant to handle.

9. PATCHING GREENS PLANTED FROM CREEPING BENT RUNNERS.—Our No. 1 green, which was reconstructed and planted vegetatively last fall, is coming along nicely, but the lower part, which slopes a little more and naturally gets more wash, shows a few bare spots about the size of a plate. We are considering planting bent seed in these spots. Would you consider such a method practicable for patching the green? (Indiana.)

Answer.—The use of bent seed for this purpose would tend to mar the uniformity of your turf. We would advise you to plant these bare spaces with plugs or runners taken from the edge of your green, as in this manner you would preserve its uniformity.

10. RIDDING TURF OF DANDELIONS.—Our turf is beginning to show dandelions and we should like to have your recommendations for getting rid of them. (California.)

Answer.—If you have only a few dandelions and they are sparsely distributed over a large area we would suggest the sulfuric acid treatment, but if you have numerous plants on your course and they appear in colony-like patches, the iron sulfate treatment would probably be better. If sulfuric acid is used, extreme caution should be exercised not to let the acid come in contact with the grass, the clothing, or the person, as it is very corrosive and will readily kill any vegetation with which it comes in contact, eat holes in clothing, and injure the skin. The acid should be applied with a sharp-pointed instrument, such as an ice-pick, which should be dipped in the acid and inserted into the crown of the plant. If iron sulfate is used, it should be employed in the form of a solution of  $1\frac{1}{2}$  to 2 pounds to 1 gallon water and applied as a spray over the infested area. This treatment should be made on a bright, sunny day, when there are no indications of rain and when the conditions are such that the area which is treated requires watering. It should be watered thoroughly just before making the treatment in order that it will not be necessary to water for two or three days following. It may require two or three of these treatments during the season to keep the dandelions in check; but at that, it is more economical than hand-weeding.

11. METHOD AND RATE OF APPLYING AMMONIUM SULFATE.—Kindly tell me what is the proper method of applying ammonium sulfate as a fertilizer. (Connecticut.)

Answer.—We prefer mixing it with sand or good loam compost and applying it at the rate of approximately 3 pounds to the 1,000 square feet. Three applications may be made, one early in spring and one late in spring; and a third application in the fall if the grass needs stimulating then. Occasionally it seems desirable to apply a little in mid-summer, especially on grass that has been attacked by brown-patch. One-half pound, or certainly not more than 1 pound, to 1,000 square feet, is all that should be applied in hot weather or in midsummer. Exceeding care is necessary to prevent burning the grass at that time, and therefore it is advisable to be in a position to water the grass thoroughly after the ammonium sulfate has been applied.

12. ERADICATING CHICKWEED AND WHITE CLOVER WITH AMMONIUM SULFATE.—What is the best method of getting rid of chickweed and white clover? (Ohio.)

Answer.—Fertilizing the grass with ammonium sulfate tends to eradicate both of these plants. Chickweed is sometimes gotten rid of by using ammonium sulfate up to the point where it begins to burn the grass. Grass will stand a little more ammonium sulfate than will chickweed. You will have to experiment in order to find the right amount to use, else you will incur the danger of injuring your greens.

13. USE OF SEED FROM HAY LITTER FOR FAIRWAYS.—We plan to reseed our fairways lightly this spring in order to thicken the turf, which is redtop. A member of our club who owns a large farm suggests that after he uses the hay in his barn he could pick up a large amount of seed from the floor. Do you think such seed would be suitable? (Maine.)

Answer.—That depends on the kinds of grasses that make up the hay. If the grass is a small native sort commonly called burden, it would be first-class for your fairways, but if it is timothy or dog grass we would not recommend its use. If you purchase any seed for this reseeding we would recommend bent.