The Fairway Fertilization Problem

On a rapidly increasing number of golf courses the problem of fairway improvement is receiving far more attention than was considered necessary on even the best-kept courses a few years ago. Watering systems have been installed throughout the fairways on many courses, artificial drainage has been provided, and many other improvements have been brought about. Together with these many improvement there has been a general increase in fertilization programs. One of the fundamental requisites of good turf is an abundant supply of plant food in readily available form; and, consequently, if the fairways are to be improved, each club must sooner or later face the problem of applying fertilizers in some form.

Years ago the almost universal fertilizer for fairways was stable manure. Changes in recent years have so reduced the supply of this commodity that on many courses it no longer proves the most economical source of plant food. Furthermore, the increased demand for a prolonged playing season on many courses renders a heavy top-dressing of manure objectionable. Initial cost of material, cost of hauling, method of handling, speed of application, interference with play, influence on weed growth, and many other factors, have played an important part in bringing into general use new methods to replace those of only a few years ago. Like so many other golf course problems, that of the most desirable fertilizer for fairways will vary somewhat with the local conditions. It is the purpose of the current issue of THE BULLETIN to bring together a number of different methods at present in use throughout the country. No attempt will be made to pass judgment on any individual method; nor is it to be inferred that the collection of articles in this BULLETIN represents the best or all of the methods that prove effective. The articles do, however, serve to show that there are several means for securing the desired results; but in the final analysis these different methods are in many respects similar.

In general, it will be observed that there is a growing tendency to turn to the more concentrated fertilizers. These reduce transportation costs, are more rapidly and easily distributed, and do not interfere with play. As a general rule, some complete fertilizer is used, but invariably the nitrogen content is high or the ratio is raised by the addition of a high-nitrogen fertilizer. On fairways where bluegrass abounds it is not desirable to increase the acidity of the soil to the same extent that is sought on greens, where the more acid-tolerant grasses, such as bent, predominate. On the other hand, it may be desirable to use fertilizers which increase the acidity of the soil if clover and other weeds are abundant. This may be especially advan-

tageous on fairways where bent turf is common. How far one may safely go in increasing soil acidity without injuring bluegrass turf is still a disputed question, although, in general, from fairway fertilization practice throughout most of the country, it is probable that any bad effects of acidity would be overbalanced by the advantage of having a less weedy turf. In any case, if such a condition in particular localities is found to be harmful, it can readily be overcome with light applications of lime.

In buying fertilizers cost is an important factor. The many fertilizer laws adequately protect the public, provided the public is interested enough to avail itself of the information at hand. In order that clubs may understand more clearly what information is at their disposal in purchasing fertilizers, we are publishing the following article by Dr. Schreiner, who is in charge of the soil-fertility work of the United States Department of Agriculture, and, consequently, well qualified to give advice on this subject. In his article Dr. Schreiner points out that greenkeepers or green committees who buy fertilizers blindly have only themselves to blame. The fertilizer business, of course, is based chiefly on the demand in ordinary agricultural production. Nevertheless, the same laws that protect the farmer protect golf clubs, if they choose to avail themselves of this protection.

We wish further to emphasize Dr. Schreiner's statements concerning the relative cost of nitrogen and the other elements used in fertilizers. We repeatedly are advised of attempts by some fertilizer companies to dispose of low-grade fertilizers, or fertilizers unsuitable for turf, at fancy prices. Many of these attempts are due to misinformation. The fertilizer business is based on farm crop production. In farm practice it is desirable in most cases to produce seed or fruit, with much less emphasis on purely vegetative production. Since nitrogen is most effective in producing leaves and stems, it can be easily overdone in fertilizing crops intended for seed production. We have not heard of a golf course trying to produce a crop of seed on its fairways, but we do know of many which are trying to increase the production of grass leaves. Therefore all the experimental work and sales literature on increased crop yields are not necessarily applicable to turf production. In addition to the danger of excessive vegetative development, due to large amounts of nitrogen, in producing farm crops, the relatively high price of nitrogen in a fertilizer has tended to discourage fertilizer manufacturers from putting out mixtures with a high nitrogen content. As is shown in the accompanying articles, golf clubs are overcoming this disadvantage by insisting on a relatively high-nitrogen mixture, such as is referred to by Mr. MacGregor, or by using some other fertilizer and increasing the nitrogen content with a strictly nitrogenous fertilizer such as described by other writers in this BULLETIN. In many farm crops phosphorus and potash are needed in large quantities, but in turf culture it is probable that much of the phosphorus and potash is wasted.

Fertilizers, in addition to furnishing plant food, may also carry organic material, which serves to improve the physical condition of the soil. Stable manure is perhaps the best fertilizer for this purpose; and where stiff clay or other poor areas of a fairway are to be improved, it will often be found desirable to use manure, rich loam, or organic fertilizers with much bulk. Such materials should

preferably be worked into the soil wherever the procedure is feasible; but even when applied on the surface they produce great improvements. On well-established fairways, concentrated fertilizers can be used to advantage, for in such cases the problem of supplying organic material is negligible, since the grass clippings left on the turf constantly replenish the supply of organic material.

In the accompanying table we list in tabular form a number of fertilizers used on fairways, and give the approximate percentages of nitrogen, phosphoric acid, and potash contained in each. It is hoped that such a list may prove of value if used in conjunction with price quotations available in different localities. These figures are only approximate in the table; but any reputable firm will gladly furnish the exact analysis of its product for comparison with other mixtures on the market. Frequently the analyses of some fertilizers will show ammonia content instead of nitrogen. This need not be confusing if it is remembered that only four-fifths of ammonia is nitrogen.

FAIRWAY FERTILIZERS

APPROXIMATE PERCENTAGE OF NITROGEN, PHOSPHORIC ACID, AND POTASH CONTAINED IN EACH, AND ITS RATE OF APPLICATION IN POUNDS (OR TONS, WHERE INDICATED) PER ACRE

	Nitrogen	*Phosphoric acid*	*Potash*	*Rate of Application* *Topdressing*	*Construction*
Urea	46	.....	....	60–90	60–75
Nitrate of ammonia	35	.....	....	75–120	75–100
Calurea	34*	.....	....	75–120	75–100
Sulphate of ammonia	20	.....	....	125–200	125–150
Nitrate of soda	16	.....	....	150–225	150–175
Ammo.-phos., 1st grade	17	20	....	150–225	175–225
Nitrophoska	15	30	15	150–225	150–225
Nitrate of potash	14	.....	44	150–225	150–225
Ammo.-phos., 2d grade	11	48	....	185–275	200–275
Cottonseed meal (75%) and sulphate of ammonia (25%)†	10	2¼	1½	400–600	600–800
Dried meat meal	10–14	3–4	....	300–400	400–600
Fish scraps	6–9	5–10	....	400–500	500–700
Lecco	7½	5	2	350–500	350–500
Cottonseed meal	6	3	2	400–600	600–800
Soybean meal	6	3	2	400–600	600–800
Milorganite (activated sludge)	5½	2½	½	400–600	600–800
Castor bean pomace	5½	2	1	400–600	600–800
Tankage	4–12	6–20	....	400–600	600–1000
Bone meal	3–5	18–20	....	500–1000	1000–1500
Pulverized poultry manure	2–3	1.6	.8	800–1200	1200–1500
Pulverized sheep manure	2–3	1	2–3	800–1200	1200–1500
Pulverized tobacco	2–2½	½–1	3½	1000–1500	1500–2000
Compost	1–2	½–1	1–1½	3–5 tons	8–20 tons
Well-rotted manure	1	½	1	8–10 tons	10–30 tons
Mushroom soil	1	½	1	6–8 tons	8–25 tons
Fresh manure	½	¼–½	1–1½	15–20 tons	20–40 tons

* Also 14% lime.

† Often sulphate of ammonia is added to organic fertilizer so as to obtain quicker results. In this way also considerably more nitrogen may be applied at one time without fear of burning the turf or excessive loss by leaching.