

## Acid- and Alkaline-Reacting Fertilizers

By R. A. Oakley

The use of the term "acid-reacting" as applied to the word "fertilizers" when undefined is open to just criticism. From a technical standpoint, the term is not a good one, since it does not properly distinguish between the reaction of fertilizers in the test-tube and the reaction in the soil. While in a sense a technical matter, there is need for a simple definition of the terms "acid-reacting" and "alkaline-reacting" fertilizers, for it is the layman and not the technical man who is likely to be confused. The technical man knows that a fertilizer may react acid and yet when applied to a soil upon which plants are growing will tend to make the soil alkaline. He also knows that the reverse of this is true. The layman, on the other hand, is inclined to think that any fertilizer to which the word "acid" is applied is one which will make soil acid when used on plants in the field. For example, it is thought by many that the well-known fertilizer acid phosphate is one that will make soils acid. This is not the case, as is shown by results of numerous critical investigations.

Those who use the term "acid-reacting fertilizer" really mean a fertilizer that, when applied to soil upon which plants are growing or are to be grown, will have a tendency to make the soil acid. By the same conditions, an alkaline-reacting fertilizer is one that, when applied to soil upon which plants are growing or are to be grown, will have a tendency to make the soil alkaline. Ammonium sulfate is a common example of the former, while sodium nitrate is a good example of the latter. In the test-tube, ammonium sulfate is not inclined to react acid; on the contrary, its reaction is toward alkalinity; but when added to the soil, plants avail themselves readily of the ammonium part of the fertilizer and leave the sulfur part, or at least most of it, unused. It is this part that tends to make the soil acid. In the case of sodium nitrate, when this substance is used as a fertilizer, plants use the nitrogen part and leave the sodium in the soil, which tends to make the soil alkaline. This is a crude and very homely explanation, but it is hoped that it will make the case clear.

It is quite an easy matter to make the soil of a putting green alkaline. Lime in any common form will do it in a relatively short time, but it is not nearly so easy to make alkaline or even neutral soils acid. It takes numerous and frequent applications of ammonium sulfate, for example, to offset the effect of a little lime in the soil.

The fertilizer experiments now under way at Arlington indicate that fresh horse manure free from straw has a very definite tendency to make the clay soils there alkaline. Probably most kinds of barnyard manure will react this way to some degree. Theoretically, at least, this is one reason for adding ammonium sulfate to compost before applying it to bent or fescue turf. However, do not conclude from this that manure should not be used on bent or fescue greens. Use it in compost wisely and carefully.

Because of their availability for summer use, it seems advisable to take advantage of this opportunity to discuss briefly two good turf grass fertilizers, namely, cottensed meal and soybean meal. There is much to be said on the subject. In addition to supplying readily available nitrogen, these meals have another point of advantage for bents and fescues. They tend to make soils to which they have been applied acid. These meals are mentioned here largely because there is need for quick-acting nitrogenous fertilizers which may be used on turf in the hot weather of

summer with little danger of burning. Ammonium sulfate is not such a fertilizer, but either cottonseed meal or soybean meal may be applied at a rate as high as 15 pounds to 1,000 square feet of turf with relative safety at any time of the year.

There is much to be said on the subject of acid- and alkaline-reacting fertilizers. There is much to be done from an investigational standpoint. Active investigations in this field should be encouraged.

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## The Size of the Fairway

By R. Avery Jones, Baltusrol Golf Club, Short Hills, N. J.

The very interesting article and instructive data on the size of the putting sward which appeared in the December, 1923, number of THE BULLETIN has no doubt resulted in the discovery that some putting greens are nearly half an acre in size. A matter of hardly less importance is the area of the mowed fairway; and judging from the standards set by different clubs, there appears to be considerable difference of opinion as to what constitutes an adequate size of fairway. Fairways averaging 70 yards and with little or no carry from the tee are mowed by some clubs, while other clubs go to the opposite extreme of 100 yards of rough from the tee and mowed fairways averaging 40 yards. The extremes can sometimes be found on the same course. As in the case of the putting sward, the fairway, as regards width, should have proper relation to the type of hole and should take into account the effect of ground contours upon the run or kick of the ball.

While it is deemed impossible to lay down standard measurements for anything in golf architecture, yet standard maintenance is a matter which is discussed and seriously proposed. Maintenance costs of various courses are compared and explanations sought for the seemingly unexplainable differences in expenditure; and in this connection the fact must not be lost sight of that while the areas mowed for fairways vary between 45 and 65 acres, and for putting greens between 5,000 and 9,000 square feet, the budgets of green committees must necessarily vary considerably.

Since every unnecessary yard of fairway means so much waste in labor, fertilizer, seed, and wear and tear of equipment, this subject deserves closer attention than it has received. Furthermore, quite apart from financial considerations and effect upon play, a well-defined and carefully planned fairway adds considerably to the appearance of a hole; a rectangular fairway is a blot on the landscape.

### 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.