

Basic Principles of Grass Fertilization

VAST sums have been wasted in vain attempts to improve poor turf. In olden days accepted methods emphasized reseeding and topdressing, together with occasional fall dressings of bulky, weed-infested animal manure. During the past decade manure scarcity compelled the substitution of more concentrated fertilizer. Because of the startling results obtained with these superior substitutes, fertilization has assumed its rightful place as the most important single factor in turf management.

RESEEDING NOT ENOUGH: Reseeding alone seldom produces desired turf improvement because thin grass is usually associated with a low level of soil fertility. Hence it is folly to expect young seedlings with meager roots, to compete successfully with old established plants for the limited supply of soil nutrients. Furthermore, on established grass it is difficult for seedlings to gain a foothold. This is particularly the case on heavy soils. Very often the seed is washed from sparse areas into adjacent tufts of grass.

The desirable grasses spread in the presence of ample food and moisture to develop dense turf, so where grass is thin, fertilization alone will effect desired improvement. Seeding should be confined to large bare areas, and should be accompanied by adequate fertilization to insure quick development of turf.

IRRIGATION SOMETIMES PREFERABLE TO TOPDRESSING: Topdressing with soil still has its staunch advocates. These enthusiasts overlook the fact that needed food can be supplied cheaper from high grade fertilizers. The huge expenditures involved in topdressing can be justified only to level uneven surfaces, or to improve the water-holding capacity of sandy soil. Too much emphasis is often placed upon these supposed benefits.

Uneven surfaces due to small cuppy depressions disappear as grass spreads under the urge of fertilization. Even several inches of heavier soil, superimposed upon sandy soil, does not increase water-holding capacity sufficiently to

insure green grass during drought. An irrigation system is apt to be more efficient, and over a period of years may prove less costly, especially if soil must be obtained from a distance.

THE MANURE ERA: During the manure era, its use presented very few problems. The procedure was simple and required very little knowledge or skill. Manure supplied some of all the required nutrients. The low content of water soluble materials prevented direct injury from burning, and minimized the danger of forcing lush, rapid growth. On established grass these supposed advantages are without substantial foundation.

Although manure is low in plant food, rates of application were sufficient to supply considerable nutrients. Even at the moderate rate of 10 tons per acre, manure supplied 80 to 100 lbs. nitrogen and potash, and about half as much phosphoric acid. Failure to appreciate this fact explains many early disappointments in attempts to duplicate results with a few hundred pounds of other fertilizer, even though it contained 6 to 12 per cent nitrogen, and what was considered adequate quantities of other elements. Where these fertilizers were used in ample quantity, results have been better and costs have been less.

To cover 50 acres with manure at the moderate rate of 10 tons per acre, necessitates handling 500 tons, but at 1000 pounds per acre, only 25 tons of concentrated fertilizer are needed.

MANURE OBJECTIONS: On established turf, surface applications of manure do not materially change the physical condition of the underlying soil. The manure fails to penetrate and become incorporated with the soil. Excessive applications build a surface layer, highly charged with plant food; detrimental because shallow root development follows. Such turf succumbs during hot weather.

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There are other objections to manure. Besides the unsightly surfaces, fairway play is prevented until trash is removed in the spring. Manure often contains many objectionable weed and clover seeds. Further stimulation of clover may result from large amount of potash supplied by the manure.

The use of manure is justified on heavy soils only, provided applications are made prior to seeding and worked into the soil. The effect of its organic matter on physical soil condition, is its justification and not the supply of plant food. On sandy loams, loams and other physically good soils, plant food requirements can be supplied more effectively and at lower cost from other materials.

THE ACID ERA: The acid era in turf fertilization followed the manure period. Up to then the use of lime was over-emphasized. Throughout this period, lime was in great disfavor and the virtues of ammonium sulphate were extolled at every gathering of greenkeepers, club officials and others interested in turf management. Besides its startling effects on color and growth, the marked decrease in weeds following the use of ammonium sulphate was emphasized. Increased soil acidity induced by the ammonium sulphate received sole credit for weed control, and greater turf density resulting from additional nitrogen was ignored. The acid era died along with the turf during the disastrously hot, wet and humid season of 1928.

It is now known that soils can become too acid for best growth of grasses. The present view is to emphasize practices which will insure development and maintenance of dense, sturdy turf. Although an acid soil may be desirable to aid clover and weed suppression, acidity should not develop to the point where turf grasses suffer. Clover and weeds flourish in thin grass swards, but seldom gain serious foothold in dense grass.

FAIRWAY IRRIGATION: Within the past five years fairway irrigation has gained tremendous popularity. Soon it may become a fixture in fairway maintenance, especially in

metropolitan districts. Like all new advances, fairway irrigation has suffered most from its greatest enthusiasts.

Irrigation will not become accepted practice until the relationship between water usage and fertilization is clearly understood. Of itself, water simply eliminates moisture as a growth limiting factor and, unless fertilization accompanies irrigation, increased clover and weeds are the inevitable result.

3 SUCCESS FACTORS: A single application of fertilizer cannot transform thin grass into dense turf. It takes courage to embark upon a definite fertilizer program but the sure reward of good turf is well worth the effort. Success depends principally upon three factors: selection of a suitable fertilizer, rates sufficient to satisfy soil deficiencies, and application during the most favorable seasons.

The variety of products now on the market confuse even the specialist. Some act quickly, others may be superior on sandy soils, and a further complication arises from the fact that the principles underlying fertilization of new seedings differ from those governing the feeding of established grass. These and other related factors must be considered in formulating any system of grass fertilization.

Fertilizer test plots still remain the most reliable method for determining the fertilizer needs of a particular crop. The unfortunate drawback is that most of a growing season must elapse before results are available. The fact that best results are obtained from a particular treatment does not prove that this is the best all time procedure.

When need for phosphoric acid is acute, a heavy initial rate to build reserves and insure deeper penetration of the phosphorus before fixation occurs is best. After that light rates usually suffice.

Where nitrogen is badly needed, turf improvement depends upon the generous use of nitrogen until desired density is obtained. Then lighter rates may suffice.

(To be continued)

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Milwaukee, Wisconsin

Printed in U. S. A.

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