Factors Controlling Turf Management

SOIL deficiencies in essential nutrient materials invariably accompany poor initial stands of grass, and are associated with the deterioration of established turf. Although fertilization is the most important single factor in turf growth, maximum efficiency from fertilizer usage is obtained only when other related factors are favorable also. The major factors include:

1. Selection of Grasses Suited to Local Conditions
2. Favorable Air Temperatures
3. Sufficient Light
4. Moisture
5. A Fertile Soil
6. Protection from Injury.

Some of these are not susceptible to change, but others can be modified to promote growth; or to avoid serious damage during unfavorable seasons, or brief periods of adverse weather.

I. USE OF GRASSES SUITED TO LOCAL CONDITIONS: At one time it was customary to sow a variety of grasses on the assumption that grasses adapted to local soil and climate eventually predominate; and it was believed that differences in the growth habit of the several species tend to provide green turf throughout the season. The principle objection lies in the unsightly appearance caused by distinct patches of the different grasses.

In most northern sections Kentucky blue grass eventually dominates grass lands and meadows, and accounts for the frequent recommendation to seed areas devoid of shade to Kentucky blue grass. Blindly following such procedure has resulted in some conspicuous failures, for there are localities and soils which are unsuited to blue grass.

Except in dense shade, Kentucky blue grass or fescue should constitute the bulk of the seed mixture. Kentucky blue grass, but not fescue, is best in the district extending from Washington to St. Louis. Elsewhere choice is governed by soil condition. On sandy soil fescue is usually preferred, but it will thrive on heavy, well drained, soil also. For best growth of Kentucky blue grass, soil must be well supplied with available phosphorus, and must not be too acid. Unless these are corrected, Kentucky blue grass is apt to fail. Fescue, on the other hand, can withstand more acidity, and needs less phosphorus.

For shady locations, poa trivialis and chewings fescue are best. They are the principal constituents of the better so-called shady lawn mixtures.

II. FAVORABLE AIR TEMPERATURES: Both rate and character of growth are profoundly affected by temperature. Yellow or purplish colors are often associated with low temperatures, and growth may be so slow that the plants succumb to the ravages of insect pests. With higher temperatures, rate of growth is rapid, plants are taller but less robust, making them more susceptible to fungus diseases.

Various plants differ in their growth response to climate. The northern grasses prefer moist cool weather, so turf is usually at its best during spring and fall, especially in sections where July and August are hot and dry. Obviously, to obtain maximum benefits, major fertilization should occur during these two favorable growing periods.

Since climate cannot be modified, varieties of grass suited to local climatic conditions should be selected. As an example, some of the strains of bent which thrive in the cooler northern sections are not suitable in regions where extreme heat prevails during mid-summer, and modifying cultural or fertilizer practices will not entirely adapt them to the new environment. Their extensive use may become a costly experiment.

III. SUFFICIENT SUNLIGHT: The necessity for sunlight is common knowledge, but the function of light is not always clearly understood. In green leaves, sugar synthesis depends

upon a source of radiant energy supplied by sunlight; and the presence of chlorophyll, which is the green substance in the leaf. These sugars serve as energy material, or are needed in the synthesis of other essential plant products.

Severe leaf defoliation by frequent close cutting may result in gradual turf deterioration. Leaf surfaces are so curtailed that adequate sugar production becomes impossible. In this respect grasses differ, due to differences in growth habit. Under close mowing, prostrate growing grasses such as bent and bermuda, retain relatively more leaf surface than erect growing blue grass and fescues. Hence bent can be cut close with impunity, but there is evidence to support the belief that blue grass and fescues should not be cut closer than 1¼ to 1½ inches. In spring and fall somewhat closer cutting can be practiced, but with the approach of summer, mowers should be raised gradually.

Turf frequently shows striking effects due to shade. Clover and crab grass may overrun closely cut lawns or fairways, and be wholly absent in the adjoining rough. The taller grass in the rough effectively excludes light, so these dwarf growing plants cannot survive. During the germination period of crab grass, it may be possible to obtain some measure of crab grass control by allowing somewhat longer growth of grass to shade the ground.

Turf maintenance under dense shade is difficult, because the over-hanging foliage absorbs the active light rays and thus deprives the grass of needed energy rays.

IV. MOISTURE CONTROL: In amount, water is the main constituent of green plant tissue. It imparts rigidity to plant structures, is the vehicle for the transport of various nutrients; and in the leaf serves as a raw material from which sugar is produced. Transpiration, or evaporation of water from the leaf surface, tends to control plant temperatures.

The demand for water during a single season is enormous, often reaching 3,000 to 5,000 barrels per acre. Because of their shallow root system, grasses are among the first plants to suffer during dry periods. The surface soil is quickly exhausted of available water, and upward movement by capillarity is too slow to compensate for this loss.

Too much water can be just as detrimental as too little. As soil moisture increases, growth is likewise increased up to an optimum, then there is an abrupt decline until growth finally ceases. Death occurs when roots are unable to obtain needed oxygen from a soil completely saturated with water.

Too rapid growth creates thin cell walls; then leaf structures become so weak and succulent that they bruise easily and are ready prey for insect pests and fungus diseases. Beside moisture, excessive nitrogen and optimum temperatures also speed rate of growth, so when all are combined, complete turf loss may result. The evil effects of over-nitrogen feeding can be partially overcome by reducing soil moisture to a point where growth is barely maintained. This tends to strengthen leaves and stems. Very few appreciate the importance of sensible watering practices.

V. A FERTILE SOIL: In a broad sense, fertility refers not only to the presence of ample nutrients, but to the existence of other favorable factors as well. Hence soils may contain an abundance of plant nutrients and yet be infertile.

In turf management, once coverage is obtained, it is impossible to profoundly modify the underlying soil. Since a favorable soil foundation is so necessary, the various factors involved will be discussed in the succeeding installments.

VI. PROTECTION FROM INJURY: These are negative factors which resolve into protection of the turf from mechanical injury, the ravages of insects, such as sodweb worm, chinch bug, grubs of the May, June, Japanese and Asiatic beetle, and the damaging effects of fungus diseases such as brown patch, dollar spot, pythium, leaf spot, snow mold, etc. Unless controlled, they may defeat any program of turf improvement.

Each of the above fundamentals is important and vital—there must be consistent follow-through—from plant feeding to turf protection—if strong, healthy, luxuriant turf is to be produced and maintained.

(To be continued)

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