

artificial, will run off rather than penetrate on acid soils. Examinations have been made on fairways soils after more than one inch of rain had fallen, and in spots where the pH was below 5.0, the soil was completely dry below the surface one half inch. The turf on these dry spots was brown and dead in spite of the fact that fairway irrigation was a regular procedure. Lime alone will aid greatly in preventing this summer drought injury since the soil is better able to absorb and hold water where lime is applied.

The many complex chemical changes that are brought about by liming the soil are discussed in great detail. This article describes how lime helps tie up the toxic aluminum, soluble iron, and manganese which are present in acid soils; iron and manganese are only required in small amounts in plant growth. Surface applications of lime on turfed areas penetrate very slowly so that even though iron and manganese are unavailable near the surface, the grass roots in the lower zones are able to absorb the required amounts of these nutrients. Because of the fact that lime penetrates slowly on grass, it is uneconomical to make heavy surface applications.

One of the most significant effects of lime is its influence upon the activity of micro-organisms in the soil. Most of the favorable soil micro-organisms are encouraged by liming. Those organisms responsible for the decomposition of organic materials in the soil are much more active in the presence of active calcium. The turf grasses form a new root system each year and in acid soils these old roots tend to accumulate instead of decomposing and becoming a part of the soil humus. Strongly acid soils may have 10 times as

many roots in the surface foot of soil as a similar soil which was only slightly acid. This accumulation of roots usually results in a sod bound condition, slow water penetration, weak unhealthy grass, and more favorable conditions for disease outbreaks.

In addition to the beneficial effects which lime has in correcting the harmful effects of excessive soil acidity, both calcium and magnesium are essential to the growth and development of all green plants. Thus these elements play a very important role in plant nutrition. A deficiency of either of these nutrients results in growth symptoms on the plant.

In conclusion, it should be emphasized that the proper use of lime, for the role it plays in the physical, chemical, and biological processes in the soil and in supplying essential calcium and magnesium for plant growth, is an indispensable aid in the efficient and economical production of turf.

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