Lawn Care

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# LIMING ACID SOILS

The value of lime as an aid in producing bigger crops on some soils has been recognized by farmers for many years. This is not because lime is valuable as a plant food, but because it neutralizes soil acidity.

A large percentage of lawns and other turfed areas do not require lime, the soil condition being such that nothing would be gained by liming, and some harm might even result.

When actually needed, lime may prove of great benefit to grass. Lime is a corrective of soil acidity or sourness. It assists in making certain food elements available to grass, and, in addition, it is a direct source of calcium and magnesium, which turf plants need in small amounts.

Lime should not be considered as a substitute for fertilizer. It does not provide those food elements that are of such vital importance to grass and which are lacking in practically all soils, namely, nitrogen, phosphorus and potassium.

## Soil Acidity

According to the theory of electrolytic dissociation, the relative proportion in the soil of positive hydrogen ions and negative hydroxyl ions determines its acid or alkaline character. If they are equal, the soil is neutral; if the positive ions predominate, it is acid; if the negative, it is alkaline.

For simplicity's sake, chemists have devised a scale for designating hydrogen ion concentration or intensity of acidity. The unit of measurement is known as *pH*. The neutral point on the scale, indicated by 7 is the pH value of distilled water. Values lower than pH 7 indicate degrees of acidity while those higher indicate degrees of alkalinity. The pH values represent intensity of acidity or alkalinity and not quantities of acid or alkali present.

Fortunately, lawn and turf grasses will grow over a wide range of soil acidity and alkalinity, although the moderately acid soils varying from pH 6.0 to 6.5 probably are best. If the acidity is more intense than pH 6, lime will be needed. Soils can be too alkaline for grass but this is rare.

Excessive acidity hinders the growth of grass. It interferes with the activity of certain bacteria which change raw plant food elements into forms usable by grass. Undue acidity, preventing decay of organic matter, may mat the turf with dead roots which will diminish the circulation of air and water in heavier soils.

A turf on an extremely acid soil may be subjected to frequent attacks by fungus diseases since the causal fungi generally grow better in an acid medium.

## Indications of Acidity

The appearance of grass as an indication of soil acidity is not to be trusted. There is some evidence of the need of lime in a shallow grass root system, the appearance of certain weeds, as sheep sorrel, and otherwise unaccountable

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lack of response to fertilizer. Several causes connected with food supply, soil texture and drainage, may produce similar appearances. The sure way to know if lime is needed is to learn the pH value by a laboratory test.

Putting greens and other areas that have been much stimulated by ammonium sulfate or other acid producing fertilizers are often very acid, especially if the soil has a natural tendency toward acidity.

The growth of moss may be the result of an acid soil but is more likely to result from a deficiency in plant nutrients, poor drainage or excessive shade.

To use unneeded lime on a soil is wasteful and may be harmful. If a laboratory test of the pH value of the soil shows that lime is needed, it should be applied properly, in the best form, at the best time, and in the required amount.

### When to Lime

Lime is most effective when mixed with the soil to the normal depth of the grass roots. On an established turf where only surface application can be made, penetration is best accomplished during periods of alternate freezing and thawing. Therefore, it is best to make application in the late fall, winter, or early spring.

In case of a newly prepared seed bed, lime can be raked or disced into the upper six inches. The season is of no consequence except that application is best made several weeks or even months before seeding.

Lime may be applied after plowing under a green manure crop or a heavy stand of grass and before preparation of the seed bed. This will stimulate the bacteria that break down the organic matter and liberate plant food.

Theory to the contrary, it seems safe to apply lime and fertilizer at the same time. They even may be mixed, but if so, should be broadcast immediately to avoid hardening and caking.

It is best not to apply lime and lead arsenate at the same time. At times the efficiency of the lead arsenate as a poison for grubs and earthworms may be impaired.

### Forms of Lime

The term *lime,* referring strictly to calcium oxide, has been broadened to include various commercial compounds of calcium and magnesium which are commonly used to overcome soil acidity. In most localities the only suitable forms are ground limestone and hydrated lime.

Ground limestone is native limestone crushed to an effective degree of fineness. For overcoming soil acidity, it should contain about 50 per cent of calcium oxide and should be fine enough so that about 75 per cent will pass through a 100 mesh screen and all through a 20 mesh screen.

Hydrated lime is made by heating ground limestone to such a temperature that the carbon dioxide and water are driven off. This makes burned lime, which is very caustic. By slaking with a fine spray of water as the burned lime is forced through a blower, hydrated lime is formed. A good quality tests about 75 per cent calcium oxide.

Other materials available in some sections have more or less neutralizing value. Finely ground oyster shells, marl or bog lime, and dolomitic limestone may be used if their cost, on the basis of the calcium oxide present, compares favorably with that of other available forms of neutralizing materials.

Gypsum, formerly used largely in agriculture, while a source of calcium, is incapable of neutralizing soil acids, and is not recommended.

In localities near steel producing centers, blast furnace slag may be considered, but it should be used only after comparing the price delivered and the

complete analysis with the cheapest available form of lime. On the assumption that the slag will have 40 to 50 per cent of calcium oxide and that it will lack the fineness of ground limestone, it may be necessary to use twice the amount that would be used of ground limestone.

Generally speaking, ground limestone is the best form of lime for neutralizing turf soils. Usually it is the more economical and, furthermore, it is safer than hydrated lime for treating established turf since it is not caustic and does not cake.

### Quantities of Lime

A prescription for the use of lime cannot be written unless an accurate soil test is made. When the pH and the soil type are known the proper amount of a given form of lime may be calculated.

Except in extreme cases, the quantity of ground limestone required will vary from 50 to 100 pounds per 1000 square feet, or from one ton to two tons per acre. For hydrated lime, with its 75 per cent calcium oxide as compared with limestone's 50 per cent, these quantities are reduced one third.

In liming established turf areas, not more than 50 pounds of limestone or 30 pounds of hydrated lime per 1,000 square feet should be used in a single application. If more is needed the application should be divided among several seasons. In preparation of a new seed bed, the entire quantity desired may be added at one time, but it should be thoroughly harrowed or raked into the upper five or six inches.

It is especially difficult to change the reaction of silt or clay that is well fortified with organic matter; hence such soils require more lime than a light, sandy soil having the same intensity of acidity.

It is far better to lime too little than too much. An overdose may upset the chemical balance of the soil, causing starvation of the grass plants and permitting certain weeds to gain control of the lawn.

Lime may be broadcast by hand or, better, with a mechanical spreader. Such spreaders are available in small sizes for home use, as well as in large tractor-drawn equipment.

It is important to spread evenly since the lime will not move laterally through the ground, but only downward. On established turf areas, the lime should be washed or brushed off the grass leaves to prevent burning.

### Native Limestone Country

The need of a soil for lime may depend largely upon the nature of its parent material, and upon the extent of leaching of alkalies.

Soils of the Atlantic Seaboard and New England States are likely to be acid because of their derivation from granites, sandstones or shales. Also, soils in New York State and northern Pennsylvania tend toward acidity, as do those of eastern Ohio.

In other parts of the country soils may be alkaline. In southern Pennsylvania there is much natural limestone. Beginning in western Ohio and extending through Indiana, Illinois, Wisconsin and into the far west, soils are generally of limestone origin.

However, it is not safe to infer the acidity or alkalinity of a soil from the fact of its location in any such division of the country. There are many modifying factors. Conditions may vary, even on adjoining properties. The maintenance program may cause an alkaline soil to become acid. Or, an alkaline condition may be maintained because of regular sprinkling with water that is strong in lime, or because of frequent topdressing with soil containing lime. A soil test is the safe guide.

### Soil Tests

*Send a sample of your lawn soil to O. M. Scott & Sons Company, Marys-*

*ville, Ohio. We shall be happy to test it in our own laboratory without charge. Mark the package plainly with your name and address and be sure to write us separately, giving a brief description of the condition and history of the turf. This service will require about a week's time after receipt of the sample.*

*To obtain a good sample, make a vertical cut to the depth of four inches with trowel or spade, and take a slice from the face of the cut. Repeat in various spots and mix the soil so obtained. One pint of this mixed soil is a sufficient sample.*

## Moles Seem Lead Arsenate Shy

At the meeting of the North Central State Entomologists' Conference at Kansas City, last March, Professor J. S. Houser, entomologist of the Ohio Agricultural Experiment Station, spoke of a seeming control of moles with lead arsenate. Here is his statement as relayed to us by J. J. Davis, Chief in Entomology, Purdue University:

"It is interesting to note the mole's behavior in the lead arsenate treated plots. They stop almost at the line where lead arsenate has been used."

The directions for using lead arsenate in grub control were given in the "Lawn Care" issue of March, 1937. Those having a lot of trouble with moles might experiment with this suggested treatment.

"The best Crabgrass puller is made by bending the prongs of a 'Pixit' (olive and pickle fork) made by the Washburn Company of Worcester, Massachusetts. It will pull the small Crabgrass without disfiguring the lawn."—Charles O. Dean, 18 Weber Street, Springfield, Massachusetts.

## Scott Literature

**Lawn Care**—This issue is No. 48 Subjects featured in previous issues include:

1928 Plantain, Dandelions, Compost.
1929 Moss, Web Worms, Chickweed, Buckhorn.
1930 Ground Ivy, Yarrow, Earthworms, Heal-all, Ants.
1931 Speedwell, Creeping Buttercup, Moles, Knot Grass.
1932 Sheep Sorrel, Quack Grass, Spurge, Trefoil, Goose Grass.
1933 Nimble Will, Knawel, Terraces, Shepherd's Purse, Chinch Bugs.
1934 Sedge, Shade, Purslane.
1935 Peppergrass, Shade, Crab Grass, Summer Injury to Turf.
1936 White Clover, Poa Annua, Henbit, Fall Seeding, Foxtail.
1937 Honeycombed Seeding, Control of Grubs, Orchard Grass, Soils, Injury from Excess Moisture.

If your file is not complete, please be sure to ask for the missing issues. A full set of bulletins in stiff paper binding will be sent for 25c.

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