

## Practical Aspects of Fertilizer Usage on Fairways, Cemetery Lawns and Parks

WITH the present flare for chemical soil tests, a word of caution regarding methods of collecting soil samples is in order, for obviously results are no more accurate than the sample submitted for analysis. Soil taken from a single spot is not always typical of an entire area; hence a composite sample is preferable always. Such samples should be taken for each soil type, but never include soil of different texture or color in the same composite. Collect samples from typical topographic locations, such as hillside slopes, high and low areas. Depth of sampling is important, because entirely different results may be obtained from samples taken at different depths. The composite should represent individual cores of uniform diameter taken to a depth of two inches only. If determinations on the deeper soil are desired, separate samples should be collected.

The layman accepts rapid chemical tests as an exact measure of available soil nutrients. Except for acidity, this is not true. Until methods have been perfected, they serve as rough guides only, and must be used with discretion.

Acidity can be tested on the property. Make two determinations at each location, one at a depth of one-half inch and the other at 3 to 4 inches. Extreme acidity may be confined to the surface, then less lime is needed.

**RATE OF LIME APPLICATION:** Besides acidity, rate of lime application depends upon soil types and kind of grass. To produce the same degree of change, less lime is needed on sandy loam than on loam and heavier soils of equal initial reaction. Fescue and bent need less lime than Kentucky blue grass. Table I can be used as a rough guide for applying lime in the form of ground limestone.

TABLE I.

Rates for Applying Ground Limestone  
(For hydrated Lime Reduce Quantity 25%)

Texture of Soil	Degree Soil Acidity	Lbs. per Acre	
		Ken- tucky Blue Grass	Fescue and Bent
Sands and Sandy Loams	Slight	1000	None
	Medium	2000	1000
	Strong	3000	2000
Loams, Silt Loams, Clay Loams, Clay	Slight	2000	None
	Medium	3000	2000
	Strong	4000	3000

Ground limestone is the safest material to use because hydrated lime is apt to burn. With hydrate, even at 1 ton per acre it is safer to make two half-ton applications ten days apart. In neutralizing value 75 pounds of hydrate equals 100 pounds of limestone.

Apply lime in spring or late fall. Always allow a lapse of 10 to 14 days between its use and the application of fertilizer containing nitrogen in the form of ammonia, otherwise loss of nitrogen or serious burning may occur. This is most imperative with hydrated lime. In the East, use dolomitic limestone to eliminate any possibility of magnesium deficiency. If possible, apply needed lime several months before using lead arsenate to control grubs and worms.

**HOW TO DETERMINE NEED FOR NITROGEN:** Mention has been made of the fact that nitrogen is the dominant need on established grass because of its effect upon color and growth. Inspection of the turf is the simple way to determine need for nitrogen. None of the rapid tests is a trustworthy indicator.

From every angle, a slow rate of growth and continuous green color are best. This assures turf of pleasing color with the least amount of mowing. To approach this ideal with water soluble fertilizer, it is necessary to use light rates at frequent intervals. One application of an organic produces the same effect, because its nitrogen is gradually converted into available form as needed by the growing grass.

Where turf is good and reasonably free from weeds, annual applications of organic fertilizer (such as Milorganite) at rates of 800 to 1200 pounds per acre suffice. On thin turf, nitrogen should be applied spring and fall until desired density is obtained. Initial applications should be 1000 to 1800 pounds with succeeding rates reduced to 800 to 1200 pounds per acre.

Where soluble nitrogen is desired with the organic fertilizer to promote immediate growth, or as an additional aid in weed suppression, an initial application of 1000 to 1500 pounds organic fertilizer (such as Milorganite), and 100 to 200 pounds sulphate of ammonia, or similar material, is suggested. Subsequent spring and fall rates can be reduced to 500 to 800 pounds organic, and 75 to 150 pounds inorganic fertilizer.

**CAUTION AGAINST BURNING:** Heavy rates of soluble fertilizer, such as ammonium sulphate, urea, ammonium phosphate, etc.,

feed with

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must be avoided, due to the danger of burning. Before growth starts in early spring, 200 to 300 pounds per acre can be applied with impunity, but after that it is unwise to exceed rates of 100 to 200 pounds per acre. Even so, burning is likely if the grass is wet, or heavily laden with dew.

During hot weather, burning may occur even though the grass is dry, so if weather suddenly turns hot, suspend operations until temperatures moderate.

**WHEN TO APPLY NITROGEN:** Spring and fall are the logical times to apply nitrogen fertilizer, especially if rainfall is the sole source of water. Spring applications are best made early, but are safe until late May.

In dense shade, fertilize sparingly in mid-summer. Growth is necessarily slow because of limited light, and is further restricted by high temperatures. Excesses of nitrogen enhance the natural tendency of grass to become soft and tender.

**WHEN AND HOW TO APPLY PHOSPHORUS:** When soil contains a reasonable supply of available phosphorus, the generous use of phosphate is unnecessary. Some of the soil tests are fair criteria for determining need for phosphorus, provided lead arsenate has not been used in quantity. Soil texture and kind of grass also affect rate of application. Less phosphate is needed on sandy soils than on heavier soil, and the rate can be lower for bent and fescue than for phosphorus loving Kentucky blue grass. Table II can be used as a guide for phosphate rates. It is based upon the Truog phosphorus test and the use of 20% superphosphate.

TABLE II.

Rates for Applying Superphosphate (20% grade or equal) on Established Turf.

Texture of Soil	Avail. Phosphorus Lbs. per Acre Truog Method	Pounds per Acre 20% Superphosphate	
		Kentucky Blue Grass	Fescue and Bent Grass
Sands and Sandy	0-25	200-300	100-200
Loams	25-50	100-200	0-100
	50-75	0-100	None
	75+	None	None
Loams, Silt and Clay Loam, Clay	0-25	300-400	200-300
	25-50	200-300	100-200
	50-75	100-200	0-100
	75+	0-100	None

Where available phosphorus approaches the larger quantity of phosphate; where it approaches the upper limit, use smaller quantity.

Apply phosphate either in spring or fall. With rates suggested in Table II, it may never be necessary to repeat heavy applications if subsequent feeding is with a fertilizer containing about half as much phosphoric acid as nitrogen.

On very acid soils, if possible, apply needed lime several months before phosphate. Best procedure is to use lime in late fall, and phosphate early the following spring. This minimizes conversion of phosphate into difficultly soluble forms by the acid soil.

**POTASH APPLICATIONS:** Most rapid chemical methods for available potassium are unsatisfactory. They tend to show a deficiency which is not borne out by field trials. In the rare instances where potash is required on poor sands, peats and mucks, use 100-200 pounds per acre of 50% muriate of potash every two to four years.

On new grass seedings use lime in accordance with the recommendations contained in Table I. If possible, apply several months before seeding and work into the soil.

Abundant phosphate is important, so rates suggested for established turf, Table II, should be increased 25 to 40%. For nitrogen, true organics (such as Milorganite) are best. On exceedingly poor soil, use 1500 to 2500 pounds per acre, from 1200 to 1500 pounds on light colored soil of moderate fertility; from 800 to 1200 pounds on the better soils. The fertilizer should be applied before seeding and worked into surface soil to depth of 1 1/2 to 2 inches.

**FERTILIZER EQUIPMENT AND COMPUTATIONS:** Apply fertilizer with one of the better two-wheel hopper type, fertilizer distributors now available. To insure even distribution, select a machine with closely spaced outlet spouts. Caution operators to overlap on each round because fertilizer does not move laterally in the soil. Outlets spouts should be closed promptly when the machine is stopped, otherwise fertilizer will continue to run from the spouts and produce burned spots. For the same reason, in filling the hopper do not spill fertilizer on the grass.

For all practical purposes, where fairways average 50 yards wide there is one acre for each 100 yards of length and an acre for each 80 yards when average is 60 yards. To compute approximate acreage, subtract short-hole yardage and length of area to be omitted in front of each tee from total course yardage; depending upon average fairway width, divide by 100 or 80. Then calculation of fertilizer requirements is simple. (To be continued)

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TWO APPLICATIONS A YEAR ARE SUFFICIENT

Tear out this sheet and save for permanent reference.