

SOIL TESTING LABORATORY

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SOIL TEST NOTES

(Supplement to Soil Test Report)

NOTE 17. Lawn Fertilization

Applying Lime to Established Lawns

If less than 50 lbs. of lime per 1000 sq. ft. is recommended, apply full amount of lime in one application. If more than 50 lbs. of lime per 1000 sq. ft. is recommended, apply the lime in several applications of up to 50 lbs. each, at intervals of 1 to 6 months, until the full amount is applied. Applying more than 50 lbs. per 1000 sq. ft. at any one time may result in an undesirable residue on the turf.

Repair Of Bare Spots With Shallow Fertilizer Incorporation

Prepare bare spots for seeding, sodding, plugging or sprigging by raking soil so that approximately one inch of loose soil is on the surface. Mixing of topsoil and/or organic matter into these spots will help prepare these areas for seeding or vegetative establishment. Refer to Publication 430-009 if more detail on lawn repair is needed.

Apply the same amount of lime but *only* two-thirds of the fertilizer recommended for maintaining your lawn (too much fertilizer will burn young grass seedlings). Rake the fertilizer and lime into the upper inch of loose soil.

After seeding, apply mulch (1½ to 2 bales of clean straw per 1000 sq. ft.) to conserve moisture. Seeded areas and areas sodded, plugged, or sprigged should be watered immediately after planting. Watering should continue as long as necessary to obtain satisfactory germination and establishment.

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GENERAL FERTILIZER INFORMATION

Fertilizer Analysis

Fertilizers are often described by utilizing three numbers, such as 12-4-8 or 46-0-0. These three numbers indicate, respectively, the percent by weight of nitrogen (N), phosphate (P_2O_5), and potash (K_2O) in the fertilizer and are required on every fertilizer bag or container. For example, a 12-4-8 fertilizer would contain 12% nitrogen, 4% phosphate, and 8% potash on a weight basis. Complete fertilizers contain nitrogen, phosphorus, and potassium.

Fertilizer Ratio

If the fertilizer analysis is 10-10-10, the fertilizer ratio is 1-1-1; similarly, a 14-7-14 analysis would have a 2-1-2 ratio and a 16-4-8 would have a 4-1-2 ratio. In cases where phosphorus or potassium are needed, a 1-1-1, 1-2-2, 1-2-1 or 2-1-1 ratio is usually recommended until deficiencies are corrected. When phosphorus and potassium soil test levels have been increased, fertilizer ratios which contain lesser amounts of these nutrients such as a 4-1-2 or 4-1-3 are normally suggested. "Turf-type" maintenance fertilizers usually contain a minimum of 10% nitrogen, have a ratio ranging between 2-1-1 and 8-1-5, and contain a portion of the nitrogen as water insoluble (slowly-available) nitrogen.

Nitrogen Availability

The source of nitrogen in fertilizers influences nitrogen availability to the turfgrass plant. There are two types of nitrogen sources; quickly-available and slowly-available. Quickly-available materials are water soluble and can be immediately utilized by the plant. Slowly-available nitrogen sources release their nitrogen over extended periods of time and, therefore, can be applied less frequently and at higher rates than the quickly-available nitrogen sources.

The portion of the nitrogen in a bag that is slowly-available is listed on the fertilizer bag as Water Insoluble Nitrogen (WIN). For instance, a 20-10-10 fertilizer with 5% WIN actually has $\frac{5}{20}$ or $\frac{1}{4}$ of the nitrogen in the slowly-available form.

A fertilizer label will provide the following information:

Guaranteed Analysis

Total Nitrogen	16%
5.6% Water Insoluble Nitrogen (WIN)	
Available Phosphoric Acid(P ₂ O ₅)	4%
Soluble Potash (K ₂ O)	8%

To find the % nitrogen that is WIN, use the following calculation:

$$\frac{\% \text{ WIN}}{\% \text{ Total Nitrogen}} \times 100 = \begin{array}{l} \% \text{ of total nitrogen that is} \\ \text{WIN or slowly-available} \end{array}$$

Therefore:

$$\frac{5.6}{16} \times 100 = \begin{array}{l} 35\% \text{ of the total nitrogen} \\ \text{is WIN or slowly-available} \end{array}$$

If no WIN is listed on the fertilizer label, one should assume it is all water-soluble or quickly-available nitrogen, unless the fertilizer label indicates it contains sulfur-coated urea. Sulfur-coated urea fertilizers do provide slowly-available nitrogen, but the fertilizer label does not list it as WIN. If the fertilizer contains sulfur-coated urea, include that portion as water-soluble nitrogen when determining the amount of nitrogen that is slowly-available.

FERTILIZER PROGRAMS

Lawn Establishment

Go directly to Table 3 and select an appropriate fertilizer from the recommendation on the Soil Test Report. Be sure to use the rate suggested in the 2.5 *lb. nitrogen column* and incorporate the fertilizer into the soil (along with lime, if needed) to a depth of 4 to 6 inches. After the turf has been established (6 to 8 weeks) follow one of the maintenance fertilization programs described below.

Lawn Maintenance

If lawn soil tests are low or medium for phosphorus or potassium, a complete fertilizer will be recommended to correct a potential deficiency of either of these plant nutrients. The complete fertilizer should be used for 3 to 4 years and then another soil sample should be taken to determine if a different fertilizer should be used. If lawn soil tests indicate high or

very high levels of phosphorus and potassium availability, then fertilizers supplying only nitrogen need be applied.

The programs listed in Table 1 (cool-season grasses) or Table 2 (warm-season grasses) give flexibility in deciding on the types of fertilizer to use to best meet your needs. Programs 1 and 3 utilize fertilizers which contain predominantly readily available nitrogen [i.e., less than 50% of the nitrogen is slowly available — listed as WIN (Water Insoluble Nitrogen) on the fertilizer bag]. Programs 2 and 4 utilize fertilizers which contain predominantly slowly available nitrogen [i.e., more than 50% of the nitrogen is slowly available (WIN)].

If used properly, any of the programs will result in quality turf. Choose the program best suited to your needs and the available fertilizer supply in your area.

Table 3 contains information on the amounts of various types of fertilizers required to apply certain rates of nitrogen per 1000 square feet. After you decide which kind of fertilizer you want to use, determine the rate at which it should be applied using Table 3.

Additional Information

Additional information may be obtained from your local VPI&SU Cooperative Extension Office. Publications available at present are:

Publication 430-009.

Lawn Establishment in Virginia.

Publication 430-010.

How to Buy Lawn Seed.

Publication 430-011.

Lawn Fertilization in Virginia.

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TABLE 1.
FERTILIZATION PROGRAM FOR
KENTUCKY BLUEGRASS, TALL FESCUE,
CREEPING RED FESCUE, AND PERENNIAL
RYEGRASS LAWNS

PROGRAM 1 - FERTILIZERS WITH LESS THAN 50% SLOWLY-
 AVAILABLE NITROGEN (WIN)

Time of Application	Nitrogen per 1000 sq. ft.	Application Priority*
	—— lbs ——	
September	1	2nd
+ October	1 to 1½	1st
+ Nov 15 to Dec 15	1 to 1½	3rd
+ May 15 to June 15	0 to ½	4th
TOTAL APPLIED PER YEAR	3 to 4½	

PROGRAM 2 - FERTILIZERS WITH 50% OR MORE SLOWLY-
 AVAILABLE NITROGEN (WIN)

Time of Application	Nitrogen per 1000 sq. ft.	Application Priority*
	—— lbs ——	
August 15 to Sept 15	1½ to 2	1st
+ October 15 to Nov 15	1½ to 2	2nd
+ May 15 to June 15	0 to 1½	3rd
TOTAL APPLIED PER YEAR	3 to 5½	

*See Comment 1 below.

**IMPORTANT COMMENTS ABOUT PROGRAMS 1
 AND 2**

1. *Application Priority* — The priority of each application is listed for those not wanting to make all applications. For instance, if you desire to make only one application following Program 1, the best time is in October.
2. *Sources of nitrogen* recommended in Program 1 may cause significant leaf burn if applied when temperatures are high or there is moisture on the leaf blades. Water the lawn after fertilization to wash particles off the blades. This is particularly important when using ammonium nitrate or urea.
3. *The November 15 to December 15 application* in Program 1 should be made after the last mowing. It is important that the grass not go into the winter excessively long.
4. *In heavily shaded areas with fine fescue turf*, it may be beneficial to reduce fertilization rates or omit applications until leaf collection is finished in the fall.

5. *Use the higher amounts of nitrogen* where soils are sandy, irrigation is used, clippings are collected, the growing season is extended, recuperative potential is needed, or high quality is desired.
6. *In Program 2*, it may be beneficial to apply 1 lb. of soluble nitrogen per 1000 sq. ft. in mid-December to encourage root growth and stored food reserves.

TABLE 2.
FERTILIZATION PROGRAM FOR
BERMUDAGRASS AND ZOYSIAGRASS
LAWNS

PROGRAM 3 - FERTILIZERS WITH LESS THAN 50% SLOWLY- AVAILABLE NITROGEN (WIN)		
Time of Application	Nitrogen per 1000 sq. ft.	Application Priority*
	—— lbs ——	
April	1 to 1½	1st
+ May	1 to 1½	2nd
+ July	1 to 1½	3rd
TOTAL APPLIED PER YEAR	3 to 4½	
PROGRAM 4 - FERTILIZERS WITH 50% OR MORE SLOWLY- AVAILABLE NITROGEN (WIN)		
Time of Application	Nitrogen per 1000 sq. ft.	Application Priority*
	—— lbs ——	
April	1½ to 2½	1st
+ June 15 to July 15	1½ to 2½	2nd
TOTAL APPLIED PER YEAR	3 to 5	

*See Comment 1 below.

IMPORTANT COMMENTS ABOUT PROGRAMS 3 AND 4

1. *Application Priority* — The priority of each application is listed for those not wanting to make all applications. For instance, if you desire to make only one application following Program 3, the April application will be most beneficial.
2. *Winter Hardiness* — If potassium is limiting, improved winterhardiness on bermudagrass will result from the application of 2 to 3 lbs. per 1000 sq. ft. of 0-0-60 (muriate of potash) or 0-0-50 (potassium sulfate) in late August or September. Water-in these potash applications to minimize leaf burn.

3. *Rates and Sources of Nitrogen* recommended in Program 3 may cause significant leaf burn if applied when temperatures are high or there is moisture on the leaf blades. Water the lawn after fertilization to wash particles off the blades.
4. *Overseeded Bermudagrass Lawns* will require additional nitrogen applications after seeding in September, then again in December or January. Water-soluble sources providing 1 lb. nitrogen per 1000 sq. ft. are recommended.

TABLE 3.
THE AMOUNTS OF VARIOUS TYPES OF FERTILIZERS TO APPLY CERTAIN RATES OF NITROGEN PER 1000 SQUARE FEET

Fert. Analysis	Approximate Ratio	lbs. of nitrogen desired per 1000 sq. ft.			
		1	1.5	2.0*	2.5*
		— lbs. fertilizer per 1000 sq. ft. —			
5-10-5	1-2-1	20.0	30.0	40.0	50.0
5-10-10	1-2-2	20.0	30.0	40.0	50.0
6-2-0	3-1-0	16.6	25.0	33.0	42.0
10-10-10	1-1-1	10.0	15.0	20.0	25.0
12-4-8	3-1-2	8.3	12.5	17.0	21.0
14-7-14	2-1-2	7.1	10.6	14.0	18.0
15-30-15	1-2-1	6.6	10.0	13.0	17.0
16-8-8	2-1-1	6.2	9.4	12.0	15.6
16-4-8	4-1-2	6.2	9.4	12.0	15.6
21-3-16	7-1-5	4.8	7.1	9.6	11.9
23-3-7	8-1-2	4.3	6.5	8.6	10.8
31-0-0	1-0-0	3.2	4.8	6.4	8.0
33.5-0-0	1-0-0	3.0	4.5	6.0	7.5
38-0-0	1-0-0	2.6	3.9	5.2	6.6
46-0-0	1-0-0	2.2	3.2	4.4	5.4

*These amounts only recommended for Programs 2 & 4. For new lawn establishment, use 2.5 lb. rate.

If the particular fertilizer you are using is not listed in the Table 3, estimate the amount, or use the following calculation to determine the exact amount of fertilizer to apply per 1000 square feet of lawn area.

$$\frac{\text{Desired lbs. of nitrogen per 1000 sq. ft.}}{\% \text{ Nitrogen in Fertilizer}} \times 100 = \frac{\text{lbs. of fertilizer needed per 1000 sq. ft.}}{}$$

For example, if one wants to apply 1.0 lb. of nitrogen per 1000 square feet using a 23-3-7 fertilizer:

$$\frac{1.0}{23} \times 100 = \frac{4.34 \text{ lb. of 23-3-7}}{\text{per 1000 sq. ft.}}$$

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