Nutrient Recommendation Tables for Alabama Crops

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William Batchelor, Director
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The Soil Testing Laboratory at Auburn University is a joint program of the Alabama Cooperative Extension System and the Alabama Agricultural Experiment Station. ACES has primary responsibility for education on soil testing and distribution of supplies while the AAES conducts soil test calibration research and operates the Soil Testing Laboratory.

For additional information contact the Soil Testing Laboratory at 334-844-3958 or visit the website at www.aces.edu/anr/soillab/

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This report can be found on the Web at
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NOTE: See companion publication AY-322A "The Basis of Soil Testing in Alabama" on the Web at
http://repo.lib.auburn.edu/repo/handle/123456789/44101

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C.C. Mitchell and G. Huluka

Introduction

The following tables contain recommendations by crop based on soil test rating (low, medium, high, etc.) for P and K. These tables allow quick recommendations without using the P and K formulas. Soil test reports from the Auburn University Soil Testing Laboratory use formulas (given in tables) to calculate the recommended P and K to the nearest 10 pounds of P_2O_5 (phosphate) and K_2O (potash). Comments that are printed on the soil test report are also given for each crop. Note: This Alabama Agricultural Experiment Station publication complements AY-322A,"The Basis of Soil Testing in Alabama."

Interpretation of the Soil Test and Recommendations

More than 100 crops or plants are placed into 56 crop code groups for the purpose of recommendations. The following information is contained in the tables in this publication:

- **Crop code**. A list of crops is included in each crop code.
- **N rate.** Each crop is assigned a standard, annual N rate based upon research conducted throughout Alabama. However, comments given with each crop may modify this rate based upon potential yield, soil, time of application, cropping system, etc.
- **P requirement level.** There are only two levels. Level 1 is for those crops with a low P requirement such as peanuts, blueberries, centipedegrass and pine trees. All other crops fall in level 2. Critical soil test levels for each soil group are presented in Table A. The critical value is that point above which no additional fertilizer is needed for 100 percent yield (See figure A).
- **K requirement level.** Crops are divided into three classes based on their K requirements. These classes are (1) peanuts, blueberries, centipedegrass, and pine trees (low K requirement), (2) soybeans and corn and other grasses (medium K requirement); and (3) cotton, forage legumes, gardens, lawns, shrubs, and other special crops (high K requirement). They are presented in Table A along with the critical level of P and K for each soil group.
- **Mg Ratings and Mg Codes.** Magnesium is rated either High (above the critical value) or Low (below the critical value) based on the soil group (Table A). There are two Mg recommendation codes for different crops (Table B).
- **Ca ratings.** Extractable Ca is calibrated only for peanuts and for tomatoes, peppers, fruits, and nuts (Table A). All other crops are not expected to respond to direct Ca applications if the soil is properly limed but receive a rating based upon that for tomatoes, peppers, fruits, and nuts.
- **Lime recommendation code.** Crops vary in the amount of acidity they can tolerate and still make top yields. They are divided into six classes based on the pH ranges in which they produce best. The classes in Table C provide the basis for ground limestone recommendations for each crop.

Soil-Test Ratings

Results of chemical tests are used to rate the fertility level of soils for each nutrient element tested. The ratings range from very low to extremely high. They are influenced by both the nutrient requirements of the crop to be grown and the soil group. The ratings for P and K are based on the relative yield that may be expected without adding the nutrient and when all other elements are in adequate supply.

Very Low (VL)
Soil will yield less than 50 percent of its potential. Large applications for soil building purposes are usually recommended. Some of the fertilizer should be placed in the drill for row crops.

Low (L)
Soil will yield 50 to 75 percent of its potential. Some fertilizer should be placed in the drill for row crops.

Medium (M)
Soil will yield 75 to 100 percent of its potential. Continued annual applications should be made in this range.

High (H)
Nutrient is adequate/optimum/sufficient for the crop, and none is recommended for field and forage crops. Where this recommendation is followed, the soil should be resampled each year.

Very High (VH)
The nutrient is at least twice the amount considered adequate. Application of this nutrient is wasteful.

Extremely High (EH)
The nutrient is at least five times the amount considered High. The level is excessive and further additions may be detrimental to the crop and may contribute to pollution of ground and surface waters.

Mitchell is Extension agronomist–soils and professor and Huluka is Soil Testing Laboratory director and associate professor in the Department of Agronomy and Soils at Auburn University.

Soil Groups

Soils can be placed into one of four groups based upon the estimated cation exchange capaticty (ECEC) of the soil and its location within the state.

Soil Group 1

Sandy soils with an ECEC less than 4.6 cmolc kg^{-1} of soil. Examples of soil series in this group are Dothan, Orangeburg, Alaga, Ruston, and Troup.

Soil Group 2

Loamy and clayey soils with an ECEC of 4.6 to 9.0 cmolc kg^{-1} of soil. Examples of soil series in this group are Madison, Lucedale, Allen, Hartsells, Cecil, Pacolet, and Savannah.

Soil Group 3

Clayey soils from areas other than the Black Belt soils. Colbert, Decatur, Dewey, Talbott, Boswell, and Iredell are examples of soil series from this group.

Soil Group 4

Calcareous clayey soils of the Black Belt with an ECEC greater than 9.0 cmolc kg^{-1} of soil. These soils are extracted using the Mississippi/Lancaster extractant instead of the Mehlich-1. Examples of soil series in this group are Houston, Sumter, Oktibbeha, Leeper, and Vaiden.

The group in which a soil is classified may affect the fertility ratings and therefore the P, K, Ca, and Mg recommendations. When a soil is near the borderline between groups, (e.g. 4.6 cmolc kg^{-1}) it may fall into one soil group one year and the other group the following year. Liming and/or fertilizing the soil may also cause it to be shifted from Group 1 to Group 2 or from Group 2 to Group 3 because of the increase in extractable cations.

Table A . Critical Soil Test P, K, Mg, and Ca Values[1]

Crops	Soil Group and Extractant			
	1 Sandy soils (CEC 0-4.6)	2 Loams (CEC 4.6-9.0)	3 Clayey soils of Limestone Valleys and high organic matter soils (CEC 9.0+)	4 Clays of Black Belt (CEC 9.0+)
	Mehlich-1	Mehlich-1	Mehlich-1	Mississippi/Lancaster
	Extractable P (lb/A)			
P LEVEL 1 Peanuts, pine trees, blueberries, centipedegrass	19	19	11	27
P LEVEL 2 All other crops	50	50	30	72
	Extractable K (lb/A)			
K LEVEL 1 Peanuts, pine trees, blueberries, centipedegrass	40	60	80	120
K LEVEL 2 Corn, grasses, soybeans, fruits, nuts	80	160	160	190
K LEVEL 3 Cotton, legumes, gardens, lawns, shrubs, vegetables	120	180	240	240
	Extractable Mg (lb/A)			
All crops	25	50	50	50
	Extractable Ca (lb/A)			
Peanuts	300	300	300	300
Tomatoes, peppers, fruits, nuts	500	500	500	500
Other crops (no response to Ca is expected)	500	500	500	500

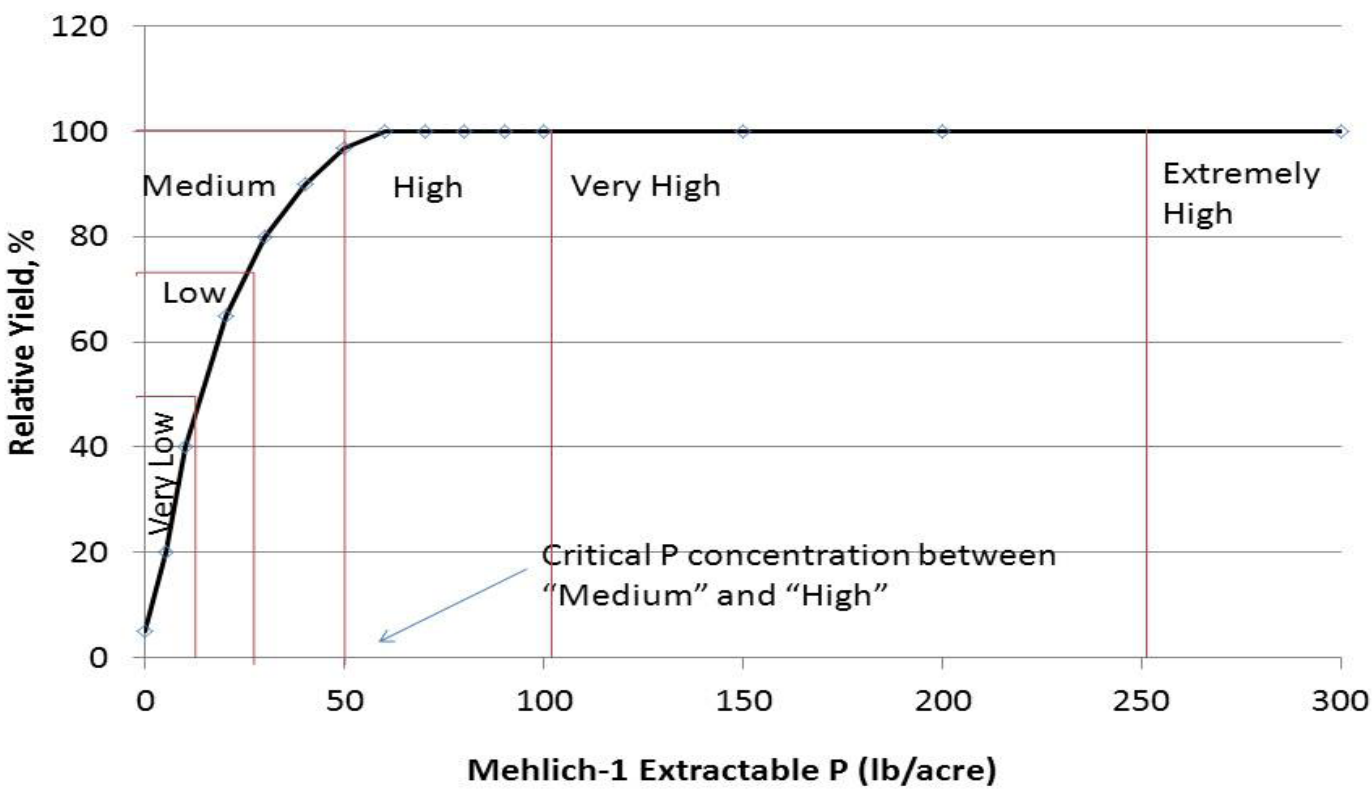
[1] Critical soil test level is that concentratoin of nutrient at which 95 percent of maximum relative yield is achieved. Additonal application of that nutrient above the critical level is not expected to increase yield.

Table B. Magnesium Recommendation Codes	
Code 1	If magnesium is low and lime is recommended, both soil acidity and low magnesium can be corrected by applying dolomitic lime at the recommended rate. If magnesium is low and lime is not recommended, no magnesium is required. (These crops have not been shown to respond to magnesium.)
Code 2	If magnesium is low and lime is recommended, both soil acidity and low magnesium can be corrected by applying dolomitic lime at the recommended rate. If magnesium is low and lime is not recommended, low magnesium may be corrected by applying 25 pounds per acre of Mg as magnesium sulfate, magnesium oxide, or sulfate of potash-magnesium, or if the pH is 6.5 or below, by applying 1,000 pounds per acre of dolomitic limestone (cotton, vegetable crops, and orchards).
Code 3	If magnesium is low and lime is recommended, both soil acidity and low magnesium can be corrected by applying dolomitic lime at the recommended rate. If lime is not recommended and Mg is low, low magnesium may be corrected by applying 25 pounds per acre of Mg as magnesium sulfate, magnesium oxide, or sulfate of potash-magnesium. Potatoes, blueberries, pines, and tobacco have a high Mg requirement but are sensitive to high pH.

Table C. Lime Recommendation Codes

Code	Lime if below	Lime to	Crops
	——pH——		
0	Lime recommended only under special condiitions		Blueberries, azaleas
1	5.8	6.5	All except those listed below
2	6.0	6.5	Corn, cotton, most clovers, gardens, vegetable crops, and most fruits and nuts
3	6.5	7.0	Alfalfa
4	5.0	5.5	Irish potatoes, tobacco, Christmas trees
5	5.6	6.0	Centipedegrass

Figure A. Example of soil test calibration for P on sandy and loamy Alabama soils for most crops. The critical value is that point above which no additional fertilizer P is needed for 100 percent yield.



NUTRIENT RECOMMENDATIONS FOR PASTURES, HAY CROPS, AND FIELD CROPS

Perennial Summer Grass Pasture

Bahia, Bermuda, Dallis

Crop Code 01

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	60-0-0	60-0-0	60-0-40	60-0-60	60-0-80
	High	60-0-0	60-0-0	60-0-40	60-0-60	60-0-80
	Medium	60-40-0	60-40-0	60-40-40	60-40-60	60-40-80
	Low	60-60-0	60-60-0	60-60-40	60-60-60	60-60-80
	Very low	60-80-0	60-80-0	60-80-40	60-80-60	60-80-80

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the following equations, which are based on soil groups.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	80 - 1.57x	80 - 0.99x
2	80 - 1.57x	80 - 0.66x
3	80 - 2.58x	80 - 0.49x
4	80 - 1.11x	80 - 0.42x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
60	2	2	5	1

* See Table A. ** See Table C. *** See Table B.

Comments:

On summer grass pastures apply P and K as recommended and 60 pounds of N before growth starts. Repeat the N application up to September 1 when more growth is desired. If less than 40 pounds of N is applied annually, then no P or K is needed.

NUTRIENT RECOMMENDATIONS FOR PASTURES, HAY CROPS, AND FIELD CROPS

Bermuda or Bahiagrass Hay (Improved Varieties)

Crop Code 02

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	100-0-0	100-0-100	100-0-200	100-0-300	100-0-300
	High	100-0-0	100-0-100	100-0-200	100-0-300	100-0-300
	Medium	100-50-0	100-50-100	100-50-200	100-50-300	100-50-300
	Low	100-75-0	100-75-100	100-75-200	100-75-300	100-75-300
	Very low	100-100-0	100-100-100	100-100-200	100-100-300	100-100-300

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	100 - 1.96x	300 - 3.70x
2	100 - 1.96x	300 - 2.48x
3	100 - 3.23x	300 - 1.88x
4	100 - 1.37x	300 - 1.58x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
100	2	2	5	1

* See Table A. ** See Table C. *** See Table B.

Comments:

For Bermuda or bahiagrass hay, apply N, P, and K as recommended before growth begins in spring. After each cutting up to September 1, apply 50 pounds N per ton of anticipated hay removed at the next cutting. Loss of stand is sometimes due to K deficiency. Where large yields of hay are removed, apply 40 pounds K_2O per ton of hay removed the previous season.

NUTRIENT RECOMMENDATIONS FOR PASTURES, HAY CROPS, AND FIELD CROPS

Perennial Winter Grass Pasture

Fescue, Orchardgrass

Crop Code 03

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	60-0-0	60-0-0	60-0-50	60-0-80	60-0-100
	High	60-0-0	60-0-0	60-0-50	60-0-80	60-50-100
	Medium	60-50-0	60-50-0	60-50-50	60-50-80	60-50-100
	Low	60-80-0	60-80-0	60-80-50	60-80-80	60-80-100
	Very low	60-100-0	60-100-0	60-100-50	60-100-80	60-100-100

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	100 - 1.96x	100 - 1.23x
2	100 - 1.96x	100 - 0.83x
3	100 - 3.23x	100 - 0.63x
4	100 - 1.38x	100 - 0.52x

* Use soil group from soil test report, if available.

** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
60	2	2	5	1

* See Table A. ** See Table C. *** See Table B.

Comments:

For grazing, apply N, P, and K as recommended by September 1. Repeat N application in February. If grass is to be cut for hay, in February apply up to 40 pounds N and 35 pounds K_2O per ton of anticipated hay yield.

NUTRIENT RECOMMENDATIONS FOR PASTURES, HAY CROPS, AND FIELD CROPS

Temporary Summer Grass Pasture and Johnsongrass

Millet, Forage Sorghum, Sudangrass, Sorghum-Sudangrass Hybrids

Crop Code 04

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	60-0-0	60-0-0	60-0-60	60-0-100	60-0-120
	High	60-0-0	60-0-0	60-0-60	60-0-100	60-0-120
	Medium	60-60-0	60-60-0	60-60-60	60-60-100	60-60-120
	Low	60-100-0	60-100-0	60-100-60	60-100-100	60-100-120
	Very low	60-120-0	60-120-0	60-120-60	60-120-100	60-120-120

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	120 - 2.35x	120 - 1.48x
2	120 - 2.4x	120 - 0.99x
3	120 - 3.9x	120 - 0.75x
4	120 - 1.66x	120 - 0.63x

* Use soil group from soil test report, if available.

** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
60	2	2	5	1

* See Table A. ** See Table C. *** See Table B.

Comments:

For temporary summer grass or Johnsongrass, apply N, P, and K as recommended before growth begins. If grass is cut for hay, apply up to 40 pounds N and 35 pounds K_2O per ton of anticipated yield after each cutting up to September 1.

NUTRIENT RECOMMENDATIONS FOR PASTURES, HAY CROPS, AND FIELD CROPS

Annual Legumes with Small Grain and Ryegrass

Arrowleaf Clover, Crimson Clover, Vetch, Caley Peas

Crop Code 05

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	60-0-0	60-0-0	60-0-60	60-0-100	60-0-120
	High	60-0-0	60-0-0	60-0-60	60-0-100	60-0-120
	Medium	60-60-0	60-60-0	60-60-60	60-60-100	60-60-120
	Low	60-100-0	60-100-0	60-100-60	60-100-100	60-100-120
	Very low	60-120-0	60-120-0	60-120-60	60-120-100	60-120-120

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	120 - 2.35x	120 - 1.5x
2	120 - 2.35x	120 - 0.99x
3	120 - 3.87x	120 - 0.75x
4	120 - 1.64x	120 - 0.63x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
60	2	3	2	1

* See Table A. ** See Table C. *** See Table B.

Comments:

On grass-legume mixtures, apply 60 pounds of N in early spring unless no additional forage growth is needed or the legume occupies one-half or more of the ground cover.

For reseeding clover or clover seed harvest, apply 1 to 1.5 pounds B per acre.

NUTRIENT RECOMMENDATIONS FOR PASTURES, HAY CROPS, AND FIELD CROPS

Perennial Clovers and Legumes

White Clover, Arrowleaf Clover, Red Clover

Crop Code 06

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	0-0-0	0-0-0	0-0-80	0-0-120	0-0-180
	High	0-0-0-	0-0-0-	0-0-80	0-0-120	0-0-180
	Medium	0-80-0	0-80-0	0-80-80	0-80-120	0-80-180
	Low	0-120-0	0-120-0	0-120-80	0-120-120	0-120-180
	Very low	0-180-0	0-180-0	0-180-80	0-180-120	0-180-180

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	180 - 3.53x	180 - 1.49x
2	180 - 3.53x	180 - 0.99x
3	180 - 5.81x	180 - 0.75x
4	180 - 2.47x	180 - 0.75x

* Use soil group from soil test report, if available.

** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
0	2	3	2	1

* See Table A. ** See Table C. *** See Table B.

Comments:

For reseeding clover or clover seed harvest, apply 1 to 1.5 pounds B per acre.

NUTRIENT RECOMMENDATIONS FOR PASTURES, HAY CROPS, AND FIELD CROPS

Summer Grass Pasture with Perennial or Late-Maturing Legumes

Dallis, Bermuda, Bahia with White Clover, Arrowleaf Clover, or Red Clover
Crop Code 07

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	0-0-0	0-0-0	0-0-80	0-0-120	0-0-180
	High	0-0-0	0-0-0	0-0-80	0-0-120	0-0-180
	Medium	0-80-0	0-80-0	0-80-80	0-80-120	0-80-180
	Low	0-120-0	0-120-0	0-120-80	0-120-120	0-120-180
	Very low	0-180-0	0-180-0	0-180-80	0-180-120	0-180-180

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	180 - 3.53x	180 - 1.49x
2	180 - 3.53x	180 - 0.99x
3	180 - 5.81x	180 - 0.75x
4	180 - 2.47x	180 - 0.75x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
0	2	3	2	1

* See Table A. ** See Table C. *** See Table B.

Comments:
For reseeding clover or clover seed harvest, apply 1 to 1.5 pounds B per acre.

Where legume covers less than one-third of the ground, apply 60 pounds of N each time forage is grazed down or cut for hay.

NUTRIENT RECOMMENDATIONS FOR PASTURES, HAY CROPS, AND FIELD CROPS

Cool Season Perennial Grass Pasture with Clover

Fescue or Orchardgrass with White Clover or Red Clover

Crop Code 08

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	0-0-0	0-0-0	0-0-80	0-0-120	0-0-180
	High	0-0-0	0-0-0	0-0-80	0-0-120	0-0-180
	Medium	0-80-0	0-80-0	0-80-80	0-80-120	0-80-180
	Low	0-120-0	0-120-0	0-120-80	0-120-120	0-120-180
	Very low	0-180-0	0-180-0	0-180-80	0-180-120	0-180-180

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	180 - 3.53x	180 - 4.29x
2	180 - 3.53x	180 - 2.90x
3	180 - 5.81x	180 - 2.20x
4	180 - 2.47x	180 - 1.48x

* Use soil group from soil test report, if available.

** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
0	2	2	2	1

* See Table A. ** See Table C. *** See Table B.

Comments:

For establishment of clover and perennial grass pastures in the fall, apply 20 to 30 pounds N per acre along with the recommended P_2O_5 and K_2O. On established grass-legume mixtures, where legume is less than one-third of the ground cover, apply 60 pounds of N in early fall and repeat if needed in early spring. For reseeding clover or clover seed harvest, apply 1 to 1.5 pounds B per acre.

NUTRIENT RECOMMENDATIONS FOR PASTURES, HAY CROPS, AND FIELD CROPS

Summer Grass Pasture with Annual Legumes

Bermuda, Dallis, Bahia with Ball Clover, Crimson Clover

Crop Code 09

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	0-0-0	0-0-0	0-0-50	0-0-80	0-0-100
	High	0-0-0	0-0-0	0-0-50	0-0-80	0-0-100
	Medium	0-50-0	0-50-0	0-50-50	0-50-80	0-50-100
	Low	0-80-0	0-80-0	0-80-50	0-80-80	0-80-100
	Very low	0-100-0	0-100-0	0-100-50	0-100-80	0-100-100

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	100 - 1.96x	100 - 1.23x
2	100 - 1.96x	100 - 0.83x
3	100 - 3.23x	100 - 0.63x
4	100 - 1.37x	100 - 0.52x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
0	2	3	1	1

* See Table A. ** See Table C. *** See Table B.

Comments:

For reseeding clover or clover seed harvest, apply 1 to 1.5 pounds B per acre.

Where legume covers less than one-third of the ground, apply 60 pounds of N each time forage is grazed down or cut for hay.

NUTRIENT RECOMMENDATIONS FOR PASTURES, HAY CROPS, AND FIELD CROPS

Cotton

Crop Code 10

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	90-0-0	90-0-0	90-0-60	90-0-90	90-0-120
	High	90-0-0	90-0-0	90-0-60	90-0-90	90-0-120
	Medium	90-60-0	90-60-0	90-60-60	90-60-90	90-60-120
	Low	90-100-0	90-100-0	90-100-60	90-100-90	90-100-120
	Very low	90-120-0	90-120-0	90-120-60	90-120-90	90-120-120

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	120 - 2.35x	120 - 0.99x
2	120 - 2.35x	120 - 0.67x
3	120 - 3.87x	120 - 0.50x
4	120 - 1.64x	120 - 0.48x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
90	2	3	1	2

* See Table A. ** See Table C. *** See Table B.

Comments:

For cotton, use the N rate as a guide. Where cotton follows a good crop of soybeans or on land where excessive growth has caused problems with late maturity, insects, or boll rot, reduce the N rate 20 to 30 pounds per acre. Where vegetative growth has been inadequate, increase the N rate by this amount. Apply 0.3 pound of B per acre in the fertilizer or in the insecticide spray. For cotton following hay crops, pasture, or soybeans on soils testing Low or Medium in K, increase K_2O application 30 to 60 pounds per acre above the amount recommended.

Starter fertilizer containing 25 to 30 pounds N and 15 to 40 pounds of P_2O_5 per acre may be used under reduced tillage condition by placing material in a 2- X 2-inch band, in a subsoil slit, or in a surface-applied band at planting.

Nitrogen may be applied in split applications up to early bloom. Additional N, if needed, can be foliar-applied as urea at rates not exceeding 15 pounds urea per acre per application.

NUTRIENT RECOMMENDATIONS FOR PASTURES, HAY CROPS, AND FIELD CROPS

Native and Indigenous Grasses for Land Stabilization

Switchgrass, Eastern Gamagrass, Bluestem, Fescue, Common Bermudagrass, etc.
Crop Code 11

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	30-0-0	30-0-0	30-0-40	30-0-60	30-0-80
	High	30-0-0	30-0-0	30-0-40	30-0-60	30-0-80
	Medium	30-40-0	30-40-0	30-40-40	30-40-60	30-40-80
	Low	30-60-0	30-60-0	30-60-40	30-60-60	30-60-80
	Very low	30-80-0	30-80-0	30-80-40	30-80-60	30-80-80

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	80 - 1.57x	80 - 0.99x
2	80 - 1.57x	80 - 0.67x
3	80 - 2.58x	80 - 0.50x
4	80 - 1.10x	80 - 0.42x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
30	2	2	5	1

* See Table A. ** See Table C. *** See Table B.

Comments:
For establishment of native and indigenous grasses (switchgrass, eastern gamagrass, bluestem, fescue, common Bermudagrass, etc.) for soil conservation purposes, apply recommended lime and N-P_2O_5-K_2O at or before planting. Repeat the N application once the grasses are established. If grasses are grazed or cut for hay, additional N will be needed annually.

NUTRIENT RECOMMENDATIONS FOR PASTURES, HAY CROPS, AND FIELD CROPS

Corn (Non-irrigated)

120 to 150 bushels/A

Crop Code 13

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	120-0-0	120-0-0	120-0-40	120-0-60	120-0-80
	High	120-0-0	120-0-0	120-0-40	120-0-60	120-0-80
	Medium	120-40-0	120-40-0	120-40-40	120-40-60	120-40-80
	Low	120-60-0	120-60-0	120-60-40	120-60-60	120-60-80
	Very low	120-80-0	120-80-0	120-80-40	120-80-60	120-80-80

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	80 - 1.57x	80 - 0.99x
2	80 - 1.57x	80 - 0.67x
3	80 - 2.58x	80 - 0.50x
4	80 - 1.10x	80 - 0.42x

* Use soil group from soil test report, if available.

** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
120	2	2	1	1

* See Table A. ** See Table C. *** See Table B.

Comments:

Non-irrigated corn may respond to nitrogen rates up to 150 pounds per acre. If yield potential is greater than 120 bushels per acre, apply up to 1.25 pounds N per bushel of anticipated yield. Nitrogen should always be applied in split applications with one-quarter to one-half of the total N applied at or near planting and the remainder as a sidedress. On sandy soils apply 3 pounds Zn per acre in fertilizer after liming or where pH is above 6.0.

NUTRIENT RECOMMENDATIONS FOR PASTURES, HAY CROPS, AND FIELD CROPS

Corn (Non-irrigated) before Soybean

Crop Code 15

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

Phosphorus (P) rating	Potassium (K) rating: Very high	High	Medium	Low	Very low
Very high	120-0-0	120-0-0	120-0-80	120-0-120	120-0-160
High	120-0-0	120-0-0	120-0-80	120-0-120	120-0-160
Medium	120-80-0	120-80-0	120-80-80	120-48-120	120-80-160
Low	120-160-0	120-160-0	120-160-80	120-160-120	120-160-160
Very low	120-160-0	120-160-0	120-160-80	120-160-120	120-160-160

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	160 - 3.2x	160 - 2x
2	160 - 3.2x	160 - 1.32x
3	160 - 5.3x	160 - x
4	160 - 2.22x	160 - 0.84x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
120	2	2	1	1

* See Table A. ** See Table C. *** See Table B.

Comments:
Non-irrigated corn may respond to nitrogen rates up to 150 pounds per acre. If yield potential is greater than 120 bushels per acre, apply up to 1.25 pounds N per bushel of anticipated yield. Nitrogen should always be applied in split applications with one-quarter to one-half of the total N applied at or near planting and the remainder as a sidedress. On sandy soils apply 3 pounds Zn per acre in fertilizer after liming or where pH is above 6.0.

If this recommendation is followed for corn in rotation before soybean, then no additional nutrients are needed for the soybean crop

NUTRIENT RECOMMENDATIONS FOR PASTURES, HAY CROPS, AND FIELD CROPS

Corn (Irrigated) or Corn or Sorghum Silage

180 bushels/A

Crop Code 16

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	200-0-0	200-0-30	200-0-60	200-0-120	200-0-120
	High	200-30-0	200-30-30	200-30-60	200-30-120	200-30-120
	Medium	200-60-0	200-60-30	200-60-60	200-60-120	200-60-120
	Low	200-120-0	200-120-30	200-120-60	200-120-120	200-120-120
	Very low	200-120-0	200-120-30	200-120-60	200-120-120	200-120-120

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	120 - 2.35x	120 - 1.48x
2	120 - 2.35x	120 - 0.99x
3	120 - 4.00x	120 - 0.75x
4	120 - 1.64x	120 - 0.63x

* Use soil group from soil test report, if available.

** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
200	2	2	1	1

* See Table A. ** See Table C. *** See Table B.

Comments:

If yield potential is greater than 200 bushels per acre, apply up to 1.25 pounds N per bushel of anticipated yield. Nitrogen should always be applied in split applications with one-quarter to one-half of the total N applied at or near planting and the remainder as a sidedress. On sandy soils apply 3 pounds Zn per acre in fertilizer after liming or where pH is above 6.0.

NUTRIENT RECOMMENDATIONS FOR PASTURES, HAY CROPS, AND FIELD CROPS

Peanut

Crop Code 17

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	0-0-0	0-0-0	0-0-40	0-0-80	0-0-120
	High	0-0-0	0-0-0	0-0-40	0-0-80	0-0-120
	Medium	0-40-0	0-40-0	0-40-40	0-40-80	0-40-120
	Low	0-80-0	0-80-0	0-80-40	0-80-80	0-80-120
	Very low	0-120-0	0-120-0	0-120-40	0-120-80	0-120-120

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	120 - 6.00x	120 - 2.86x
2	120 - 6.00x	120 - 1.94x
3	120 - 10.00x	120 - 1.46x
4	120 - 4.29x	120 - 0.98x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
0	1	1	1	1

* See Table A. ** See Table C. *** See Table B.

Comments:

For peanuts apply 0.3 to 0.5 pound B per acre in the fertilizer, gypsum, or disease control spray or dust.

Apply 250 pounds of gypsum at blooming time if calcium rating is medium and no lime is recommended or if calcium is low and lime is recommended.

Apply 500 pounds of gypsum at blooming time if calcium rating is low and no lime is recommended.

NUTRIENT RECOMMENDATIONS FOR PASTURES, HAY CROPS, AND FIELD CROPS

Annual Legumes

Crimson Clover, Ball Clover, Annual Lespedeza, Caley Peas, Vetch
Crop Code 19

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	0-0-0	0-0-0	0-0-50	0-0-80	0-0-100
	High	0-0-0	0-0-0	0-0-50	0-0-80	0-0-100
	Medium	0-50-0	0-50-0	0-50-50	0-50-80	0-50-100
	Low	0-80-0	0-80-0	0-80-50	0-80-80	0-80-100
	Very low	0-100-0	0-100-0	0-100-50	0-100-80	0-100-100

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	100 - 2x	100 - 1.23x
2	100 - 2x	100 - 0.83x
3	100 - 3.33x	100 - 0.62x
4	100 - 1.39x	100 - 0.52x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
0	2	3	1	1

* See Table A. ** See Table C. *** See Table B.

Comments:
For reseeding clover or clover seed harvest, apply 1 to 1.5 pounds B per acre.

NUTRIENT RECOMMENDATIONS FOR PASTURES, HAY CROPS, AND FIELD CROPS

Southern Peas

Field peas, Crowder peas, Cowpeas, dried beans

Crop Code 20

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	30-0-0	30-0-0	30-0-50	30-0-80	30-0-100
	High	30-0-0	30-0-0	30-0-50	30-0-80	30-0-100
	Medium	30-50-0	30-50-0	30-50-50	30-50-80	30-50-100
	Low	30-80-0	30-80-0	30-80-50	30-80-80	30-80-100
	Very low	30-100-0	30-100-0	30-100-50	30-100-80	30-100-100

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	100 - 1.96x	100 - 1.23x
2	100 - 1.96x	100 - 0.83x
3	100 - 3.23x	100 - 0.62x
4	100 - 1.37x	100 - 0.52x

* Use soil group from soil test report, if available.

** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
30	2	3	1	1

* See Table A. ** See Table C. *** See Table B.

Nutrient Recommendations for Pastures, Hay Crops, and Field Crops

Grain Sorghum, Sweet Sorghum, Sugarcane, Sunflower

Crop Code 21

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	80-0-0	80-0-0	80-0-40	80-0-60	80-0-80
	High	80-0-0	80-0-0	80-0-40	80-0-60	80-0-80
	Medium	80-40-0	80-40-0	80-40-40	80-40-60	80-40-80
	Low	80-60-0	80-60-0	80-60-60	80-60-60	80-60-80
	Very low	80-80-0	80-80-0	80-80-40	80-80-60	80-80-80

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	80 - 1.57x	80 - 0.99x
2	80 - 1.57x	80 - 0.67x
3	80 - 2.58x	80 - 0.50x
4	80 - 1.10x	80 - 0.42x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
80	2	2	1	1

* See Table A. ** See Table C. *** See Table B.

NUTRIENT RECOMMENDATIONS FOR PASTURES, HAY CROPS, AND FIELD CROPS

Alfalfa

Crop Code 22

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

Phosphorus (P) rating	Potassium (K) rating: Very high	High	Medium	Low	Very low
Very high	0-0-0	0-0-120	0-0-240	0-0-360	0-0-480
High	0-0-0	0-0-120	0-0-240	0-0-360	0-0-480
Medium	0-80-0	0-80-120	0-80-240	0-80-360	0-80-480
Low	0-120-0	0-120-120	0-120-240	0-120-360	0-120-480
Very low	0-200-0	0-200-120	0-200-240	0-200-360	0-200-480

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	200 - 3.92x	480 - 5.93x
2	200 - 3.92x	480 - 3.97x
3	200 - 6.45x	480 - 2.98x
4	200 - 2.74x	480 - 2.51x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
0	2	3	3	1

* See Table A. ** See Table C. *** See Table B.

N rate = 0 P level = 2 K level = 3 Lime code = 3 Mg code = 1

Comments:
For establishment of alfalfa apply at least 50 pounds K_2O per ton of anticipated hay removed.

For alfalfa apply 3 pounds of B per acre annually.

NUTRIENT RECOMMENDATIONS FOR PASTURES, HAY CROPS, AND FIELD CROPS

Serecia Lespedeza

***Lespedeza serecia,* Korean Lespedeza, Annual Lespedeza**

Crop Code 23

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	0-0-0	0-0-0	0-0-40	0-0-80	0-0-120
	High	0-0-0	0-0-0	0-0-40	0-0-80	0-0-120
	Medium	0-40-0	0-40-0	0-40-40	0-40-80	0-40-120
	Low	0-80-0	0-80-0	0-80-40	0-80-80	0-80-120
	Very low	0-120-0	0-120-0	0-120-40	0-120-80	0-120-120

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	120 - 2.35x	120 - 1.48x
2	120 - 2.35x	120 - 0.99x
3	120 - 3.87x	120 - 0.75x
4	120 - 1.64x	120 - 0.63x

* Use soil group from soil test report, if available.

** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
0	2	2	1	1

* See Table A. ** See Table C. *** See Table B.

Comments:

Fertilizer recommended should be sufficient for two years.

NUTRIENT RECOMMENDATIONS FOR PASTURES, HAY CROPS, AND FIELD CROPS

Soybean

Crop Code 24

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	0-0-0	0-0-0	0-0-40	0-0-80	0-0-120
	High	0-0-0	0-0-0	0-0-40	0-0-80	0-0-120
	Medium	0-40-0	0-40-0	0-40-40	0-40-80	0-40-120
	Low	0-80-0	0-80-0	0-80-40	0-80-80	0-80-120
	Very low	0-120-0	0-120-0	0-120-40	0-120-80	0-120-120

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	120 - 2.35x	120 - 1.48x
2	120 - 2.35x	120 - 0.99x
3	120 - 3.87x	120 - 0.75x
4	120 - 1.64x	120 - 0.63x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
0	2	2	1	1

* See Table A. ** See Table C. *** See Table B.

Comments:
On all soils of northern Alabama and on fine-textured, acid soils in other areas of Alabama, apply the equivalent of 1 ounce per acre of sodium molybdate or ammonium molybdate to the seed at planting.

NUTRIENT RECOMMENDATIONS FOR PASTURES, HAY CROPS, AND FIELD CROPS

Small Grain Followed by Soybean

Crop Code 25

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	100-0-0	100-0-0	100-0-80	100-0-120	100-0-160
	High	100-0-0	100-0-0	100-0-80	100-0-120	100-0-160
	Medium	100-80-0	100-80-0	100-80-80	100-80-120	100-80-160
	Low	100-160-0	100-160-0	100-160-80	100-160-120	100-160-160
	Very low	100-160-0	100-160-0	100-160-80	100-160-120	100-160-160

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	160 - 3.14x	160 - 1.98x
2	160 - 3.14x	160 - 1.32x
3	160 - 5.16x	160 - 0.99x
4	160 - 2.19x	160 - 0.84x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
100	2	2	1	1

* See Table A. ** See Table C. *** See Table B.

Comments:
If the recommended amounts of P and K are applied to small grain in the fall, no additional P or K should be needed for soybeans the following year.

For small grains and ryegrass planted on fallow fields in early September for grazing, apply 100 pounds of N at planting and 60 pounds in early spring for grazing or grain. Those crops grown for grain only should receive 20 pounds of N in the fall and 60 pounds in the spring. Ryegrass planted alone for grazing should receive no more than 60 pounds of N in the fall and up to 100 pounds N in early spring.

NUTRIENT RECOMMENDATIONS FOR PASTURES, HAY CROPS, AND FIELD CROPS

Tobacco (Flue Cured)

Crop Code 26

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

Phosphorus (P) rating	Potassium (K) rating: Very high	High	Medium	Low	Very low
Very high	60-50-100	60-60-120	60-80-160	60-50-200	60-50-200
High	60-50-100	60-60-120	60-80-160	60-50-200	60-50-200
Medium	60-100-100	60-120-120	60-100-200	60-100-200	60-100-200
Low	60-200-100	60-200-100	60-200-200	60-200-200	60-200-200
Very low	60-200-100	60-200-100	60-200-200	60-200-200	60-200-200

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	200 - 3.92x	200 - 2.47x
2	200 - 3.92x	200 - 1.65x
3	200 - 6.45x	200 - 1.24x
4	200 - 2.74x	200 - 1.24x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
60	2	3	4	2

* See Table A. ** See Table C. *** See Table B.

Comments:
Increase N to 140 pounds per acre for Burley and Darfire tobacco.

NUTRIENT RECOMMENDATIONS FOR PASTURES, HAY CROPS, AND FIELD CROPS

Small Grain or Temporary Winter Grass Pasture

Oats, Rye, Wheat, Ryegrass

Crop Code 27

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	100-0-0	100-0-0	100-0-60	100-0-100	100-0-120
	High	100-0-0	100-0-0	100-0-60	100-0-100	100-0-120
	Medium	100-60-0	100-60-0	100-60-60	100-60-100	100-60-120
	Low	100-100-0	100-100-0	100-100-60	100-100-100	100-100-120
	Very low	100-120-0	100-120-0	100-120-60	100-120-100	100-120-120

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	120 - 2.35x	120 - 1.48x
2	120 - 2.35x	120 - 0.99x
3	120 - 3.87x	120 - 0.75x
4	120 - 1.64x	120 - 0.63x

* Use soil group from soil test report, if available.

** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
100	2	2	1	1

* See Table A. ** See Table C. *** See Table B.

Comments:

For small grains and ryegrass planted on fallow fields in early September for grazing, apply 100 pounds of N at planting and 60 pounds in early spring for grazing or grain. Ryegrass planted alone for grazing should receive no more than 60 pounds of N in the fall and up to 100 pounds N in the early spring.

For grain only, apply 20 pounds N per acre in the fall and 60 to 80 pounds in the late winter to early spring. The fall N can be eliminated following a good soybean crop or other legume.

NUTRIENT RECOMMENDATIONS FOR TURFGRASS LAWNS, GOLF COURSES, AND ROADSIDES

Bermuda, Zoysia, St. Augustine Lawn

Crop Code 40

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	80-0-0[1]	80-0-0[1]	80-0-40[2]	80-0-80[3]	80-0-80[3]
	High	80-0-0[1]	80-0-0[1]	80-0-40[5]	80-0-80[6]	80-0-80[6]
	Medium	80-40-0[4]	80-40-0[4]	80-40-40[5]	80-40-80[6]	80-40-80[6]
	Low	80-80-0[7]	80-80-0[7]	80-80-40[8]	80-80-80[8]	80-80-80[8]
	Very low	80-80-0[7]	80-80-0[7]	80-80-40[8]	80-80-80[8]	80-80-80[8]

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	80 - 1.57x	80 - 0.67x
2	80 - 1.57x	80 - 0.45x
3	80 - 2.58x	80 - 0.34x
4	80 - 1.10x	80 - 0.34x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
80	2	2	5	1

* See Table A. ** See Table C. *** See Table B.

Comments:
One ton limestone per acre is approximately equivalent to 50 pounds per 1,000 square feet. Suggestions for meeting recommendations:

[1] Per 1,000 square feet apply 1 pound N (3 pounds 34-0-0 or equivalent) when spring growth begins and repeat in mid-summer. If more growth or better color is desired make additional applications of 1 pound N at two-month intervals.

[2] Per 1,000 square feet apply 6 pounds (3 quarts) 15-0-15 or equivalent low phosphorus fertilizer when spring growth begins and apply 1 pound N (3 pounds 34-0-0 or equivalent) in mid-summer. If more growth or better color is desired, make additional applications of 1 pound N at two-month intervals.

[3] Per 1,000 square feet apply 6 pounds (3 quarts) 15-0-15 or equivalent low phosphorus fertilizer when spring growth begins and repeat in mid-summer. If more growth or better

color is desired, make additional applications of 1 pound N (3 pounds 34-0-0 or equivalent) at two-month intervals.

[4] Per 1,000 square feet apply 1 pound N (3 pounds 34-0-0 or equivalent) and 2 pounds (2 pints) triple superphosphate or equivalent when spring growth begins and apply 1 pound N in mid-summer. If more growth or better color is desired, make additional applications of 1 pound N at two-month intervals.

[5] Per 1,000 square feet apply 12 pounds (6 quarts) 13-13-13 or equivalent when spring growth begins and apply 1 pound N (3 pounds 34-0-0 or equivalent) in mid-summer. If more growth or better color is desired, make additional applications of 1 pound N at two-month intervals.

[6] Per 1,000 square feet apply 12 pounds (6 quarts) 13-13-13 or equivalent when spring growth begins and apply 6 pounds 15-0-15 or equivalent low phosphorus fertilizer in mid-summer. If more growth or better color is desired, make additional applications of 1 pound N (3 pounds 34-0-0 or equivalent) at two-month intervals.

[7] Per 1,000 square feet apply 10 pounds (5 quarts) 13-13-13 or equivalent when spring growth begins and repeat in mid-summer. If more growth or better color is desired, make additional applications of 1 pound N (3 pounds 34-0-0 or equivalent) at two-month intervals.

[8] Per 1,000 square feet apply 12 pounds (6 quarts) 13-13-13 or equivalent when spring growth begins and repeat in mid-summer. If more growth or better color is desired, make additional applications of 1 pound N (3 pounds 34-0-0 or equivalent) at two-month intervals.

For small areas, comments give examples of ways to meet the fertilizer recommendations. Other fertilizer grades or materials that supply equivalent amounts of plant nutrients may be used with equal results. If you need assistance in calculating amounts of other materials to use, contact your county agent or fertilizer supplier. A pint of dry fertilizer is approximately 1 pound.

NUTRIENT RECOMMENDATIONS FOR TURFGRASS LAWNS, GOLF COURSES, AND ROADSIDES

Centipede Lawn

Crop Code 42

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	40-0-0[1]	40-0-0[1]	40-0-40[2]	40-0-40[2]	40-0-40[2]
	High	40-0-0[1]	40-0-0[1]	40-0-40[2]	40-0-40[2]	40-0-40[2]
	Medium	40-40-0[1]	40-40-0[1]	40-40-40[4]	40-40-40[4]	40-40-40[4]
	Low	40-40-0[3]	40-40-0[3]	40-40-40[4]	40-40-40[4]	40-40-40[4]
	Very low	40-40-0[3]	40-40-0[3]	40-40-40[4]	40-40-40[4]	40-40-40[4]

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	40 - 2.00x	40 - 0.95x
2	40 - 2.00x	40 - 0.65x
3	40 - 3.33x	40 - 0.49x
4	40 - 1.43x	40 - 0.33x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
40	1	1	5	1

* See Table A. ** See Table C. *** See Table B.

Comments:
One ton limestone per acre is approximately equivalent to 50 pounds per 1,000 square feet.

[1] Per 1,000 square feet apply 1 pound N (3 pounds 34-0-0 or equivalent) when spring growth begins. If phosphorus is excessive, fertilizers containing this element should not be used. Excessive phosphorus may cause an iron deficiency. The symptoms occur as a general yellowing of new growth. To correct, spray with a soluble source of iron, which can be found at garden supply stores.

[2] Per 1,000 square feet apply 6 pounds 15-0-15 or equivalent low phosphorus fertilizer when spring growth begins. If phosphorus is excessive, fertilizers containing this element should not be used. Excessive phosphorus may cause an iron deficiency. The symptoms occur as a general yellowing of new growth. To correct, spray with a soluble source of iron, which can be found at garden supply stores.

[3] Per 1,000 square feet apply 1 pound N (3 pounds 34-0-0 or equivalent) and 2 pounds triple superphosphate (0-45-0) or equivalent when spring growth begins.

[4] Per 1,000 square feet apply 12 pounds 13-13-13 or equivalent when spring growth begins.

Comments give examples of ways to meet the fertilizer recommendations for small areas. Other fertilizer grades or materials that supply equivalent amounts of plant nutrients may be used with equal results. A pint of dry fertilizer is approximately equivalent to 1 pound. If you need assistance in calculating amounts of other materials to use, contact your county agent or fertilizer supplier.

NUTRIENT RECOMMENDATIONS FOR TURFGRASS LAWNS, GOLF COURSES, AND ROADSIDES

Ryegrass, Fescue, Bluegrass Lawn

Crop Code 43

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	80-0-0[1]	80-0-0[1]	80-0-40[2]	80-0-80[3]	80-0-80[3]
	High	80-0-0[1]	80-0-0[1]	80-40-40[5]	80-40-80[6]	80-40-80[6]
	Medium	80-40-0[4]	80-40-0[4]	80-40-40[5]	80-40-80[6]	80-40-80[6]
	Low	80-80-0[7]	80-80-0[7]	80-80-40[8]	80-80-80[8]	80-80-80[8]
	Very low	80-80-0[7]	80-80-0[7]	80-80-40[8]	80-80-80[8]	80-80-80[8]

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	80 - 1.57x	80 - 0.67x
2	80 - 1.57x	80 - 0.45x
3	80 - 2.58x	80 - 0.34x
4	80 - 1.10x	80 - 0.34x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
80	2	2	5	1

* See Table A. ** See Table C. *** See Table B.

Comments:
One ton limestone per acre is approximately equivalent to 50 pounds per 1,000 square feet.

[1] Per 1,000 square feet apply 1 pound N (3 pounds 34-0-0 or equivalent) in the fall and repeat in spring. If more growth or better color is desired, add 1 pound N at two-month intervals.

[2] Per 1,000 square feet apply 6 pounds 15-0-15 or equivalent low phosphorus fertilizer in the fall and apply 1 pound N (3 pounds 34-0-0 or equivalent) in the spring. If more growth or better color is desired, add 1 pound N at two-month intervals.

[3] Per 1,000 square feet apply 6 pounds 15-0-15 or equivalent low phosphorus fertilizer in the fall and repeat in spring. If more growth or better color is desired, add 1 pound N (3 pounds 34-0-0 or equivalent) at two-month intervals.

[4] Per 1,000 square feet apply 1 pound N (3 pounds 34-0-0 or equivalent) and 2 pounds triple superphosphate (0-45-0) or equivalent in the fall and apply 1 pound N in the spring. If more growth or better color is desired, add 1 pound N at two-month intervals.

[5] Per 1,000 square feet apply 12 pounds 13-13-13 or equivalent in the fall and apply 1 pound N (3 pounds 34-0-0 or equivalent) in the spring. If more growth or better color is desired, add 1 pound N at two-month intervals.

[6] Per 1,000 square feet apply 12 pounds 13-13-13 or equivalent in the fall and apply 6 pounds 15-0-15 or equivalent low phosphorus fertilizer in the spring. If more growth or better color is desired, add 1 pound N (3 pounds 34-0-0 or equivalent) at two-month intervals.

[7] Per 1,000 square feet apply 10 pounds 13-13-13 or equivalent in the fall and apply 1 pound N in the spring. If more growth or better color is desired, add 1 pound N (3 pounds 34-0-0 or equivalent) at two-month intervals.

[8] Per 1,000 square feet apply 12 pounds 13-13-13 or equivalent in the fall and repeat in the spring. If more growth or better color is desired, add 1 pound N (3 pounds 34-0-0 or equivalent) at two-month intervals.

For small areas, comments give examples of ways to meet the fertilizer recommendations. Other fertilizer grades or materials that supply equivalent amounts of plant nutrients may be used with equal results. A pint of dry fertilizer is approximately 1 pound. If you need assistance in calculating amounts of other materials to use, contact your county agent or fertilizer supplier.

NUTRIENT RECOMMENDATIONS FOR TURFGRASS LAWNS, GOLF COURSES, AND ROADSIDES

Golf Green, Tee, Commercial Sod

Crop Code 44

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	400-0-0[1]	400-0-0[1]	400-0-100[2]	400-0-200[3]	400-0-200[3]
	High	400-50-0[1]	400-50-50[4]	400-50-100[5]	400-50-200[6]	400-50-200[6]
	Medium	400-100-0[7]	400-100-50[8]	400-100-100[8]	400-100-200[9]	400-100-200[9]
	Low	400-200-0[10]	400-200-50[11]	400-200-100[11]	400-200-200[12]	400-200-200[12]
	Very low	400-200-0[10]	400-200-50[11]	400-200-100[11]	400-200-200[12]	400-200-200[12]

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	200 - 3.92x	200 - 1.66x
2	200 - 3.92x	200 - 1.11x
3	200 - 6.45x	200 - 0.83x
4	200 - 2.74x	200 - 0.83x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
400	2	2	1	1

* See Table A. ** See Table C. *** See Table B.

Comments:
One ton limestone per acre is approximately equivalent to 50 pounds per 1,000 square feet.

[1] For all greens and tees, the 400-pound N recommendation is the sum of approximately 10 four- to five-week applications of 1 pound of N per 1,000 square feet from soluble N sources. This may be supplied as 3 pounds 34-0-0 or equivalent when N is supplied alone or as 8-8-8, 15-0-15, or other equivalent grades suggested when P_2O_5 or K_2O are recommended. Nitrogen applications should be alternated with application of other materials and modified to maintain desired growth and color. If slow release materials are used, rates and frequency of application may be modified.

[2] Per 1,000 square feet apply 8 pounds of 15-0-15 or equivalent low phosphorus fertilizer in the spring and repeat in the fall.

[3] Per 1,000 square feet apply 6 pounds of 15-0-15 or equivalent low phosphorus fertilizer in the spring and repeat every two months for a total of four applications.

[4] Per 1,000 square feet apply 14 pounds 13-13-13 or equivalent.

[5] Per 1,000 square feet apply 14 pounds 13-13-13 or equivalent in the spring and 6 pounds in the fall.

[6] Per 1,000 square feet apply 14 pounds 13-13-13 or equivalent in the spring and four applications of 6 pounds 15-0-15 at two-month intervals.

[7] Per 1,000 square feet apply 6 pounds of superphosphate or equivalent in the spring and repeat in the fall.

[8] Per 1,000 square feet apply 14 pounds of 13-13-13 or equivalent in the spring and repeat in the fall.

[9] Per 1,000 square feet apply 14 pounds of 13-13-13 or equivalent in the spring and repeat in the fall. Apply 6 pounds 15-0-15 or equivalent low phosphorus fertilizer at two-month intervals.

[10] Per 1,000 square feet apply 12 pounds of superphosphate or equivalent in the spring and repeat in the fall.

[11] Per 1,000 square feet apply 12 pounds of superphosphate or equivalent in the spring to build up soil phosphorus. Apply 14 pounds of 8-8-8 or equivalent in the spring and repeat in the fall.

[12] Per 1,000 square feet apply 14 pounds of 13-13-13 or equivalent in the spring and at two-month intervals for a total of four applications.

NUTRIENT RECOMMENDATIONS FOR TURFGRASS LAWNS, GOLF COURSES, AND ROADSIDES

Golf Fairway

Crop Code 45

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	120-0-0	120-0-0	120-0-40	120-0-80	120-0-80
	High	120-0-0	120-0-0	120-0-40	120-0-80	120-0-80
	Medium	120-40-0	120-40-0	120-40-40	120-40-80	120-40-80
	Low	120-80-0	120-80-0	120-80-40	120-80-80	120-80-80
	Very low	120-80-0	120-80-0	120-80-40	120-80-80	120-80-80

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	80 - 1.57x	80 - 0.66x
2	80 - 1.57x	80 - 0.45x
3	80 - 2.58x	80 - 0.33x
4	80 - 1.10x	80 - 0.33x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
120	2	2	5	1

* See Table A. ** See Table C. *** See Table B.

Comments:
On fairways, apply 60 pounds of N with the recommended rates of P_2O_5 and K_2O in the spring. Apply additional N as needed at the rate of 60 pounds per acre per application.

NUTRIENT RECOMMENDATIONS FOR TURFGRASS LAWNS, GOLF COURSES, AND ROADSIDES

Athletic Field

Crop Code 46

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	200-0-0	200-0-0	200-0-40	200-0-80	200-0-80
	High	200-0-0	200-0-0	200-0-40	200-0-80	200-0-80
	Medium	200-40-0	200-40-0	200-40-40	200-40-80	200-40-80
	Low	200-80-0	200-80-0	200-80-40	200-80-80	200-80-80
	Very low	200-80-0	200-80-0	200-80-40	200-80-80	200-80-80

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	80 - 1.57x	80 - 0.66x
2	80 - 1.57x	80 - 0.45x
3	80 - 2.58x	80 - 0.33x
4	80 - 1.10x	80 - 0.33x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
200	2	2	5	1

* See Table A. ** See Table C. *** See Table B.

Comments:
For athletic fields, nitrogen should be divided into four applications at two-month intervals beginning in March. Apply additional nitrogen at the rate of 50 pounds of N (150 pounds 34-0-0 or equivalent) per acre if needed to maintain desired growth and color. A football field plus 20 feet on all sides is about two acres.

NUTRIENT RECOMMENDATIONS FOR TURFGRASS LAWNS, GOLF COURSES, AND ROADSIDES

Roadside Turf Establishment

Crop Code 47

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	120-0-0	120-0-40	120-0-80	120-0-160	120-0-160
	High	120-40-0	120-40-40	120-40-80	120-40-160	120-40-160
	Medium	120-80-0	120-80-40	120-80-80	120-80-160	120-80-160
	Low	120-160-0	120-160-40	120-160-80	120-160-160	120-160-160
	Very low	120-160-0	120-160-40	120-160-80	120-160-160	120-160-160

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	160 - 3.14x	160 - 1.32x
2	160 - 3.14x	160 - 0.88x
3	160 - 5.16x	160 - 0.66x
4	160 - 2.19x	160 - 0.66x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
120	2	2	1	1

* See Table A. ** See Table C. *** See Table B.

Comments:
Before planting turf, mix recommended lime, phosphorus, and potassium and 80 pounds of N per acre into the surface soil. One month after planting, apply 40 pounds of N per acre. After establishing turf, apply 40 pounds of N, P_2O_5, and K_2O per acre at six-month intervals.

Nutrient Recommendations for Turfgrass Lawns, Golf Courses, and Roadsides

Roadside Turf Maintenance

Crop Code 48

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	80-0-0	80-0-0	80-0-40	80-0-80	80-0-80
	High	80-0-0	80-0-0	80-0-40	80-0-80	80-0-80
	Medium	80-40-0	80-40-0	80-40-40	80-40-80	80-40-80
	Low	80-80-0	80-80-0	80-80-80	80-80-80	80-80-80
	Very low	80-80-0	80-80-0	80-80-80	80-80-80	80-80-80

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	80 - 1.57x	80 - 0.66x
2	80 - 1.57x	80 - 0.45x
3	80 - 2.58x	80 - 0.33x
4	80 - 1.110x	80 - 0.33x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
80	2	2	1	1

* See Table A. ** See Table C. *** See Table B.

NUTRIENT RECOMMENDATIONS FOR VEGETABLE GARDENS AND COMMERCIAL VEGETABLES

Vegetable Garden (Organic Fertilization)

Crop Code 59

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	1	1	1,2	1,2	1,2
	High	3	3	4,5,2	4,5,2	4,5,2
	Medium	6	6	6,2	6,2	6,2
	Low	6,7	6,7	6,7,2	6,7,2	6,7,2
	Very low	6,7	6,7	6,7,2	6,7,2	6,7,2

* Numbers in table refer to comments below.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	180 - 3.53x	180 - 1.49x
2	180 - 3.53x	180 - 0.99x
3	180 - 5.81x	180 - 0.75x
4	180 - 2.47x	180 - 0.75x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
120	2	3	2	2

* See Table A. ** See Table C. *** See Table B.

Comments:

[1] Soil analyses indicate very high or excessive P. Additional organic amendments will add more P. Use materials high in N but low in P such as cottonseed meal (6-3-1), fish meal (10-6-1), or bloodmeal (13-2-1). Legume cover crops can also provide some N to subsequent crops.

[2] Organic materials generally provide less potassium (K) compared to N and P. Potassium can be supplied with "green sand" (6 percent K_2O), or potassium magnesium sulfate (18 percent K_2O, 11 percent Mg, 22 percent S). Apply enough material to supply 1 to 3 pounds K_2O per 1,000 square feet.

[3] Soil analyses indicate adequate K and P for most vegetables. To supply N for non-legumes, use materials high in N but low in K such as cottonseed meal (6-3-1), fish meal (10-6-1), or blood meal (13-2-1). Legume cover crops can also provide some N to subsequent crops.

[4] P is adequate for most crops.

[5] To supply N for non-legumes use materials high in N but low in P such as cottonseed meal (6-3-1), fish meal (10-6-1), or blood meal (13-2-1). Legume cover crops can also provide some N to subsequent crops.

[6] Most manures and composts will provide some N and P. Apply enough material to provide approximately 3 pounds N and 3 pounds P_2O_5 per 1,000 square feet during the growing season.

[7] Low soil P can be corrected by using bone meal (1-15-0) or rock phosphate (2 to 35 percent P_2O_5) to provide 2 to 3 pounds P_2O_5 per 1,000 square feet.

Most organic materials contain low levels of available nutrients. However, because large quantities are often used to build soil organic matter and improve soil physical characteristics, soil nutrients (i.e. P) often build to excessive levels. Nutrient availability (especially N) depends upon how fast the organic matter breaks down in the soil. Following are typical analyses (percent N-P_2O_5-K_2O) of some common materials used as soil amendments in organically grown gardens:

fresh broiler litter (3-3-2)	composted broiler litter (2-3-1)
blood meal (13-2-1)	composted cow manure (1-2-1)
bone meal (1-15-0)	cottonseed meal (6-3-1)
fish meal (10-6-1)	wheat/oat straw (0-0-1)
legume hay (2-1-2)	composted yard waste (1-2-1)

NUTRIENT RECOMMENDATIONS FOR VEGETABLE GARDENS AND COMMERCIAL VEGETABLES

Vegetable Garden (Conventional Fertilization)

Crop Code 60

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	120-0-0[1]	120-0-60[2]	120-0-120[3]	120-0-180[4]	120-0-180[4]
	High	120-60-0[5]	120-60-60[6]	120-60-120[7]	120-60-180[8]	120-60-180[8]
	Medium	120-120-0[9]	120-120-60[10]	120-120-120[11]	120-120-180[12]	120-120-180[12]
	Low	120-180-0[13]	120-180-60[14]	120-180-120[15]	120-180-180[16]	120-180-180[16]
	Very low	120-180-0[13]	120-180-60[14]	120-180-120[15]	120-180-180[16]	120-180-180[16]

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	180 - 3.53x	180 - 1.49x
2	180 - 3.53x	180 - 0.99x
3	180 - 5.81x	180 - 0.75x
4	180 - 2.47x	180 - 0.75x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
120	2	3	2	2

* See Table A. ** See Table C. *** See Table B.

Comments:
One ton limestone per acre is approximately equivalent to 50 pounds per 1,000 square feet.

For cauliflower, broccoli, and root crops on sandy soils, apply 1 pound boron (B) per acre. This is equivalent to 1 tablespoon of borax per 100 feet of row. For sweet corn on sandy soils, apply 1 tablespoon zinc sulfate per 100 feet of row.

For strawberries apply about one-third of the fertilizer in September, one-third about 90 days before ripening, and one-third after harvest.

[1] Per 100 feet of row apply 0.4 pound N (1 pint 34-0-0 or equivalent) at planting and sidedress with another 0.4 pound N.

[2] Per 1,000 square feet broadcast 2.3 pounds muriate of potash (1 quart 0-0-60). Per 100 feet of row apply 0.4 pound N (1 pint 34-0-0 or equivalent) at planting and sidedress with 0.4 pound N.

[3] Per 1,000 square feet broadcast 4.6 pounds muriate of potash (2 quarts 0-0-60). Per 100 feet of row apply 0.4 pound N (1 pint 34-0-0 or equivalent) at planting and sidedress with 0.4 pound N.

[4] Per 1,000 square feet broadcast 7 pounds muriate of potash (3 quarts 0-0-60). Per 100 feet of row apply 0.4 pound N (1 pint 34-0-0 or equivalent) at planting and sidedress with 0.4 pound N.

[5] Per 1,000 square feet broadcast 3 pounds triple superphosphate (3 pints 0-45-0). Per 100 feet of row apply 3 pounds 13-13-13 (1.5 quarts) at planting and sidedress with 0.4 pound N (1 pint 34-0-0 or equivalent).

[6] Per 100 feet of row apply 5 pounds (2.5 quarts) 13-13-13 at planting and sidedress with 0.4 pound N (1 pint 34-0-0 or equivalent).

[7] Per 1000 square feet, apply 10 pounds (5 quarts) 13-13-13 or equivalent at planting. Sidedress with 3 pounds (3 pints) 15-0-15 or equivalent per 100 feet of row.

[8] Per 1,000 square feet broadcast 4.6 pounds muriate of potash (2 quarts 0-0-60). Per 100 feet of row apply 3 pounds 13-13-13 (1.5 quarts) at planting and sidedress with 0.4 pound N (1 pint 34-0-0 or equivalent).

[9] Per 1,000 square feet broadcast 6 pounds triple superphosphate (3 quarts). Per 100 feet row apply 3 pounds 13-13-13 (1.5 quarts) at planting and sidedress with 0.4 pound N.

[10] Per 1,000 square feet broadcast 3 pounds triple superphosphate (1.5 quarts 0-46-0). Per 100 feet of row apply 3 pounds 13-13-13 (1.5 quarts) at planting and sidedress with 0.4 pound N (1 pint 34-0-0 or equivalent).

[11] Per 100 feet of row apply 4 pounds 13-13-13 (2 quarts) at planting and sidedress with 2.5 pounds 13-13-13 (5 cups).

[12] Per 1,000 square feet broadcast 2.3 pounds muriate of potash (1 quart 0-0-60). Per 100 feet of row apply 4 pounds 13-13-13 (2 quarts) at planting and sidedress with 2.5 pounds 13-13-13 (5 cups).

[13] Per 1,000 square feet broadcast 9 pounds triple superphosphate (4.5 quarts). Per 100 feet of row apply 0.4 pound N (1 pint 34-0-0 or equivalent) at planting and sidedress with 0.4 pound N.

[14] Per 1,000 square feet broadcast 3 pounds triple superphosphate (1.5 quarts). Per 100 feet of row apply 4 pounds 13-13-13 (2 quarts) at planting and sidedress with 0.4 pound N (1 pint 34-0-0 or equivalent).

[15] Per 1,000 square feet broadcast 3 pounds triple superphosphate (1.5 quarts). Per 100 feet of row apply 4 pounds 13-13-13 (2 quarts) at planting and sidedress with 2.5 pounds 13-13-13 (5 cups).

[16] Per 1,000 square feet broadcast 35 pounds 4-12-12 or equivalent at planting. Per 100 feet of row sidedress with 0.4 pound N (1 pint 34-0-0 or equivalent).

For small areas, comments give examples of ways to meet the fertilizer recommendations. Other fertilizer grades or materials that supply equivalent amounts of plant nutrients may be used with equal results. If you need assistance in calculating amounts of other materials to use, contact your county agent or fertilizer supplier.

NUTRIENT RECOMMENDATIONS FOR VEGETABLE GARDENS AND COMMERCIAL VEGETABLES

Commercial Vegetable Crops

Crop Code 61

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	120-0-0	120-0-60	120-0-120	120-0-180	120-0-180
	High	120-60-0	120-60-60	120-60-120	120-60-180	120-60-180
	Medium	120-120-0	120-120-60	120-120-120	120-100-180	120-120-180
	Low	120-180-0	120-180-60	120-180-120	120-180-180	120-180-180
	Very low	120-180-0	120-180-60	120-180-120	120-180-180	120-180-180

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	180 - 3.53x	180 - 1.49x
2	180 - 3.53x	180 - 0.99x
3	180 - 5.81x	180 - 0.75x
4	180 - 2.47x	180 - 0.75x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
120	2	3	2	2

* See Table A. ** See Table C. *** See Table B.

Comments:
For cauliflower, broccoli, and root crops, apply 1 pound of B per acre.

NUTRIENT RECOMMENDATIONS FOR VEGETABLE GARDENS AND COMMERCIAL VEGETABLES

Tomatoes

Crop Code 62

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	120-0-0	120-0-60	120-0-120	120-0-180	120-0-180
	High	120-60-0	120-60-60	120-60-120	120-60-180	120-60-180
	Medium	120-120-0	120-120-60	120-120-180	120-120-180	120-120-180
	Low	120-180-0	120-180-60	120-180-120	120-180-180	120-180-180
	Very low	120-180-0	120-180-60	120-180-120	120-180-180	120-180-180

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	180 - 3.53x	180 - 1.49x
2	180 - 3.53x	180 - 0.99x
3	180 - 5.81x	180 - 0.75x
4	180 - 2.47x	180 - 0.75x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
120	2	3	2	2

* See Table A. ** See Table C. *** See Table B.

Comments:

Apply 1,000 pounds of gypsum per acre to tomatoes before planting if calcium is rated low and no lime is recommended.

Apply 500 pounds of gypsum per acre to tomatoes before planting if calcium is rated medium and no lime is recommended.

NUTRIENT RECOMMENDATIONS FOR VEGETABLE GARDENS AND COMMERCIAL VEGETABLES

Sweet Potatoes

Crop Code 63

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	80-0-0	80-0-80	80-0-120	80-0-160	80-0-200
	High	80-40-0	80-40-80	80-40-120	80-40-160	80-40-200
	Medium	80-80-0	80-80-80	80-80-120	80-80-160	80-80-200
	Low	80-120-0	80-120-80	80-120-120	80-120-160	80-120-200
	Very low	80-160-0	80-160-80	80-160-120	80-160-160	80-160-200

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	160 - 3.14x	200 - 1.65x
2	160 - 3.14x	200 - 1.11x
3	160 - 5.16x	200 - 0.83x
4	160 - 2.19x	200 - 0.83x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
80	2	3	1	2

* See Table A. ** See Table C. *** See Table B.

Nutrient Recommendations for Vegetable Gardens and Commercial Vegetables

Irish Potatoes

Crop Code 64

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	120-50-0	120-50-100	120-50-150	120-50-200	120-50-200
	High	120-100-0	120-100-100	120-100-150	120-100-200	120-100-200
	Medium	120-150-0	120-150-100	120-150-150	120-150-200	120-150-200
	Low	120-200-0	120-200-100	120-200-150	120-200-200	120-200-200
	Very low	120-200-0	120-200-100	120-200-150	120-200-200	120-200-200

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	200 - 3.92x	200 - 1.67x
2	200 - 3.92x	200 - 1.11x
3	200 - 6.45x	200 - 0.83x
4	200 - 2.74x	200 - 0.83x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
120	2	3	4	3

* See Table A. ** See Table C. *** See Table B.

Comments:
Where Irish potatoes are grown in rotation with other crops, follow lime recommendation for Irish potatoes.

NUTRIENT RECOMMENDATIONS FOR VEGETABLE GARDENS AND COMMERCIAL VEGETABLES

Watermelons, Cantaloupes, Cucumbers, Lima Beans, Snap Beans, Bush Beans, Pole Beans, Squash, Okra

Crop Code 65

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	80-0-0	80-0-40	80-0-80	80-0-120	80-0-120
	High	80-40-0	80-40-40	80-40-80	80-40-120	80-40-120
	Medium	80-80-0	80-80-40	80-80-80	80-80-120	80-80-120
	Low	80-120-0	80-120-40	80-120-80	80-120-120	80-120-120
	Very low	80-120-0	80-120-40	80-120-80	80-120-120	80-120-120

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	120 - 2.4x	120 - 0.99x
2	120 - 2.4x	120 - 0.66x
3	120 - 4x	120 - 0.50x
4	120 - 1.67x	120 - 0.50x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
80	2	3	1	2

* See Table A. ** See Table C. *** See Table B.

NUTRIENT RECOMMENDATIONS FOR VEGETABLE GARDENS AND COMMERCIAL VEGETABLES

Sweet Corn

Crop Code 66

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	80-0-0	80-0-40	80-0-80	80-0-120	80-0-120
	High	80-40-0	80-40-40	80-40-80	80-40-120	80-40-120
	Medium	80-80-0	80-80-40	80-80-80	80-80-120	80-80-120
	Low	80-120-0	80-120-40	80-120-80	80-120-120	80-120-120
	Very low	80-120-0	80-120-40	80-120-80	80-120-120	80-120-120

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	120 - 2.4x	120 - 0.99x
2	120 - 2.4x	120 - 0.66x
3	120 - 4x	120 - 0.50x
4	120 - 1.67x	120 - 0.50x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
80	2	3	1	2

* See Table A. ** See Table C. *** See Table B.

Comments:
Apply 3 pounds of Zn per acre in corn fertilizer.

NUTRIENT RECOMMENDATIONS FOR VEGETABLE GARDENS AND COMMERCIAL VEGETABLES

Pepper

Pimiento, Bell, Hot

Crop Code 67

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	100-0-0	100-0-60	100-0-120	100-0-180	100-0-180
	High	100-60-0	100-60-60	100-60-120	100-60-180	100-60-180
	Medium	100-120-0	100-120-60	100-120-120	100-120-180	100-120-180
	Low	100-180-0	100-180-60	100-180-120	100-180-180	100-180-180
	Very low	100-180-0	100-180-60	100-180-120	100-180-180	100-180-180

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	180 - 3.53x	180 - 1.49x
2	180 - 3.53x	180 - 0.99x
3	180 - 5.81x	180 - 0.75x
4	180 - 2.47x	180 - 0.75x

* Use soil group from soil test report, if available.

** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
100	2	3	1	2

* See Table A. ** See Table C. *** See Table B.

N rate = 100 P level = 2 K level = 3 Lime code = 1 Mg code = 2

NUTRIENT RECOMMENDATIONS FOR VEGETABLE GARDENS AND COMMERCIAL VEGETABLES

Canola

Crop Code 68

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	160-0-0	160-0-0	160-0-60	160-0-90	160-0-120
	High	160-0-0	160-0-0	160-0-60	160-0-90	160-0-120
	Medium	160-60-0	160-60-0	160-60-60	160-60-90	160-60-120
	Low	160-100-0	160-100-0	160-100-60	160-100-90	160-100-120
	Very low	160-120-0	160-120-0	160-120-60	160-120-90	160-120-120

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	120 - 2.35x	120 - 1.48x
2	120 - 2.35x	120 - 0.99x
3	120 - 3.87x	120 - 0.75x
4	120 - 1.64x	120 - 0.63x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
160	2	2	1	2

* See Table A. ** See Table C. *** See Table B.

Comments:
Apply 40 to 50 pounds N per acre at planting in the fall and all the recommended P_2O_5 and K_2O. If canola follows a good legume crop in the fall (peanuts or soybeans), reduce the fall N application to 20 pounds per acre. Apply 90 to 120 pounds N per acre in February just prior to crop bolting. The spring N application should contain at least 10 pounds sulfur per acre.

On sandy soils where boron deficiency is likely (group 1 soils), include 1 pound boron (B) per acre with the fall fertilizer application.

NUTRIENT RECOMMENDATIONS FOR SHRUBS AND ORNAMENTALS

Shrubs and Perennial Flowers

Crop Code 80

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

Phosphorus (P) rating	Potassium (K) rating: Very high	High	Medium	Low	Very low
Very high	120-0-0[1]	120-0-0[1]	120-0-60[2]	120-0-120[3]	120-0-120[3]
High	120-0-0[1]	120-0-0[1]	120-0-60[2]	120-0-120[3]	120-0-120[3]
Medium	120-60-0[8]	120-60-0[8]	120-60-60[4]	120-60-120[5]	120-60-120[5]
Low	120-120-0[6]	120-120-0[6]	120-120-60[9]	120-120-120[7]	120-120-120[7]
Very low	120-120-0[6]	120-120-0[6]	120-120-60[9]	120-120-120[7]	120-120-120[7]

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	120 - 2.35x	120 - 0.99x
2	120 - 2.35x	120 - 0.67x
3	120 - 3.87x	120 - 0.50x
4	120 - 1.64x	120 - 0.50x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
120	2	3	1	2

* See Table A. ** See Table C. *** See Table B.

Comments:
One ton limestone per acre is approximately equivalent to 50 pounds per 1,000 square feet.

[1] Per 100 square feet apply 1 cup 34-0-0 or equivalent in early spring and repeat in early summer.

[2] Per 100 square feet apply 1 pint 15-0-15 or equivalent in early spring and then apply 1 cup 34-0-0 or equivalent in early summer.

[3] Per 100 square feet apply 1 pint 15-0-15 or equivalent in early spring and repeat in early summer.

[4] Per 100 square feet apply 1.5 pints 13-13-13 or equivalent in early spring and then apply 1 cup 34-0-0 or equivalent in early summer.

[5] Per 100 square feet apply 1.5 pints 13-13-13 or equivalent in early spring and then apply 1 pint 15-0-15 in early summer.

[6] Per 100 square feet apply 1.5 cups triple superphosphate or equivalent and 1 cup 34-0-0 or equivalent in early spring and then apply 1 cup 34-0-0 in early summer.

[7] Per 100 square feet apply 1.5 pints 13-13-13 or equivalent in early spring and repeat in early summer.

[8] Per 100 square feet apply 1 cup triple superphosphate or equivalent plus 1 cup 34-0-0 or equivalent in early spring then 1 cup 34-0-0 or equivalent in early summer.

[9] Per 100 square feet apply 1 cup triple superphosphate or equivalent plus 1.5 pints 13-13-13 or equivalent in early spring. Apply 1 cup 34-0-0 or equivalent in early summer.

For small areas, comments give examples of ways to meet the fertilizer recommendations. Other fertilizer grades or materials that supply equivalent amounts of plant nutrients may be used with equal results. If you need assistance in calculating amounts of other materials to use, contact your county agent or fertilizer supplier.

Shrubs: Final remark on liming. For shrubs such as azaleas, gardenias, and rhododendron, which require acid soil, do not apply lime. If the pH is below 5.0 you may wish to check with your county agent concerning the advisability of using a reduced rate of lime for these shrubs. Established shrubs may need little or no fertilization for maintenance. Reduce fertilizer use on shrubs that require excessive pruning.

Trees in the landscape: Trees in the landscape should not require special fertilization. If turfgrass, shrubs, goundcover, and ornamentals are fertilized as recommended above, any nearby trees will get adequate nutrients for normal growth.

NUTRIENT RECOMMENDATIONS FOR SHRUBS AND ORNAMENTALS

Azaleas, Gardenias, Rhododendrons

Crop Code 81

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	120-0-0[1]	120-0-0[1]	120-0-60[2]	120-0-120[3]	120-0-120[3]
	High	120-0-0[1]	120-0-0[1]	120-0-60[2]	120-0-120[3]	120-0-120[3]
	Medium	120-60-0[8]	120-60-0[8]	120-60-60[4]	120-60-120[5]	120-60-120[5]
	Low	120-120-0[6]	120-120-0[6]	120-120-60[9]	120-120-120[7]	120-120-120[7]
	Very low	120-120-0[6]	120-120-0[6]	120-120-60[9]	120-120-120[7]	120-120-120[7]

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	120 - 2.35x	120 - 0.99x
2	120 - 2.35x	120 - 0.67x
3	120 - 3.87x	120 - 0.50x
4	120 - 1.64x	120 - 0.50x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
120	2	3	0	2

* See Table A. ** See Table C. *** See Table B.

Comments:

[1] Per 100 square feet apply 1.5 cups ammonium sulfate (21-0-0) or equivalent in early spring and repeat in early summer.

[2] Per 100 square feet apply 1 pint 15-0-15 or equivalent in early spring and then apply 1.5 cups ammonium sulfate (21-0-0) or equivalent in early summer.

[3] Per 100 square feet apply 1 pint 15-0-15 or equivalent in early spring and repeat in early summer.

[4] Per 100 square feet apply 1.5 pints 13-13-13 or equivalent in early spring and then apply 1.5 cups ammonium sulfate (21-0-0) or equivalent in early summer.

[5] Per 100 square feet apply 1 quart 8-8-8 or equivalent in early spring and then apply 1 pint 15-0-15 in early summer.

[6] Per 100 square feet apply 1.5 cups triple superphosphate (0-45-0) or equivalent and 1.5 cups ammonium sulfate (21-0-0) or equivalent in early spring; then apply 1.5 cups ammonium sulfate in early summer.

[7] Per 100 square feet apply 1.5 pints 13-13-13 or equivalent in early spring and repeat in early summer.

[8] Per 100 square feet apply 1 cup triple superphosphate (0-45-0) or equivalent plus 1.5 cups ammonium sulfate (21-0-0) or equivalent in early spring then 1.5 cups ammonium sulfate or equivalent in early summer.

[9] Per 100 square feet apply 1 cup triple superphosphate (0-45-0) or equivalent plus 1 quart 8-8-8 or equivalent in early spring then apply 1.5 cups ammonium sulfate (21-0-0) or equivalent in early summer.

Established plants may need little or no fertilization for maintenance. Reduce fertilizer use on plants that require excessive pruning.

NUTRIENT RECOMMENDATIONS FOR SHRUBS AND ORNAMENTALS

Roses, Mums, Annual Flowers

Crop Code 82

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

Phosphorus (P) rating	Potassium (K) rating: Very high	High	Medium	Low	Very low
Very high	120-0-0[2]	120-0-0[2]	120-0-60[3]	120-0-120[4]	120-0-120[4]
High	120-0-0[2]	120-0-0[2]	120-0-60[3]	120-0-120[4]	120-0-120[4]
Medium	120-60-0[1]	120-60-0[1]	120-60-60[5]	120-60-120[9]	120-60-120[9]
Low	120-120-0[7]	120-120-0[7]	120-120-60[8]	120-120-120[9]	120-120-120[9]
Very low	120-120-0[7]	120-120-0[7]	120-120-60[8]	120-120-120[9]	120-120-120[9]

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	120 - 2.35x	120 - 0.99x
2	120 - 2.35x	120 - 0.67x
3	120 - 3.87x	120 - 0.50x
4	120 - 1.67x	120 - 0.50x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
120	2	3	1	2

* See Table A. ** See Table C. *** See Table B.

Comments:
One ton limestone per acre is approximately equivalent to 50 pounds per 1,000 square feet.

[1] Per 100 square feet apply 1 cup triple superphosphate or equivalent and 0.5 cup 34-0-0 equivalent when spring growth begins.

[2] Per 100 square feet apply 0.5 cup 34-0-0 or equivalent when spring growth begins and repeat monthly until August 1. If P is excessive, then fertilizers containing this element should not be used. Excessive P may cause an Fe deficiency. The symptoms occur as a general yellowing of new growth. To correct, spray with a soluble source of Fe, which can be found at garden supply stores.

[3] Per 100 square feet apply alternately 1 cup 15-0-15 or equivalent and 0.5 cup 34-0-0 or equivalent monthly starting when spring growth begins. Make last application about August 1. If P is excessive, then fertilizers containing this element should not be used. Ex-

cessive P may cause an Fe deficiency. The symptoms occur as a general yellowing of new growth. To correct, spray with a soluble source of Fe, which can be found at garden supply stores.

[4] Per 100 square feet apply 1 cup 15-0-15 when spring growth begins and repeat monthly until August 1. If P is excessive, then fertilizers containing this element should not be used. Excessive P may cause an Fe deficiency. The symptoms occur as a general yellowing of new growth. To correct, spray with a soluble source of Fe, which can be found at garden supply stores.

[5] Per 100 square feet apply 2 cups 8-8-8 and 0.5 cup 34-0-0 or equivalent at monthly intervals starting when spring growth begins. Make last application about August 1.

[6] Per 100 square feet apply 2 cups 8-8-8 or equivalent and 1 cup 15-0-15 or equivalent at monthly intervals starting when spring growth begins. Make last application about August 1.

[7] Per 100 square feet apply 1.5 cups triple superphosphate or equivalent and 0.5 cup 34-0-0 or equivalent when spring growth begins. Repeat 34-0-0 monthly until August 1.

[8] Per 100 square feet apply 1/2 cup triple superphosphate or equivalent as corrective treatment. Then apply alternately 2 cups 8-8-8 and 0.5 cup ammonium nitrate or equivalent at monthly intervals starting when spring growth begins. Make the last application about August 1.

[9] Per 100 square feet apply 1.5 cups 8-8-8 or equivalent when spring growth begins and repeat monthly until August1.

For small areas, comments give examples of ways to meet the fertilizer recommendations. Other fertilizer grades or materials that supply equivalent amounts of plant nutrients may be used with equal results. If you need assistance in calculating amounts of other materials to use, contact your county agent or fertilizer supplier.

NUTRIENT RECOMMENDATIONS FOR FRUITS, ORCHARD CROPS, AND TREES

Christmas Trees

Eastern Red Cedar, Virginia Pines, Pines, Arizona Cypress, Leyland Cypress

Crop Code 85

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	0-0-0	0-0-0	0-0-40	0-0-60	0-0-80
	High	0-0-0	0-0-0	0-0-40	0-0-60	0-0-80
	Medium	0-40-0	0-40-0	0-40-40	0-40-60	0-40-80
	Low	0-60-0	0-60-0	0-60-40	0-60-60	0-60-80
	Very low	0-80-0	0-80-0	0-80-40	0-80-60	0-80-80

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	80 - 1.57x	80 - 0.66x
2	80 - 1.57x	80 - 0.44x
3	80 - 2.64x	80 - 0.33x
4	80 - 1.10x	80 - 0.33x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
0	2	1	4	3

* See Table A. ** See Table C. *** See Table B.

Comments:

Apply dolomitic lime and P and K fertilizer as recommended and work into the soil before planting. No N is needed at planting. After the first year, make applications of up to 30 pounds N per acre as needed to give desired growth.

NUTRIENT RECOMMENDATIONS FOR FRUITS, ORCHARD CROPS, AND TREES

Strawberries

Crop Code 89

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	120-0-0	120-0-60	120-0-120	120-0-180	120-0-180
	High	120-60-0	120-60-60	120-60-120	120-60-180	120-60-180
	Medium	120-120-0	120-120-60	120-120-120	120-120-180	120-120-180
	Low	120-180-0	120-180-60	120-180-120	120-180-180	120-180-180
	Very low	120-180-0	120-180-60	120-180-120	120-180-180	120-180-180

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	180 - 3.53x	180 - 1.49x
2	180 - 3.53x	180 - 0.99x
3	180 - 5.81x	180 - 0.75x
4	180 - 2.47x	180 - 0.75x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
120	2	3	1	2

* See Table A. ** See Table C. *** See Table B.

Comments:

For matted row system (established plantings) at renovation, just as soon as the plants stop fruiting, apply 40 to 50 pounds N; then apply 30 to 45 pounds N in late August or early September. A 20-pound N topdressing in February may be useful in sandy soils.

For annual hill plasticulture system, plants require about 150 pounds N for the entire production season with approximately one-third (about 50 pounds N) being applied dry preplant in the beds. The remaining two-thirds (approximately 100 pounds N) is supplied by injection through the drip irrigation system. About 50 to 100 percent of the K and all recommended P are applied preplant. K can be injected along with N.

NUTRIENT RECOMMENDATIONS FOR FRUITS, ORCHARD CROPS, AND TREES

Peaches

Crop Code 90

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

Phosphorus (P) rating	Potassium (K) rating: Very high	High	Medium	Low	Very low
Very high	*-0-0	*-0-0	*-0-30	*-0-60	*-0-90
High	*-0-0	*-0-0	*-0-30	*-0-60	*-0-90
Medium	*-30-0	*-30-0	*-30-30	*-30-60	*-30-90
Low	*-60-0	*-60-0	*-60-30	*-60-60	*-60-90
Very low	*-60-0	*-60-0	*-60-30	*-60-60	*-60-90

* Rate is given in pounds of N-P_2O_5-K_2O per acre, and N application rate is variable.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	60 - 1.18x	90 - 1.12x
2	60 - 1.18x	90 - 0.75x
3	60 - 1.94x	90 - 0.56x
4	60 - 0.82x	90 - 0.47x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
Variable	2	2	2	2

* See Table A. ** See Table C. *** See Table B.

Comments:

For establishing new orchards, apply lime and P and K fertilizer as recommended and turn to a depth of 12 to 16 inches; then repeat the application and disk into the topsoil. Broadcast 20 to 25 pounds Zn (50 to 70 pounds 36 percent Zn sulfate) per acre and disk into topsoil when establishing new plantings. No soil applications of zinc are usually needed on old orchard or cropland. Maintain soil pH at about 6.5 by re-liming as needed by soil test.

For annual maintenance, apply P and K fertilizer as recommended. For the first and second leaf apply 0.08 pound N (4 ounces 34-0-0 or equivalent) per tree per year of age about February 15; then repeat two or three times at six-week intervals beginning at initiation of new growth. In third leaf apply 0.6 pound N (1.75 pounds 34-0-0) per tree, in fourth leaf apply 0.8 pound N (2.33 pounds 34-0-0), and in fifth leaf or older apply 1 pound N (3 pounds 34-0-0) per tree. Beginning in third leaf apply two-thirds of the N in February and one-third of the N after harvest.

NUTRIENT RECOMMENDATIONS FOR FRUITS, ORCHARD CROPS, AND TREES

Muscadine Grapes

Crop Code 91

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	*-0-0	*-0-0	*-0-30	*-0-60	*-0-90
	High	*-0-0	*-0-0	*-0-30	*-0-60	*-0-90
	Medium	*-30-0	*-30-0	*-30-30	*-30-60	*-30-90
	Low	*-60-0	*-60-0	*-60-30	*-60-60	*-60-90
	Very low	*-60-0	*-60-0	*-60-30	*-60-60	*-60-90

* Rate is given in pounds of N-P_2O_5-K_2O per acre, and N application rate is variable.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	60 - 1.18x	90 - 1.12x
2	60 - 1.18x	90 - 0.75x
3	60 - 1.94x	90 - 0.56x
4	60 - 0.82x	90 - 0.47x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
Variable	2	2	2	2

* See Table A. ** See Table C. *** See Table B.

Comments:
Apply P and K as recommended above and maintain pH in range of 6.0 to 7.0 by liming as needed according to soil test.

Nitrogen (N) should be applied as follows: In first and second year apply 0.04 pound N (2 ounces 34-0-0 or equivalent) per plant per year of age in February and repeat in May and early July.

In third year apply 0.16 pound N (0.5 pound 34-0-0 or equivalent) per plant in March and repeat in late May after fruit set.

In fourth year and later apply 0.32 pound N (1 pound 34-0-0 or equivalent) in March and 0.16 pound N per plant per year of age in late May up to a maximum application of 0.55 pound N per plant or 100 pounds N per acre.

NUTRIENT RECOMMENDATIONS FOR FRUITS, ORCHARD CROPS, AND TREES

Apples, Pears

Crop Code 92

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	*-0-0	*-0-0	*-0-30	*-0-60	*-0-90
	High	*-0-0	*-0-0	*-0-30	*-0-60	*-0-90
	Medium	*-30-0	*-30-0	*-30-30	*-30-60	*-30-90
	Low	*-60*0	*-60-0	*-60-30	*-60-60	*-60-90
	Very low	*-60-0	*-60-0	*-60-30	*-60-60	*-60-90

* Rate is given in pounds of N-P_2O_5-K_2O per acre, and N application rate is variable.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	60 - 1.18x	90 - 1.12x
2	60 - 1.18x	90 - 0.75x
3	60 - 1.94x	90 - 0.56x
4	60 - 0.82x	90 - 0.47x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
Variable	2	2	2	2

* See Table A. ** See Table C. *** See Table B.

Comments:

For establishing new orchards, apply lime and P and K fertilizer as recommended and turn to depth of 12 to 16 inches, then repeat the application and disk into topsoil. Maintain soil pH in range of 6.0 to 7.0 by re-liming as indicated by soil test.

For annual maintenance, apply P and K fertilizer as recommended. For young trees apply 0.1 pound N (10 ounces calcium nitrate) per tree and for trees 10 years or older apply 35 pounds N per acre. (Calcium nitrate is recommended as a source of N for apple.)

Zinc: To correct Zn deficiency in apples apply 0.08 pound Zn (0.24 pound zinc sulfate) per tree. Broadcast 20 to 25 pounds Zn (50 to 70 pounds 36 percent zinc sulfate) per acre and disk into topsoil when establishing new plantings. No soil applications of zinc are usually needed on old orchards or cropland.

Boron: Make two sprays using 1 pound Solubor® or equivalent per 100 gallons of water. Begin at petal fall and repeat two weeks later. If B sprays are not used, make a soil application of 2 pounds B per acre annually.

Calcium: Make four sprays using either 3 pounds calcium nitrate or 2 pounds calcium chloride per 100 gallons of water. Begin two weeks after petal fall and repeat three times at two-week intervals.

For bitter pit: If calcium sprays are not made in early spring they should be applied as recommended above beginning eight weeks prior to anticipated harvest.

NUTRIENT RECOMMENDATIONS FOR FRUITS, ORCHARD CROPS, AND TREES

Plums

Crop Code 93

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

Phosphorus (P) rating	Potassium (K) rating: Very high	High	Medium	Low	Very low
Very high	*-0-0	*-0-0	*-0-30	*-0-60	*-0-90
High	*-0-0	*-0-0	*-0-30	*-0-60	*-0-90
Medium	*-30-0	*-30-0	*-30-30	*-30-60	*-30-90
Low	*-60-0	*-60-0	*-60-30	*-60-60	*-60-90
Very low	*-60-0	*-60-0	*-60-30	*-60-60	*-60-90

* Rate is given in pounds of N-P_2O_5-K_2O per acre, and N application rate is variable.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	60 - 1.18x	90 - 1.12x
2	60 - 1.18x	90 - 0.75x
3	60 - 1.94x	90 - 0.56x
4	60 - 0.82x	90 - 0.47x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
Variable	2	2	2	2

* See Table A. ** See Table C. *** See Table B.

Comments:

For establishing new orchards, apply lime and P and K fertilizer as recommended and turn to a depth of 12 to 16 inches; then repeat the application and disk into the topsoil. Broadcast 20 to 25 pounds Zn (50 to 70 pounds 36 percent zinc sulfate) per acre and disk into topsoil when establishing new plantings. No soil applications of zinc are usually needed on old orchards or cropland.

For annual maintenance, apply P and K fertilizer as recommended. For the first and second leaf apply 0.08 pound N (4 ounces 34-0-0 or equivalent) per tree per year of age about February 15; then repeat two or three times at six-week intervals beginning at initiation of new growth. In third leaf apply 0.6 pound N (1.75 pounds ammonium nitrate) per tree (4 pounds ammonium nitrate) per tree. Beginning in third leaf, apply two-thirds of the N in February and one-third of the N after harvest. If borated fertilizer is not used to supply boron, apply 1 pound B per acre or 5 tablespoons borax per tree.

Nutrient Recommendations for Fruits, Orchard Crops, and Trees

Pecans

Crop Code 94

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

Phosphorus (P) rating	Potassium (K) rating: Very high	High	Medium	Low	Very low
Very high	*-0-0	*-0-0	*-0-30	*-0-60	*-0-90
High	*-0-0	*-0-0	*-0-30	*-0-60	*-0-90
Medium	*-30-0	*-30-0	*-30-30	*-30-60	*-30-90
Low	*-60-0	*-60-0	*-60-30	*-60-60	*-60-90
Very low	*-60-0	*-60-0	*-60-30	*-60-60	*-60-90

* Rate is given in pounds of N-P_2O_5-K_2O per acre, and N application rate is variable.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	60 - 1.18x	90 - 1.12x
2	60 - 1.18x	90 - 0.75x
3	60 - 1.94x	90 - 0.56x
4	60 - 0.82x	90 - 0.47x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
Variable	2	2	2	2

* See Table A. ** See Table C. *** See Table B.

Comments:

Apply P and K fertilizer as recommended above. For trees 20 years old or older, apply 6 to 8 pounds N (20 to 25 pounds 34-0-0 or equivalent) per tree or broadcast 100 pounds N per acre in August. For younger trees apply 0.34 pound N (1 pound 34-0-0 or equivalent) per tree per year of age. For trees four years old and older showing zinc deficiency, apply 10 pounds of zinc (Zn) (28 pounds 36 percent zinc sulfate) per acre. In addition, apply two to four foliar sprays of 36 percent zinc sulfate at the rate of 2 pounds per 100 gallons of water during April and early May the first year after soil application. Thereafter, monitor Zn leaf levels by leaf analysis. For younger trees apply 0.1 pound of Zn sulfate per tree per year of age. In irrigated orchards, banding the zinc in a narrow 4-inch wide band on top of emitter or microsprinkler wetted zones improves uptake.

Full benefit from fertilization will not be obtained unless trees are irrigated and a good spray program for disease and insect control is followed.

NUTRIENT RECOMMENDATIONS FOR FRUITS, ORCHARD CROPS, AND TREES

Home Orchards

Crop Code 95

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	*-0-0[1]	*-0-0[1]	*-0-50[2]	*-0-50[2]	*-0-50[2]
	High	*-0-0[1]	*-0-0[1]	*-0-50[2]	*-0-50[2]	*-0-50[2]
	Medium	*-50-0[3]	*-50-50[4]	*-50-50[4]	*-50-50[4]	*-50-50[4]
	Low	*-50-50[4]	*-50-50[4]	*-50-50[4]	*-50-50[4]	*-50-50[4]
	Very low	*-50-50[4]	*-50-50[4]	*-50-50[4]	*-50-50[4]	*-50-50[4]

* Rate is given in pounds of N-P_2O_5-K_2O per acre, and N application rate is variable.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	50 - 0.98x	50 - 0.62x
2	50 - 0.98x	50 - 0.42x
3	50 - 1.61x	50 - 0.31x
4	50 - 0.68x	50 - 0.26x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
Variable	2	2	2	2

* See Table A. ** See Table C. *** See Table B.

Comments:
One ton limestone per acre is approximately equivalent to 50 pounds per 1,000 square feet.

[1] No P or K needed. Apply N for individual trees as recommended below.

[2] Per 1,000 square feet apply 2 pounds (1 quart) muriate of potash (0-0-60); then apply N for individual trees as recommended below.

[3] Per 1,000 square feet apply 2.5 pounds (5 cups) triple superphosphate (0-45-0) or equivalent. Apply N for individual plants as recommended below.

[4] Per 1,000 square feet apply 8 pounds (4 quarts) 0-14-14 or equivalent. Apply N for individual trees as recommended below.

Apply nitrogen for individual plants as follows:

Peaches, plums, pecans: Apply 0.16 pound N (1 cup 34-0-0 or equivalent) per plant per year of age up to a maximum of 1 pound N per tree for peaches, 0.8 pound N per tree for plums, and 10 pounds N per tree for pecans.

Pears: Apply 0.06 pound N (¼ cup 34-0-0 or equivalent) per tree per year of age up to a maximum of 0.56 pound N (3 cups 34-0-0) per tree. If fire blight is a problem on pears, reduce or eliminate the N application.

Apples: Apply 0.08 pound N (⅓ cup 34-0-0 or equivalent) per plant per year of age up to a maximum of 0.56 pound N (3 cups 34-0-0) per plant. If fire blight is a problem on apples, reduce or eliminate the N application.

Figs, grapes: Apply 0.04 pound N (¼ cup 34-0-0 or equivalent) per plant per year of age up to a maximum of 0.56 pound N (3 cups 34-0-0) per plant.

Strawberries: Apply 0.3 pound N (2 cups 34-0-0 or equivalent) per 100 feet of row in October; repeat 90 days before ripening and again after harvest.

Blackberries: Apply 1 to 1.3 pounds N (3 to 4 pints 34-0-0 or equivalent) per 100 feet of row in February and repeat after harvest.

Blueberries: Apply 0.02 pound N (about ¼ cup ammonium sulfate (21-0-0) per plant per year of age up to a maximum of 0.14 pounds N per plant (1 cup ammonium sulfate or equivalent) split into two applications—one in February and one after harvest. Ammonium N sources are recommended for blueberries. Do not lime blueberries.

Note: For plants not mentioned above use the recommendations for plants with similar growth characteristics.

For small areas, comments give examples of ways to meet the fertilizer recommendations. Other fertilizer grades or materials that supply equivalent amounts of plant nutrients may be used with equal results. If you need assistance in calculating amounts of other materials to use, contact your county agent or fertilizer supplier.

NUTRIENT RECOMMENDATIONS FOR FRUITS, ORCHARD CROPS, AND TREES

Commercial Blueberries

Crop Code 96

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

Phosphorus (P) rating	Potassium (K) rating: Very high	High	Medium	Low	Very low
Very high	*-0-0	*-0-0	*-0-50	*-0-50	*-0-50
High	*-0-0	*-0-0	*-0-50	*-0-50	*-0-50
Medium	*-50-0	*-50-50	*-50-50	*-50-50	*-50-50
Low	*-50-0	*-50-50	*-50-50	*-50-50	*-50-50
Very low	*-50-0	*-50-50	*-50-50	*-50-50	*-50-50

* Rate is given in pounds of N-P_2O_5-K_2O per acre, and N application rate is variable.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	50 - 2.50x	50 - 1.19x
2	50 - 2.50x	50 - 0.81x
3	50 - 4.17x	50 - 0.62x
4	50 - 1.79x	50 - 0.41x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
Variable	1	1	0	3

* See Table A. ** See Table C. *** See Table B.

Comments:
Apply P and K as recommended in February.

Apply nitrogen as follows: During first two years, apply 0.01 pound N (0.05 pound ammonium sulfate, 21-0-0, or equivalent) per plant per year of age in February, April, and June. Beginning in third year, apply 0.01 pound N (0.05 pound ammonium sulfate) per plant per year of age in February, April, and again after harvest up to a maximum of 0.07 pound N per application or 0.14 pound N per year.

NUTRIENT RECOMMENDATIONS FOR FRUITS, ORCHARD CROPS, AND TREES

Commercial Blackberries

Crop Code 97

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	100-0-0	100-0-0	100-0-30	100-0-60	100-0-90
	High	100-0-0	100-0-0	100-0-30	100-0-60	100-0-90
	Medium	100-30-0	100-30-0	100-30-30	100-30-60	100-30-90
	Low	100-60-0	100-60-0N	100-60-30	100-60-60	100-60-60
	Very low	100-60-0	100-60-0	100-60-30	100-60-60	100-60-90

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	60 - 1.18x	90 - 0.75x
2	60 - 1.18x	90 - 0.50x
3	60 - 1.94x	90 - 0.38x
4	60 - 0.82x	90 - 0.38x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
100	2	3	1	3

* See Table A. ** See Table C. *** See Table B.

Comments:
Apply 35 to 40 pounds N per acre or approximately 0.4 pound N per 100 feet of row and the recommended phosphorus (P_2O_5) and potassium (K_2O) in late winter or early spring. Apply fertilizer in a 3- to 4-foot wide band under the row. Repeat the N application after harvest. Where additional primocane growth is needed in the fall on trellised blackberries, repeat the N application by August 15 in North Alabama, September 1 in Central Alabama, and September 15 in South Alabama for a total of approximately 100 pounds N per acre per year. Fertilization late in the season may increase the chances of damage from early freezes. Well-managed irrigation and weed control are necessary for the plants to use nutrients efficiently.

For organic blackberry production, some of the N, P, and K can be satisfied by applying compost mulch (approximately 1-1-1). Cottonseed meal (6-1-1), feather meal (approximately 12-0-0), fish meal (approximately 9-3-6), etc. are high in N and would be good choices for stimulating primocane growth. For example, approximately 6 pounds cottonseed meal per 100 feet of row will provide the required 40 pounds N per acre per application. It would also add about 6 pounds P_2O_5 and 6 pounds K_2O per acre. Fish emulsion (approximately 5-1-1) can be injected into an irrigation system for organic fertigation.

NUTRIENT RECOMMENDATIONS FOR FRUITS, ORCHARD CROPS, AND TREES

Commercial Pine Plantations

Crop Code 100

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

Phosphorus (P) rating	Potassium (K) rating: Very high	High	Medium	Low	Very low
Very high	0-0-0[1]	0-0-0[1]	0-0-0[1]	0-0-0[1]	0-0-[1,4]
High	0-0-0[1]	0-0-0[1]	0-0-0[1]	0-0-0[1]	0-0-[1,4]
Medium	40-90-0[2]	40-90-0[2]	40-90-0[2]	40-90-0[2,4]	40-90-[2,4]
Low	60-120-0[3]	60-120-0[3]	60-120-0[3]	60-120-0[3,4]	60-120-[3,4]
Very low	60-150-0[3]	60-150-0[3]	60-150-0[3]	60-150-0[3,4]	60-150-[3,4]

* Rate is given in pounds of N-P_2O_5-K_2O per acre, and N application rate is variable.

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
Variable	1	1	4	1

* See Table A. ** See Table C. *** See Table B.

Comments:

Fertilization is recommended only where good silvicultural practices are used and trees are grown as a commercial crop. **Good weed control must be practiced!**

[1] If soil test P = High or Very High: No fertilization is needed at planting. Apply approximately 200 pounds N per acre after first thinning and 200 to 300 pounds N per acre after second thinning.

[2] If soil test P = Medium: Apply recommended N and P three months after planting. Diammonium phosphate (18-46-0) is generally used for pine fertilization. Apply approximately 200-120-0 pounds N-P_2O_5-K_2O per acre after first thinning and 200 to 300 pounds N per acre after second thinning.

[3] If soil test P = Low or Very Low: Apply recommended N and P three months after planting. Diammonium phosphate (18-46-0) is generally used for pine fertilization. Apply approximately 200-120-0 pounds N-P_2O_5-K_2O per acre after first thinning and 200 to 300 pounds N per acre and 60 pounds P_2O_5 after second thinning.

[4] Pine trees do not respond to K fertilization but at Low and Very Low soil K levels, some K may be included in the fertilizer.

NUTRIENT RECOMMENDATIONS FOR WILDLIFE PLOTS

Wildlife Food Plots, Cool Season Annual Grasses, Legumes

Small Grain, Ryegrass, Clovers, Vetch
Crop Code 101

Amount of N-P_2O_5-K_2O Needed Per Acre Based on P and K Ratings*

		Potassium (K) rating				
		Very high	High	Medium	Low	Very low
Phosphorus (P) rating	Very high	60-0-0	60-0-0	60-0-60	60-0-100	60-0-120
	High	60-0-0	60-0-0	60-0-60	60-0-100	60-0-120
	Medium	60-60-0	60-60-0	60-60-60	60-60-100	60-60-120
	Low	60-100-0	60-100-0	60-100-60	60-100-100	60-100-120
	Very low	60-120-0	60-120-0	60-120-60	60-120-100	60-120-120

* Rate is given in pounds of N-P_2O_5-K_2O per acre.

For more precise fertilizer recommendations, use the equations in the following table for your soil group.

Fertilizer Recommendation Formulas

Soil group*	P_2O_5 Equation**	K_2O Equation**
1	120 - 2.35x	120 - 1.48x
2	120 - 2.35x	120 - 0.99x
3	120 - 3.87x	120 - 0.75x
4	120 - 1.64x	120 - 0.63x

* Use soil group from soil test report, if available.
** Use equation to determine pounds of fertilizer P_2O_5 or K_2O per acre required; x = soil test P or K

Fertilizer Requirement Levels and Recommendation Codes

N rate	P level*	K level*	Lime code**	Mg code***
60	2	2	1	1

* See Table A. ** See Table C. *** See Table B.

Comments:
For best results, cool-season annual grasses and legumes (clover, vetch, small grains, ryegrass) should be planted, established, and fertilized in September. Apply recommended ground limestone and incorporate into soil before planting. Fertilizer may be applied at planting or after a stand is established. If additional spring growth is desired, apply 60 pounds of N in late winter or early spring unless the legume occupies one-half or more of the ground cover.

APPENDIX A. EXAMPLES OF SOIL TEST REPORTS AVAILABLE FROM THE AU SOIL TESTING LABORATORY

The AU Soil Testing Laboratory can provide reports in several different formats:

Graphic format is used mainly for gardens, lawns, and shrubs. A sample's results can be printed on a single sheet of paper and test values, lime and fertilizer recommendations, and comments are presented graphically for easier interpretation. This format is also included as an Adobe.pdf attachment to e-mails.

Text format is the traditional way of reporting results. This includes a rating for each nutrient (very low, low, medium, high, very high, extremely high) for the crops to be grown (see crop codes) plus lime and fertilizer recommendations and comments. Several samples and/or crop recommendations can be printed on a single page.

Spreadsheet. For large numbers of samples where interpretation is not needed, results can be sent electronically as a MS Excel Spreadsheet.

Special formats. For large number of samples, the sender may contact the lab directly and have the report sent electronically in any number of special formats for precision agriculture application software.

ALABAMA COOPERATIVE Extension SYSTEM Your Experts for Life

Report on Soil Test

Auburn University Soil Testing Laboratory

Auburn University, AL 36849-5411

Myfirstname Mylastname
1234 Mystreet
Mycity, AL 36849

County:Lee
District:2

SOIL TEST RESULTS

LAB No.	Test Date	Sender's Sample Designation	Crop	Soil Group*	pH**
00070	10/01/12	My Sample	Bermuda Lawn	2	6.1

Recommendations for Bermuda Lawn:

Ground Agricultural Limestone = 0.0 tons/acre

Fertilizer N-P_2O_5 -K_2O = 80-0-40 pounds/acre

Soil pH = 6.1

Phosphorus*** P = 349 lb/acre

Potassium*** K = 100 lb/acre

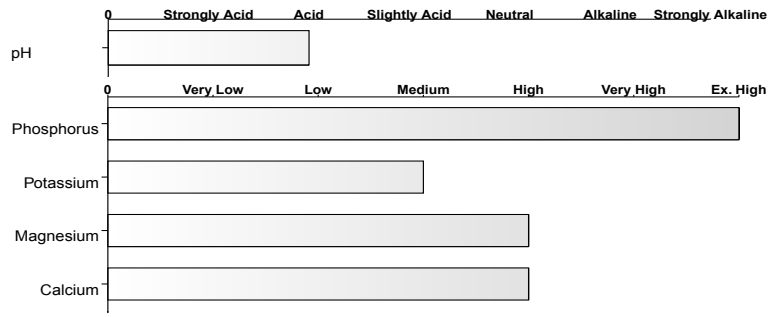
Magnesium*** Mg = 123 lb/acre

Calcium*** Ca = 1056 lb/acre

See Comment 1

See Comment 2

Lab Result



Method of Analysis = Mehlich-1

Comment No.1: Per 1,000 sq. ft. apply 6 pounds 15-0-15, or equivalent low phosphorus fertilizer, when spring growth begins and apply 1 pound N (3 pounds 34-0-0 or equivalent) in mid-summer. If more growth or better color is desired, make additional applications of 1 pound N at 2-month intervals. A pint of dry fertilizer is approximately 1 pound.

Comment No.2: Final remark - For small areas, comments give examples of ways to meet the fertilizer recommendations. Other fertilizer grades or materials that supply equivalent amounts of plant nutrients may be used with equal results. If you need assistance in calculating amounts of other materials to use, contact your county agent or fertilizer supplier. A pint of dry fertilizer is approximately 1 pound.

The number of samples processed in this report is: 1

For further information call your county agent: (334) 749-3353

* 1. Sandy soil (CEC ‹ 4.6 $cmol_c kg^{-1}$)

* 2. Loams and Light clays (CEC = 4.6-9.0 $cmol_c kg^{-1}$)

* 3. Clays and soils high in organic matter (CEC > 9.0 $cmol_c kg^{-1}$)

* 4. Clays of the Blackbelt (CEC > 9.0 $cmol_c kg^{-1}$)

** 7.4 or higher - Alkaline - - - - - - - - - - - - - - - 6.6-7.3 - Neutral - - - - - - - - - - - - - - 6.5 or lower - Acid - - - - - - - - - - - - -5.5 or lower - Strong Acid

*** Extractable nutrients in pounds per acre

If soil group = 1, 2 or 3, Method of Analysis = Mehlich-1. If soil group = 4, Method of Analysis = Miss/Lancaster.

Approved by: Joseph Hulcher Print Date: October 3, 2012 Page 1 of 1

Figure 1. Example of soil test report in a graphic format.

Report on Soil Test

Auburn University Soil Testing Laboratory

Auburn University, AL 36849-5411

Myfirstname Mylastname

1234 Mystreet

Mycity, AL 36849

County:Lee

District:2

						SOIL TEST RESULTS				RECOMMENDATIONS			
LAB No.	Test Date	Sample Designation	Crop	Soil Group*	pH**	Phosphorus P***	Potassium K***	Magnesium Mg***	Calcium Ca***	LIME-STONE	N	P_2O_5	K_2O
						Pounds/Acre				Tons/Acre	Pounds/Acre		
00070	10/01/12	My Sample See Comments 1,2,3	Alfalfa	2	6.1	EH 349	M 100	H 123	H 1056	1.5	0	0	130
		My Sample See Comment 4	Bermuda Hay	2	6.1	EH 349	M 100	H 123	H 1056	0.0	100	0	200
		My Sample See Comment 5	Bermuda Pasture	2	6.1	EH 349	M 100	H 123	H 1056	0.0	60	0	40

Comment No.1: Soil acidity (low pH) can be corrected with either dolomitic or calcitic lime.

Comment No.2: For established alfalfa, apply 3 pounds boron (B) per acre annually. Recommended P2O5 and half the K2O should be applied in early spring with the remainder of the K2O applied after the second cutting. If soil test K is medium (M) or high (H), apply a total of at least 50 pounds K2O per ton of anticipated hay removed.

Comment No.3: For alfalfa establishment, incorporate the recommended amount of lime, P2O5, and K2O prior to planting in the fall. Soil pH and fertility status should be monitored annually.

Comment No.4: For bermuda or bahiagrass hay, apply N, P, and K as recommended before growth begins in spring. After each cutting up to September 1, apply 50 pounds N per ton of anticipated hay removed at the next cutting. Loss of stand is sometimes due to K deficiency. Where large yields of hay are removed, apply 40 pounds K2O per ton of hay removed the previous season.

Comment No.5: On summer grass pastures apply P and K as recommended and 60 pounds of N before growth starts. Repeat the N application up to September 1 when more growth is desired. If less than 40 pounds of N is applied annually, then no P or K is needed.

The number of samples processed in this report is: 1

For further information call your county agent: (334) 749-3353

* 1. Sandy soil (CEC ‹ 4.6 $cmol_c kg^{-1}$)

* 2. Loams and Light clays (CEC = 4.6-9.0 $cmol_c kg^{-1}$)

* 3. Clays and soils high in organic matter (CEC > 9.0 $cmol_c kg^{-1}$)

* 4. Clays of the Blackbelt (CEC > 9.0 $cmol_c kg^{-1}$)

** 7.4 or higher - Alkaline - - - - - - - - - - - - - - 6.6-7.3 - Neutral - - - - - - - - - - - - - 6.5 or lower - Acid - - - - - - - - - - - - -5.5 or lower - Strong Acid

*** Extractable nutrients in pounds per acre

If soil group = 1, 2 or 3, Method of Analysis = Mehlich-1. If soil group = 4, Method of Analysis = Miss/Lancaster.

Approved by:

Print Date: October 4, 2012

Page 1 of 1

Figure 2. Example of soil test report in a text format.

Grower Name	Lab ID	Sample ID	Crop	Soil Grp	pH	Buffer pH	P*	K*	Mg*	Ca*	Test Date	Recommendations				
												Lime	N	P2O5	K2O	CEC
Your name	Year lab#	1	Corn	3	5.6	7.45	15	264	193	1967	Year month day	2.0	120	40	0	10.45
Your name	Year lab#	2	Corn	3	6	7.47	2	96	174	2173	Year month day	0.0	120	70	40	10.51
Your name	Year lab#	3	Corn	3	5.5	7.4	2	64	191	2030	Year month day	2.5	120	70	50	10.74
Your name	Year lab#	4	Corn	3	5.1	7.24	2	51	193	1574	Year month day	3.5	120	70	60	10.87
Your name	Year lab#	5	Corn	3	6.4	7.53	40	235	137	2539	Year month day	0.0	120	0	0	10.97
Your name	Year lab#	6	Corn	3	6.6	7.49	10	129	140	2799	Year month day	0.0	120	50	40	11.82
Your name	Year lab#	7	Corn	3	6.6	7.56	8	95	117	2426	Year month day	0.0	120	60	40	10.19
Your name	Year lab#	8	Corn	2	6.5	7.57	6	81	107	1850	Year month day	0.0	120	70	40	8.61
Your name	Year lab#	9	Corn	3	5.4	7.42	14	205	165	2276	Year month day	2.5	120	40	0	11.27
Your name	Year lab#	10	Corn	3	5.6	7.36	3	68	162	2028	Year month day	2.5	120	70	50	10.94
Your name	Year lab#	11	Corn	3	5.4	7.35	3	51	181	1723	Year month day	3.0	120	70	60	10.32
Your name	Year lab#	12	Corn	3	5.4	7.35	3	45	234	1526	Year month day	3.0	120	70	60	10.04
Your name	Year lab#	13	Corn	3	6.6	7.64	46	167	147	2949	Year month day	0.0	120	0	0	11.07
Your name	Year lab#	14	Corn	3	6.8	7.62	16	91	110	2385	Year month day	0.0	120	40	40	9.57
Your name	Year lab#	15	Corn	2	6.7	7.62	6	66	104	2061	Year month day	0.0	120	70	40	8.71

P*=phosphorus; K*=potassium; Mg*=magnesium; Ca*=calcium all in lbs/A

Figure 3. Example of soil test report in an MS Excel spreadsheet.

APPENDIX B. LIME TABLES

The following tables can be used to estimate agricultural limestone requirement to raise the soil pH to a target pH of 5.5, 6.0, 6.5, or 7.0. Values in these tables assume the following:

1. An acre furrow slice, 6-inch deep weighs 2 million pounds.

2. Limestone is mixed with an 8-inch furrow slice e.g. 2,670,000 pounds of soil per acre.

3. Recommended, ground agricultural limestone has an effective calcium carbonate equivalency of 63 percent of pure $CaCO_3$. This is the calculated value for minimum quality agricultural limestone as regulated by the Alabama Department of Agriculture and Industries.

4. Values are rounded off to the nearest 100 pounds of ground limestone.

	Target pH = 5.5						
	Hundreds of pounds of ag. lime at different water pH						
Buffer pH	5.4	5.3	5.2	5.1	5	4.9	4.8
7.9	1	2	3	4	5	7	7
7.8	2	4	7	9	11	14	15
7.7	3	7	10	13	16	20	22
7.6	5	9	13	17	22	27	29
7.5	6	11	16	21	27	34	36
7.4	7	13	20	26	32	41	44
7.3	8	16	23	30	38	47	51
7.2	9	18	26	34	43	54	58
7.1	10	20	29	39	48	61	65

	Target pH = 6.0											
	Hundreds of pounds of ag lime at different water pH											
Buffer pH	5.9	5.8	5.7	5.6	5.5	5.4	5.3	5.2	5.1	5	4.9	4.8
7.9	1	2	3	4	5	6	7	7	8	9	10	10
7.8	2	5	7	8	10	12	13	15	16	17	19	20
7.7	4	7	10	13	15	17	20	22	24	26	29	30
7.6	5	9	13	17	20	23	26	29	32	35	39	40
7.5	6	11	16	21	25	29	33	36	40	44	48	50
7.4	7	14	20	25	30	35	39	44	48	52	58	60
7.3	8	16	23	29	35	41	46	51	56	61	68	70
7.2	10	18	26	33	40	46	52	58	64	70	77	80
7.1	11	21	30	38	45	52	59	65	72	78	87	90

	Target pH = 6.5																
	Hundreds of pounds of ag lime at different water pH																
Buffer pH	6.4	6.3	6.2	6.1	6	5.9	5.8	5.7	5.6	5.5	5.4	5.3	5.2	5.1	5	4.9	4.8
7.9	2	3	4	5	6	7	7	8	8	9	10	10	10	11	11	12	12
7.8	3	6	8	10	12	13	15	16	17	18	19	20	21	22	23	24	24
7.7	5	9	12	15	17	20	22	24	25	27	29	30	31	33	34	36	37
7.6	6	11	16	20	23	26	29	32	34	36	38	40	42	44	45	48	49
7.5	8	14	20	25	29	33	36	39	42	45	48	50	52	54	57	60	61
7.4	9	17	24	30	35	39	44	47	51	54	57	60	63	65	68	72	73
7.3	11	20	28	35	41	46	51	55	59	63	67	70	73	76	79	84	85
7.2	12	23	32	40	46	53	58	63	68	72	76	80	83	87	91	96	97
7.1	14	26	36	44	52	59	65	71	76	81	86	90	94	98	102	108	110

	Target pH = 7.0																				
	Hundreds of pounds of ag lime at different water pH																				
Buffer pH	6.9	6.8	6.7	6.6	6.5	6.4	6.3	6.2	6.1	6	5.9	5.8	5.7	5.6	5.5	5.4	5.3	5.2	5.1	5	4.9	4.8
7.9	2	4	6	7	8	9	9	10	10	11	11	12	12	12	12	13	13	13	13	14	14	14
7.8	5	9	11	14	16	17	18	20	21	22	22	23	24	24	25	25	26	26	27	27	28	28
7.7	7	13	17	21	23	26	28	29	31	32	33	35	36	36	37	38	39	39	40	41	42	42
7.6	10	17	23	27	31	34	37	39	41	43	45	46	47	49	50	51	52	53	53	54	56	56
7.5	12	21	28	34	39	43	46	49	52	54	56	58	59	61	62	63	65	66	67	68	70	70
7.4	15	26	34	41	47	51	55	59	62	65	67	69	71	73	74	76	77	79	80	82	84	84
7.3	17	30	40	48	54	60	65	69	72	75	78	81	83	85	87	89	90	92	94	95	97	98
7.2	20	34	46	55	62	69	74	79	83	86	89	92	95	97	99	101	103	105	107	109	111	112
7.1	22	38	51	62	70	77	83	88	93	97	100	104	107	109	112	114	116	118	120	123	125	126

The following equations may be used to calculate lime requirement based on soil pHw and buffer pH after calculating Hydrogen saturation (Hsat). The result will be in pure calcium carbonate calculations to 8 inch for different water pH (pHw).

Target pH	Equation (tons/A)	Equation (lbs/A)
7.0	(8000x(8-buffer pH)/hsat1)x(Hsat1-Hsat2)x0.001	(8000x(8-buffer pH)/hsat1)x(Hsat1-Hsat2)x2
	(8000x(8-buffer pH)/hsat1)x(Hsat1-0.1116)x0.001	(8000x(8-buffer pH)/hsat1)x(Hsat1-0.1116)x2
6.5	(8000x(8-buffer pH)/hsat1)x(Hsat1-Hsat2)x0.001	(8000x(8-buffer pH)/hsat1)x(Hsat1-Hsat2)x2
	(8000x(8-buffer pH)/hsat1)x(Hsat1-0.21739)X0.001	(8000x(8-buffer pH)/hsat1)x(Hsat1-0.21739)x2
6	(8000x(8-buffer pH)/hsat1)x(Hsat1-Hsat2)x0.001	(8000x(8-buffer pH)/hsat1)x(Hsat1-Hsat2)x2
	(8000x(8-buffer pH)/hsat1)x(Hsat1-0.34116)x0.001	(8000x(8-buffer pH)/hsat1)x(Hsat1-0.34116)x2
5.5	(8000x(8-buffer pH)/hsat1)x(Hsat1-Hsat2)x0.001	(8000x(8-buffer pH)/hsat1)x(Hsat1-Hsat2)x2
	(8000x(8-buffer pH)/hsat1)x(Hsat1-0.49725)x0.001	(8000x(8-buffer pH)/hsat1)x(Hsat1-0.49725)x2

Hsat1 is the H saturation of the soil.
Hsat2 is the H saturation for the target pH.
Exchangeable acidity is determined from the Modified Adams-Evans buffer pH.
Hsat1= (Exchange acidity H)/CEC

The Soil Testing Laboratory at Auburn University estimates CEC by summation of Mehlich-1 extractable K, Mg, and Ca plus estimated exchange acidity using the modified Adams-Evans buffer (Huluka, 2005). The extractable bases are calculated using the following equations:

Extractable Ca (cmolc/kg) = Mehlich-1 Ca (mg/kg) / 200.20
Extractable Mg (cmolc/kg) = Mehlich-1 Mg (mg/kg) / 121.5
Extractable K (cmolc/kg) = Mehlich-1 K (mg/kg) / 390

Exchangeable acidity is determined from the Modified Adams-Evans buffer pH.

Exchangeable acidity H (cmolc/kg) = 8 x (8-buffer pH).

The cmolc/kg of Ca, Mg and K, and the exchangeable H are summed up to determine the estimated apparent soil CEC. This is called CEC by summation and is reported on the soil test report.

CEC may also calculated from the following equation:
CEC = Exchangeable acidity / H-saturation, where H-saturation is expressed as a fraction of CEC.

NOTE: Auburn University recommends ground limestone assumed to have an effective calcium carbonate equivalency of 63 percent. Therefore, ground limestone recommendation x 1.5 = pure calcium carbonate.

References

Huluka, G. 2005. A modification to the Adams-Evans soil buffer determination solution. Commuications in Soil Science and Plant Analysis. 36: 2005-2014.5

Alabama's Agricultural Experiment Station
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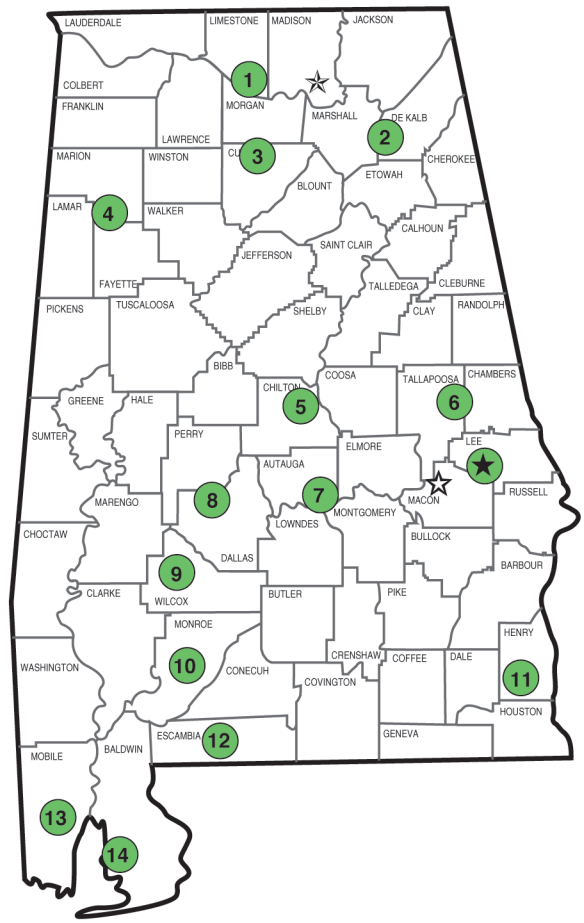
With an agricultural research unit in every major soil area, Auburn University serves the needs of field crop, livestock, forestry, and horticultural producers in each region in Alabama. Every citizen of the state has a stake in this research program, since any advantage from new and more economical ways of producing and handling farm products directly benefits the consuming public.



Research Unit Identification

★ Main Agricultural Experiment Station, Auburn.
☆ Alabama A&M University.
☆ E. V. Smith Research Center, Shorter.

1. Tennessee Valley Research and Extension Center, Belle Mina.
2. Sand Mountain Research and Extension Center, Crossville.
3. North Alabama Horticulture Research Center, Cullman.
4. Upper Coastal Plain Agricultural Research Center, Winfield.
5. Chilton Research and Extension Center, Clanton.
6. Piedmont Research Unit, Camp Hill.
7. Prattville Agricultural Research Unit, Prattville.
8. Black Belt Research and Extension Center, Marion Junction.
9. AU Natural Resources Education Center, Camden (inactive).
10. Monroeville Agricultural Research Unit, Monroeville.
11. Wiregrass Research and Extension Center, Headland.
12. Brewton Agricultural Research Unit, Brewton.
13. Ornamental Horticulture Research Center, Spring Hill.
14. Gulf Coast Research and Extension Center, Fairhope.