

Lime and Fertilizer Recommendations For the Various Crops of Tennessee

Chapter II Agronomic Crops

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Revised February 2009: P and K recommendations at high soil test;
Corn, grain sorghum, cotton and tobacco notes

Revised March 2009: Commercial sunflower and
Switchgrass/biofuel added; corn yield goal ranges modified.

Revised April 2015: Older cotton N rate for bottom soils removed; N credit note for legumes revised to indicate
single species; older wheat N recommendations removed; banding P and K note for corn on low test soils removed;
and adjustment to sunflower N rate. Corn nitrogen calculator reference added

Revised April 2016: Sulfur fertilizer note added to all but Switchgrass for biofuel and Tobacco

Revised Jan. 2017: Boron critical value added to all crops but cotton

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Computer Codes

1. a. CR100, b. CR125,
c. CR150, d. CR175, e. CR200

CORN (FIELD)

Soil Test Recommendations for N, P₂O₅ and K₂O (Pounds per Acre)

Practice	Nitrogen	Phosphate (P ₂ O ₅)				Potash (K ₂ O)				Notes	
	Soil Test Levels*										
	(NT)	L	M	H	V	L	M	H	V		
1. Grain											
a. 100-125 bu./A	120	100	50	0	0	100	50	0	0	1,2,3,4	
b. 126-150 bu./A	150	120	60	0	0	120	60	0	0	1,2,3,4	
c. 151-175 bu./A	180	140	70	0	0	140	70	0	0	1,2,3,4	
d. 176-200 bu./A	210	160	80	0	0	160	80	0	0	1,2,3,4	
e. 201-225 bu./A	240	180	90	0	0	180	90	0	0	1,2,3,4	

*NT = Not Tested L = Low M = Medium H = High V = Very High

Notes: Lime recommendations from Lime Chart 2.

1. Split applications of nitrogen may be beneficial when nitrogen rates are greater than 120 pounds per acre. ALSO: See corn nitrogen rate calculator at www.utcrops.com
2. If nitrogen sources containing urea are not incorporated, some loss of nitrogen may occur if applied to moist soils followed by three or more days of rapidly drying conditions without rainfall.
3. Reduce N rate by 60 to 80 pounds per acre following a well-established single-species winter cover crop of crimson clover or hairy vetch that has reached early bloom stage.
4. On soils having a coarse textured subsoil, 10 pounds of sulfur per acre as part of the fertilizer blend may benefit yield, especially where deficiency symptoms have been observed in the past or where plant tissue tests have suggested sulfur deficiency.

Use Notes 5, 6 and 7 only as indicated in the note.

5. Apply 5 pounds of zinc (approximately 15 pounds zinc sulfate) per acre just prior to planting. (*Note 5 is used only when the zinc test indicates a need for zinc.*)
6. If zinc was not tested, apply 5 pounds of zinc (approximately 15 pounds zinc sulfate) per acre when soil pH is 6.1 or above and phosphorus is high or anytime lime is applied or anywhere zinc deficiencies were observed the previous year. (*Note 6 is used for the following counties when the zinc test is not requested: Bedford, Cannon, Coffee, Cumberland, Davidson, DeKalb, Fentress, Franklin, Giles, Grundy, Jackson, Lincoln, Macon, Marshall, Maury, Moore, Morgan, Overton, Pickett, Putnam, Robertson, Smith, Sumner, Trousdale, Warren, Williamson and Wilson.*)
7. When boron tests less than 0.8 lbs/acre apply 1.0 lb of boron per acre annually. Follow up with another soil test in two years. . (*Note 5 is used only when the boron test indicates a need for boron.*)

CANOLA/RAPE

Soil Test Recommendations for N, P₂O₅ and K₂O (Pounds per Acre)

Practice	Nitrogen	Phosphate (P ₂ O ₅)				Potash (K ₂ O)				Notes	
	Soil Test Levels*										
	(NT)	L	M	H	V	L	M	H	V		
1. Establishment	30	30	0	0	0	30	0	0	0	1,2,3	
Top dress	110										

*NT = Not Tested L = Low M = Medium H = High V = Very High

Notes: Lime recommendations from Lime Chart 3.

1. Apply 30 pounds of N at seeding in fall and top-dress with an additional 110 pounds of nitrogen per acre before bolt (rapid stem elongation), usually in early to mid-March.
2. On soils having a coarse textured subsoil, 10 pounds of sulfur per acre as part of the fertilizer blend may benefit yield, especially where deficiency symptoms have been observed in the past or where plant tissue tests have suggested sulfur deficiency.
3. When boron tests less than 0.8 lbs/acre apply 1.0 lb of boron per acre annually. Follow up with another soil test in two years. . (Note 3 is used only when the boron test indicates a need for boron.)

COTTON

Soil Test Recommendations for N, P₂O₅ and K₂O (Pounds per Acre)

Practice	Nitrogen	Phosphate (P ₂ O ₅)				Potash (K ₂ O)				Notes	
	Soil Test Levels*										
	(NT)	L	M	H	V	L	M	H	V		
1. Establishment	60 - 80	90	60	0	0	120	90	0	0	1,2,3	

*NT = Not Tested L = Low M = Medium H = High V = Very High

Notes: Lime recommendations from Lime Chart 2. Potassium break points differ from other crops and are currently: Low (L) 0-140, Medium (M) 141-280, High (H) 281-319, and Very High (VH) 320+

1. Use one-half (1/2) pound of boron per acre when the soil pH is above 6.0 or anywhere lime is used.
2. Reduce N rate by 60 to 80 pounds per acre following a well-established single-species winter cover crop of crimson clover or hairy vetch that has reached early bloom stage.
3. On soils having a coarse textured subsoil, 10 pounds of sulfur per acre as part of the fertilizer blend may benefit yield, especially where deficiency symptoms have been observed in the past or where plant tissue tests have suggested sulfur deficiency.

GRAIN SORGHUM

Soil Test Recommendations for N, P₂O₅ and K₂O (Pounds per Acre)

Practice	Nitrogen	Phosphate (P ₂ O ₅)				Potash (K ₂ O)				Notes	
	Soil Test Levels*										
	(NT)	L	M	H	V	L	M	H	V		
1. Establishment	60-90	60	30	0	0	60	30	0	0	1,2,3,4	

*NT = Not Tested L = Low M = Medium H = High V = Very High

Notes: Lime recommendations from Lime Chart 2

- Response to the higher rate of nitrogen would most likely occur when grain sorghum follows a non-legume, is grown no-till, or is grown on soils with restricted drainage or having textures with more clay than silty clay loam.
 - Reduce N rate by 60 to 80 pounds per acre following a well-established single-species winter cover crop of crimson clover or hairy vetch that has reached early bloom stage.
 - On soils having a coarse textured subsoil, 10 pounds of sulfur per acre as part of the fertilizer blend may benefit yield, especially where deficiency symptoms have been observed in the past or where plant tissue tests have suggested sulfur deficiency.
4. When boron tests less than 0.8 lbs/acre apply 1.0 lb of boron per acre annually. Follow up with another soil test in two years. . (Note 4 is used only when the boron test indicates a need for boron.)

SMALL GRAIN

Soil Test Recommendations for N, P₂O₅ and K₂O (Pounds per Acre)

Practice	Nitrogen	Phosphate (P ₂ O ₅)				Potash (K ₂ O)				Notes	
	Soil Test Levels*										
	(NT)	L	M	H	V	L	M	H	V		
1. Establishment and Top dress	15-30	80	40	0	0	40	20	0	0	1,3,4 2	
	60-90	-	-	-	-	-	-	-	-		

*NT = Not Tested L = Low M = Medium H = High V = Very High

Notes: Lime recommendations from Lime Chart 2

- For small grain establishment, apply 15 pounds of nitrogen per acre when following soybeans and 30 pounds per acre when following corn, grain sorghum or grasses.
- Top dress small grain February 15 to March 15 with 60 to 90 pounds per acre of nitrogen. Use lower rates of nitrogen where lodging has been a problem.
- On soils having a coarse textured subsoil, 10 pounds of sulfur per acre as part of the fertilizer blend may benefit yield, especially where deficiency symptoms have been observed in the past or where plant tissue tests have suggested sulfur deficiency.
- When boron tests less than 0.8 lbs/acre apply 1.0 lb of boron per acre annually. Follow up with another soil test in two years. . (Note 4 is used only when the boron test indicates a need for boron.)

SMALL GRAIN SOYBEANS

Soil Test Recommendations for N, P₂O₅ and K₂O (Pounds per Acre)

Practice	Nitrogen	Phosphate (P ₂ O ₅)				Potash (K ₂ O)				Notes	
	Soil Test Levels*										
	(NT)	L	M	H	V	L	M	H	V		
1. Establishment	15-30	90	60	0	0	120	60	0	0	1,2,3,4, 5,6	
2. Top dress (Feb.)											
Sm. Gr. only	60-90	-	-	-	-	-	-	-	-		

*NT = Not Tested L = Low M = Medium H = High V = Very High

Notes: Lime recommendations from Lime Chart 2.

1. The above recommendation will supply the phosphate and potash needs of both small grain and soybeans.
2. For small grain establishment, apply 15 pounds of nitrogen per acre when following soybeans and 30 pounds per acre when following corn, grain sorghum or grasses. Nitrogen is not recommended for soybeans since it is a legume and when properly inoculated will supply its own nitrogen.
3. Treat soybean seed with two-tenths (0.2) of an ounce of molybdenum per bushel when soil pH is 6.5 or below. Apply either one-half (0.5) of an ounce of sodium molybdate per bushel or for liquid hopper-box applied sources containing fungicides, follow the product label.
4. Top dress small grain February 15 to March 15 with 60 to 90 pounds per acre of nitrogen. Use lower rates of nitrogen where lodging has been a problem.
5. On soils having a coarse textured subsoil, 10 pounds of sulfur per acre as part of the fertilizer blend may benefit wheat/soybean yields, especially where deficiency symptoms have been observed in the past or where plant tissue tests have suggested sulfur deficiency.
6. When boron tests less than 0.8 lbs/acre apply 1.0 lb of boron per acre annually. Follow up with another soil test in two years. . (Note 6 is used only when the boron test indicates a need for boron.)

SOYBEANS

Soil Test Recommendations for N, P₂O₅ and K₂O (Pounds per Acre)

Practice	Nitrogen	Phosphate (P ₂ O ₅)				Potash (K ₂ O)				Notes	
	Soil Test Levels*										
	(NT)	L	M	H	V	L	M	H	V		
1. Establishment	0	40	20	0	0	80	40	0	0	1,2,3,4,5,6	

*NT = Not Tested L = Low M = Medium H = High V = Very High

Notes: Lime recommendations from Lime Chart 2.

- Lime, phosphate and potash can be broadcast over the soil surface in fall, winter or spring. If soybeans follow established wheat, apply the phosphate and potash for soybeans when the wheat is top dressed with nitrogen in the spring, or at time of planting the soybeans.
- Nitrogen is not recommended since soybeans are legumes and when properly inoculated produce their own nitrogen.
- Treat soybean seed with two-tenths (0.2) of an ounce of molybdenum per bushel when soil pH is 6.5 or below. Apply either one-half (0.5) of an ounce of sodium molybdate per bushel or follow the product label for liquid hopper-box applied sources containing fungicides.
- Where only soybeans are to be grown, lime recommended may be omitted if water pH of the soil is greater than 5.6 and if soybean seed are properly treated with molybdenum. On soils having a coarse textured subsoil, 10 pounds of sulfur per acre as part of the fertilizer blend may benefit yield, especially where deficiency symptoms have been observed in the past or where plant tissue tests have suggested sulfur deficiency.
- (Note 5 is used only when the pH is above 7.0 and the manganese test indicates a need for manganese.)*
Apply 20 pounds of manganese per acre as manganese sulfate just prior to planting.
- When boron tests less than 0.8 lbs/acre apply 1.0 lb of boron per acre annually. Follow up with another soil test in two years. . *(Note 6 is used only when the boron test indicates a need for boron.)*

**SUNFLOWER for Seed
Soil Test Recommendations for N, P₂O₅ and K₂O (Pounds per Acre)**

Practice	Nitrogen	Phosphate (P ₂ O ₅)				Potash (K ₂ O)				Notes	
	Soil Test Levels*										
	(NT)	L	M	H	V	L	M	H	V		
1. Establishment	90-120	80	40	0	0	80	40	0	0	1,2,3,4,5,6	

*NT = Not Tested L = Low M = Medium H = High V = Very High

Notes: Lime recommendations from Lime Chart 2.

1. Lime, phosphate and potash can be broadcast over the soil surface in fall, winter or spring. Nitrogen should only be applied in the spring at or near planting time.
2. Reduce N rate by 60 to 80 pounds per acre following a well-established single-species winter cover crop of crimson clover or hairy vetch that has reached early bloom stage.
3. Reduce N rate up to 20 pounds when following soybeans yielding 20 bu/acre or better.
4. Double crop yield is generally about one-half of the initial seasons yield. Apply 45 to 60 pounds of N per acre at establishment of a second season's crop of sunflowers.
5. On soils having a coarse textured subsoil, 10 pounds of sulfur per acre as part of the fertilizer blend may benefit yield, especially where deficiency symptoms have been observed in the past or where plant tissue tests have suggested sulfur deficiency.
6. When boron tests less than 0.8 lbs/acre apply 1.0 lb of boron per acre annually. Follow up with another soil test in two years. . (Note 6 is used only when the boron test indicates a need for boron.)

SWITCHGRASS for BIOFUEL PRODUCTION
Soil Test Recommendations for N, P₂O₅ and K₂O (Pounds per Acre)

Practice	Nitrogen	Phosphate (P ₂ O ₅)				Potash (K ₂ O)				Notes	
	Soil Test Levels*										
	(NT)	L	M	H	V	L	M	H	V		
1. Establishment	0	40	0	0	0	80	0	0	0	1,2,3	

*NT = Not Tested L = Low M = Medium H = High V = Very High

Notes: No Lime recommended.

1. At or just prior to seeding, apply phosphorus and potassium according to soil test recommendations. Amounts should be applied annually; however, soil test every two years. Do not apply nitrogen fertilizer at seeding. Native warm-season grasses are slow starters and nitrogen will stimulate weed competition.
2. Beginning in the spring following establishment apply 60 pounds of nitrogen per acre when grass begins to grow in May following the establishment year.
3. When boron tests less than 0.8 lbs/acre apply 1.0 lb of boron per acre annually. Follow up with another soil test in two years. . (Note 3 is used only when the boron test indicates a need for boron.)

Computer Codes
Burley 1. TB
 2. BUTB
Dark 1. DTB
 2. DATB

TOBACCO (Burley and Dark)
Soil Test Recommendations for N, P₂O₅ and K₂O (Pounds per Acre)

Practice	Nitrogen	Phosphate (P ₂ O ₅)				Potash (K ₂ O)				Notes	
	Soil Test Levels*										
	(NT)	L	M	H	V	L	M	H	V		
1. Establishment	150-200	150	90	30	0	300	180	90	0	1,2,4,5	
2. Beds										3	

*NT = Not Tested L = Low M = Medium H = High V = Very High

Notes: Lime recommendations from Lime Chart 2 for Burley and from Lime Chart 3 for Dark Tobacco fields. Use Lime Chart 5 for Burley and Lime Chart 6 for Dark Tobacco beds. Use Note 4 only as indicated.

1. Reduce N rate by 60 to 80 pounds per acre following a well-established single-species winter cover crop of crimson clover or hairy vetch that has reached early bloom stage.
2. The sulfate form of potash should be used to improve curing and quality.
3. Apply 50-75 pounds of 4-16-4 per 9 feet x 100 feet of bed.
4. When boron tests less than 0.8 lbs/acre apply 1.0 lb of boron per acre annually. Follow up with another soil test in two years. . (Note 4 is used only when the boron test indicates a need for boron.)
5. (Note 5 is used only when the magnesium test indicates a need for magnesium.) Apply 20 pounds of magnesium per acre using magnesium sulfate or potassium-magnesium sulfate. If lime is needed, dolomitic limestone is recommended as the magnesium source since it can be used to correct both low magnesium and soil acidity.



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