

LIMING IMPORTANCE IN FERTILITY MANAGEMENT

The availability of many fertilizer nutrients such as nitrogen, phosphorus, potassium, and others is reduced as soil pH decreases. Thus, in order to maximize the benefits of fertilizer application, lime should be applied to soils when the pH falls from the optimum range of the managed crop. For optimum pH ranges of selected crops see **TABLE 1**.

On cropland, pasture, hayland, and other land where vegetative cover is to be established and maintained, lime recommendations will be based on the results of a current laboratory soil analysis or reliable field test. Recommendations based on field test results will be from **TABLE 2**.

LIMING MATERIAL AND APPLICATION

The quality of liming material is usually expressed as Effective Calcium Carbonate Equivalent (ECCE), which combines the material's fineness, efficiency, and neutralizing value. Pure calcium carbonate is given a value of 100 or 100%. **Soil test results from Texas A&M University, Stephen F. Austin University, and most other labs provide liming recommendations based on 100% ECCE**, unless otherwise noted on the test results. Ground limestone for agricultural use can have a wide range of ECCE values. Always be aware of the ECCE value of lime that is applied, and apply the amount equivalent to the recommended ECCE. **TABLE 3, RATES OF LIMESTONE MATERIALS WHICH SHOULD BE APPLIED TO FIELDS BASED ON TONS OF ECCE RECOMMENDED AND THE ECCE VALUE OF THE LIMING MATERIAL**, will be used to determine the amount of liming material to apply for various ECCE values.

Liming material applied will be ground to fineness so that at least 40% will pass through a 100-mesh sieve, and that at least 98% will pass through a 20-mesh sieve.

Recommended amounts of liming material will be distributed uniformly at the recommended rate and, if possible, incorporated to a depth of 4 - 6 inches within 24 hours of application on cropland and new field plantings of grasses and legumes. On construction sites recommended amounts of liming material will be incorporated as part of final seedbed preparation. Superfine liming material will be used (if available) anytime incorporation is not an option.

Where a soil analysis shows a deficiency of magnesium, dolomitic limestone will be used.

Soil pH should be checked at least every 2 - 3 years on cropland and established vegetative cover. The best time to take a soil test is in the fall.

Maintenance of good soil tilth and adequate pH range will make plant nutrient uptake more efficient, reducing the amount of applied nutrients needed to achieve yield goals.

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 AGRONOMY TECHNICAL NOTE TX-13 - LIMING INFORMATION AND
 RECOMMENDATIONS, *Revised July 2005*

TABLE 1
 RECOMMENDED pH RANGES FOR COMMON CROPS

Field and Forage Crops		Fruits and Vegetables	
<u>Crop</u>	<u>pH Range</u>	<u>Crop</u>	<u>pH Range</u>
Alfalfa	6.5 - 8.0	Apple	6.0 - 8.0
Arrowleaf Clover (Yuchi)	5.5 - 7.0	Beans	6.0 - 7.5
Alyceclover	5.5 - 7.5	Beets	6.0 - 7.5
Bahiagrass	5.5 - 7.0	Blackberries (most vars.)	6.0 - 8.0
Ball Clover	5.5 - 7.5	Blueberries	5.0 - 6.0
Barley	6.5 - 7.8	Cabbage	6.0 - 8.0
Bermudagrass	5.5 - 8.0	Cantaloupe	6.0 - 8.0
Berseem Clover (Bigbee)	6.5 - 8.0	Carrot	6.0 - 7.5
Corn	6.0 - 7.5	Cucumber	5.5 - 8.0
Cotton	6.0 - 8.0	Dewberry	5.5 - 6.5
Cowpeas	5.5 - 7.5	Eggplant	5.5 - 7.5
Crimson Clover	5.5 - 8.0	Grape	6.0 - 8.0
Dallisgrass	6.0 - 7.0	Lettuce	6.0 - 7.5
Lespedeza	5.0 - 6.5	Mustard	5.5 - 6.5
Millet	5.5 - 7.5	Okra	6.0 - 7.5
Oates	5.0 - 7.5	Onion	6.0 - 8.0
Peanuts	5.3 - 6.6	Peach, Plum	6.0 - 7.5
Rice	5.0 - 6.5	Pear	5.8 - 7.5
Rose Clover (Overton R18)	6.0 - 7.5	Peas	6.0 - 8.0
Rye	5.0 - 7.0	Pecan	6.0 - 7.8
Ryegrass	5.5 - 8.0	Pepper	5.5 - 7.0
Singletary Pea	5.5 - 8.0	Irish Potato (For control of scab)	4.8 - 5.4
Sorghum (syrup)	5.5 - 6.5	Irish Potato (For growth and yield)	5.5 - 7.5
Sorghum (forage & grain)	5.5 - 7.0	Sweet Potato	5.0 - 7.5
Soybean	5.5 - 7.5	Radish	6.0 - 8.0
Subterranean Clover (Mt. Barker, Woogenellup) (Clare, Koala, Rosedale)	5.5 - 7.3 6.0 - 8.0	Spinach	6.0 - 8.0
Sudangrass	5.5 - 7.5	Strawberries	5.0 - 7.5
Sweet Clover (Hubam)	6.5 - 8.0	Sweet Corn	6.0 - 7.5
Vetch (Hairy)	5.0 - 8.0	Tomato	6.0 - 7.5
Wheat	5.5 - 7.5	Turnip	5.5 - 7.0
White Clover (La. S-1)	5.5 - 7.5	Watermelon	6.0 - 7.5

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LIMING INFORMATION AND RECOMMENDATIONS

TABLE 2 LIMESTONE RECOMMENDATIONS

Non-Legumes (tons/acre)*

Soil Texture Class			
pH Range	Coarse 1/	Medium 2/	Fine 3/
Greater than 6.0	0	0	0
5.5 – 6.0	1.0	1.0	1.5
5.0 – 5.4	1.5	2.0	2.5
4.5 – 4.9	2.0	2.5	3.5

Legumes (tons/acre)*

Soil Texture Class			
pH Range	Coarse 1/	Medium 2/	Fine 3/
Greater than 6.5	0	0	0
6.0 – 6.4	1	1	1.5
5.5 - 5.9	1	1.5	2
5.0 - 5.4	2	2	3
Lower than 5.0	2.5	3	4

* **The values above are based on lime with a 100% Effective Calcium Carbonate Equivalent (ECCE).** Thus, rates should be increased when using lower ECCE lime, or decreased when using higher ECCE lime, see Table 3 for details.

Table 2 values are from Texas Cooperative Extension (TCE) publication SCS-2001-05, Managing Soil Acidity.

1/ Coarse includes: coarse sand, sand, very fine sand, loamy coarse sand, loamy sand, loamy fine sand, and loamy very fine sand.

2/ Medium includes: sandy loam, coarse sandy loam, fine sandy loam, loam, very fine sandy loam, silt loam, and silt.

3/ Fine includes: clay loam, sandy clay loam, silty clay loam, sandy clay, silty clay, and clay.

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AGRONOMY TECHNICAL NOTE TX-13 - LIMING INFORMATION AND RECOMMENDATIONS, Revised July 2005

TABLE 3

RATES OF LIMESTONE MATERIAL WHICH SHOULD BE APPLIED IN THE FIELD BASED ON TONS OF ECCE RECOMMENDED AND THE ECCE VALUE OF THE LIMING MATERIAL ^{1/}

PERCENT ECCE OF THE LIMING MATERIAL

Recommended ECCE rate (tons/acre)	40	45	50	55	60	65	70	75	80	85	90	95	100	105
TONS OF LIMING MATERIAL PER ACRE														
0.6	1.5	1.3	1.2	1.1	1.0	0.9	0.9	0.8	0.8	0.7	0.7	0.6	0.6	0.6
0.8	2.0	1.8	1.6	1.5	1.3	1.2	1.1	1.1	1.0	0.9	0.9	0.8	0.8	0.8
1.0	2.5	2.2	2.0	1.8	1.7	1.5	1.4	1.3	1.3	1.2	1.1	1.1	1.0	1.0
1.2	3.0	2.7	2.4	2.2	2.0	1.8	1.7	1.6	1.5	1.4	1.3	1.3	1.2	1.1
1.4	3.5	3.1	2.8	2.5	2.3	2.2	2.0	1.9	1.8	1.6	1.6	1.5	1.4	1.3
1.6	4.0	3.6	3.2	2.9	2.7	2.5	2.3	2.1	2.0	1.9	1.8	1.7	1.6	1.5
1.8	4.5	4.0	3.6	3.3	3.0	2.8	2.6	2.4	2.3	2.1	2.0	1.9	1.8	1.7
2.0	5.0	4.4	4.0	3.6	3.3	3.1	2.9	2.7	2.5	2.4	2.2	2.1	2.0	1.9
2.2	5.5	4.9	4.4	4.0	3.7	3.4	3.1	2.9	2.8	2.6	2.4	2.3	2.2	2.1
2.4	6.0	5.3	4.8	4.4	4.0	3.7	3.4	3.2	3.0	2.8	2.7	2.5	2.4	2.3
2.6	6.5	5.8	5.2	4.7	4.3	4.0	3.7	3.5	3.3	3.1	2.9	2.7	2.6	2.5
2.8	7.0	6.2	5.6	5.1	4.7	4.3	4.0	3.7	3.5	3.3	3.1	2.9	2.8	2.7
3.0	7.5	6.7	6.0	5.5	5.0	4.6	4.3	4.0	3.8	3.5	3.3	3.2	3.0	2.9

^{1/} EXAMPLE: A soil test recommendation calls for the application of 0.8 tons of ECCE per acre. If the liming material is 50% ECCE, the rate applied in the field is 1.6 tons per acre. However, if the liming material is 90% ECCE, then the rate of material applied in the field is only 0.9 tons per acre.

Source: Table 3 is from the Stephen F. Austin State University Soil Testing laboratory Bulletin SP-4, *Quality of Limestone Sold in Texas: Update 1*, dated January 1989.