

# Effect of Liming with Different Ca/Mg Contents

Alan Sundermeier, Agriculture and Natural Resources Extension Agent

## Objective

To compare two different lime sources for their effect on soil test values and crop yields.

## Background

Cooperator:	Rich Bennett	Tillage:	Conventional
County:	Henry	Crop Cycle:	1995- Wheat
Nearest Town:	Napolean		1996- Corn
Soil Type:	Millgrove loam		1997- Soybeans
Drainage:	Tile		1998- Corn

## Methods

In the same field, two different types of lime were applied to separate 45-foot-wide field-length strips in a randomized, complete block design. From Bucyrus, Ohio, a high calcium (Hi Ca) lime (analysis: 33% Ca, 4% Mg, 99% total neutralizing power or TNP ) was randomly applied to 6 strips. From Woodville, Ohio, a low calcium (Low Ca) lime (analysis: 23% Ca, 10% Mg, 107% TNP) was randomly applied to six strips.

Initial soil samples were taken in September 1995. In October 1995 two tons per acre of lime were applied according to plot design. In October 1996 corn yields were recorded for each strip and soil samples were taken. In November 1996 another two tons per acre of lime were applied according to plot design. In September 1997 soybean yields were recorded and soil samples were taken. In September 1998 corn yields were taken and soil samples were taken.

## Results

**Table 1. Corn and Soybean Yields.**

Lime Treatment	Yield (bu/A)		
	1996 Corn	1997 Soybeans	1998 Corn
Low Calcium	131.9	49.3	198.9
High Calcium	128.9	50.6	201.2
LSD (P = 0.05)	6.3	1.6	5.3
CV (%)	3.3	1.8	1.5
Significant Difference	No	No	No

**Table 2. Soil pH on Soil Test Dates.**

Lime Treatment	Soil pH			
	September 1	October 1	September 1	September 1
Low Calcium	5.57	5.43	6.07	6.12
High Calcium	5.6	5.55	6.23	6.6
LSD (P = 0.05)	0.25	0.4	0.32	0.15
CV (%)	3.07	4.85	3.46	1.38
Significant Difference	No	No	No	Yes

**Table 3. Soil Calcium Percent Base Saturation on Soil Test Dates.**

Lime Treatment	Calcium Base Saturation (%)			
	September 1	October 1	September 1	September 1
Low Calcium	56.4	39.3	51.7	80.6
High Calcium	57.7	46.8	61.7	62
LSD (P = 0.05)	4.08	14.5	12	5.01
CV (%)	4.82	22.7	14.2	4
Significant Difference	No	No	No	Yes

**Table 4. Soil Magnesium Percent Base Saturation on Soil Test Dates.**

Lime Treatment	Magnesium Base Saturation (%)			
	September 1	October 1	September 1	September 1
Low Calcium	16.5	11	16	24.6
High Calcium	16.7	11.3	21.2	17.2
LSD (P = 0.05)	1.6	3.7	3.8	5.1
CV (%)	6.4	22.2	13.9	13.9
Significant Difference	No	No	Yes	Yes

## Summary and Notes

The two different lime sources resulted in significantly different values for pH and Ca in the last year of this study and Mg in the last two years. However, an economic return for this lime was not realized since yields were not significantly different. The Hi Ca lime source cost was \$4.50 per ton more than the low Ca lime source.

Initially in 1995, the test field had medium levels of soil calcium and high levels of magnesium; also the Ca/Mg ratio was over 3:1. Therefore, with a soil pH of 5.6 and a Ca/Mg ratio greater than 1:1, the farmer need only be concerned with raising the soil pH. The fineness of the lime and TNP (total neutralizing power) are the more important quality measures for comparing lime sources. As long as the soil Ca/Mg ratio is more that 1:1, the farmer need not worry about adding

a concentrated Ca lime source. Raising soil pH is not necessarily related to the Ca and Mg content of the lime. Most northwest Ohio soils are not deficient in calcium.

A farmer should select the cheapest lime source that will neutralize the soil. The calcium and magnesium content of that lime is less important than TNP in most northwest Ohio soils. This study confirmed that yield was not affected by the type of lime applied.

For additional information, contact: Alan Sundermeier  
The Ohio State University Extension  
sundermeier.5@osu.edu