

Understanding Lime

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Why We Lime

pH is a term used to describe the activity of hydrogen ions in soil chemistry. The more hydrogen on the soil surface makes the soil more acidic.

Proper pH is needed for plant roots to be able to up-take nutrients from the soil. These nutrients include, but not limited to, Nitrogen (N), Phosphorus (P), Potassium/Potash (K), Calcium (Ca), Magnesium (Mg).

pH is measured with a range from 0 to 14. Soils from 0 to 6.9 are classified as acidic, seven (7) is neutral and soils above 7 are classified as alkaline/base.

Some plants like blueberries, azalea and woodland areas prefer a pH of 4.5 to 5.5. Pastures/hay fields, field crops, and most other plants prefer pH range from 6.0 to 7.2. A chart is provided below as a visual aid for most plants.



Whenever the pH is different than what is needed for the plants that are growing there, then, certain elements can be used to move the pH to the desired range. If the pH is too high, then sulfur or sulfur-based fertilizers can be used to decrease the pH downward. A couple examples would be when pH is above 7.2 or if someone is planning to grow blueberries and needs it to be around 5.0.

Lime can be used to increase the pH upward. Over time the pH of most soils declines naturally. Therefore, lime is needed to increase the pH back to desired growing levels.

Knowing your soil pH will help you make the best decisions for your field. It is recommended to soil test every 4 years in most fields. See your local Extension agent for soil testing information.



Types of Lime

Type of Limestone	Chemical Compound	Neutralizing Value	Years of Benefit to Soil pH	Special Notes
Aglime Calcitic or Dolomitic	CaCO ₃ CaCO ₃ & MgCO ₃ mixed	70 to 95 95 to 108	4 to 8	The particle size ranges from fine powder to gravel. Size of particles directly affect the length of benefits to pH change.
Burnt Lime	CaO	179	1	Also known as quicklime. Heated limestone.
Hydrated Lime	Ca(OH ₂)	136	1	Will burn eyes and skin. Used in mortar/concrete and sewage treatment. It is burnt lime treated with water.
Pelletized Lime	CaCO ₃ & MgCO ₃	Same as Aglime	2	Works fast and easy to handle. Expensive at same rate compared to aglime. Very fine particles of aglime mixed with binding agents and pressed together.

The Iowa Study

An Iowa study conducted in 2017 compared aglime and pelletized limestone. The charts below show that yields on corn and soybeans were scientifically the same when both products were used at the same rate. It also stated that pelletized lime was quicker to change the pH upward but was quicker to return to lower pH levels.

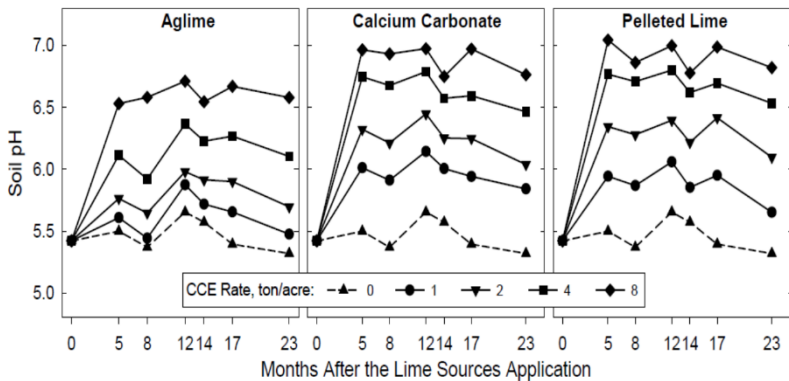


Fig. 2. Effect of lime sources and application rates on soil pH over a 23-month period.

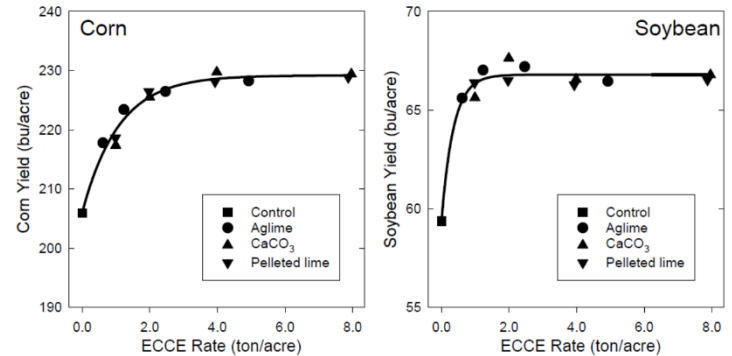


Fig. 1. Effect of lime sources and application rates on crop grain yield. Averages across three corn responsive sites (2015) and four soybean responsive sites (2016).

Recommendations

1. Soil test to know your pH.
2. Due to price and ease of application, pelletized lime is recommended at 400 to 500 pounds per acre. Remember, pelletized lime works fast, but this is only good for a 2-year period. Retest soil at the 2-year mark and reapply lime as needed.
3. Aglime is recommended at 2 ton per acre and is good for 4 to 8 years. Retest soil every 4 years to make sure pH is holding strong.
4. If hydrated lime is used, be careful not to burn your skin. Use gloves when handling, don't allow lime to touch moist skin and wear protective eyewear.