Dow AgroSciences
Mycogen® SEEDS

AGRONOMY BULLETIN 29 — APPLYING LIME TO ACIDIC SOILS

SOIL pH: THE FOUNDATION OF ANY FERTILITY PROGRAM

SITUATION

Soil acidity is one of the primary fertility issues that can limit crop growth. High levels of acid can reduce nutrient availability, restrict root growth and increase the toxicity of some elements. Soil acidification occurs naturally as the result of rainfall, plant growth, breakdown of organic matter and the application of ammonia fertilizers. Applying lime reduces soil acidity and is a source of calcium (Ca) and magnesium (Mg).

FACTORS TO CONSIDER

- Current soil pH
- Target pH for best crop growth
- Purity and particle size of liming material

ACTION PLAN

1. **Understand soil acidity.** Acidic soils are defined as having a pH below 7. Soil pH is a measure of hydrogen ions (H+) in the soil. Higher concentrations of H+ equal lower soil pH.

2. **Determine the target soil pH for the crop.** Establish the target soil pH for your crop. Most agronomic crops prefer a pH between 6 and 7, which is where the availability of most soil nutrients is maximized.

3. **Test soil pH.** Conduct soil tests to determine soil pH and lime requirement. Take samples from the surface down to the depth of tillage. In no-till, sample to a depth of 2 inches. Ask your soil testing laboratory to provide soil pH, buffer pH and the amount of lime required to reach your target pH. In soils that are Mg-deficient, dolomitic limestone may be required because it contains Mg in addition to Ca.

4. **Monitor lime purity.** Soil tests display lime requirements in terms of pure calcium carbonate. Limestone is the most common liming material. Quicklime, hydrated lime, marl and fly ash also can be used. Because these materials have different components and purities, it is important to know the calcium carbonate equivalence (CCE). Most agricultural lime has a CCE between 80 percent and 95 percent. A limestone with a CCE of 75 percent is only 75 percent as effective as pure calcium carbonate, so it would take a higher application rate to achieve the same result. Use the formula below to adjust for CCE.

$$\text{Actual liming material required} = \frac{\text{soil test recomendation}}{\text{CCE of liming material}} \times 100$$

5. **Evaluate lime particle size.** Smaller limestone particles dissolve faster and neutralize acid more quickly. However, grinding particles smaller does not increase the overall amount of acidity neutralized. Fine-grinding limestone increases its cost and reduces its ability to be spread in dry form. Plan ahead if you use pulverized limestone, because its mixture of fine, medium and coarse material spreads out the time of reaction over three years. Making emergency applications to quickly adjust pH can be expensive because of the cost of grinding. Most states have standards to which limestone must be ground to be sold as agricultural lime. Consult a local agronomic professional for recommendations.

SUMMARY

Managing soil pH should be the first step in any soil fertility program and is essential to achieving maximum yields. Take soil samples to determine your lime requirement and adjust application rate for liming material accordingly. For more information, contact your local Mycogen Seeds customer agronomist or trusted agronomic adviser.

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