

SUGARCANE SOIL FERTILITY RECOMMENDATIONS FOR 2026

When considering a sugarcane soil fertility program, follow these guidelines. The number one priority should be the soil pH. Soil pH that is outside the optimum ranges will adversely affect the availability of all other applied nutrients. The second most important component of your fertility program should be nitrogen, followed by potassium, sulfur and phosphorus. Soil testing should be a regular part of your soil fertility program. Periodic leaf tissue analyses can verify midseason plant health.



Photo by Al Maclean

LIME

Check lime requirements by conducting soil tests. Liming is primarily a method of correcting soil pH, but there are several other benefits, which include:

- ◆ *Adjusting soil pH to improve fertilizer-use efficiency by maximizing nutrient availability.*
- ◆ Supplying calcium, an essential plant food nutrient. If magnesium is deficient, use dolomitic limestone.
- ◆ Reducing aluminum and manganese toxicity.
- ◆ Enhancing the activity of soil microorganisms.
- ◆ Improving the activity of soil-applied herbicides.

Lime when:

- ◆ Soil pH is lower than 5.5 on sandy loam and silt loam soils.
- ◆ Soil pH is lower than 5.2 on clay loam and clay soils.
- ◆ The lime rate should be based on soil test results and ideally should raise soil pH to 6.5.
- ◆ It is ideal to broadcast lime to fallow fields or in crop during the fall or winter.
- ◆ Apply lime after precision leveling.
- ◆ To decrease the total amount of lime applied, consider variable rate lime applications.

How long will it take for lime to work?

- ◆ The lime reaction rate will depend primarily on the **lime quality**, which is based on two factors: 1) the chemical purity of

the liming material and 2) the particle size distribution.

- ◆ Chemical purity is expressed as the calcium carbonate equivalent (CCE) of the liming material. Pure calcium carbonate has a CCE of 100%, and most soil testing labs assume that your liming material has a CCE of 100% when making lime recommendations. If your material has a CCE less than 100%, you will have to apply more lime. For example, if your recommendation is for 1 ton of lime with a CCE of 100%, apply 2 tons of a material with a CCE of 50% ($100/50 \times 1 \text{ ton/A} = 2$) or 1.33 tons of a material with a CCE of 75% ($100/75 \times 1 \text{ ton lime/A} = 1.33$).
- ◆ Particle size distribution is expressed as the percentage of the liming material that passes through screens of various sizes. Small lime particles will react more quickly and larger lime particles more slowly. Ideally, your liming material will have a good distribution of particle sizes with smaller particles to quickly raise the soil pH and larger particles to provide longer term soil pH control. Current Louisiana recommendations for ground lime specify the materials should meet the following minimum standard: 90% shall pass through a No. 10 mesh sieve, 50% shall pass through a No. 60 mesh sieve, and 25% shall pass through a No. 100 mesh sieve. The larger the screen size, the smaller the lime particles.
- ◆ Typically, with a good quality lime, the biggest change in pH after application will occur within three to four months. The pH may continue to increase for six to 12 months.

NITROGEN

Nitrogen rate recommendations for sugarcane in Louisiana.

Crop	Soil Type	Nitrogen Rate (lbs. N/acre)
Plant cane	Light	60-80
Plant cane	Heavy	80-100
Stubble	Light	80-100
Stubble	Heavy	100-120

- ◆ For efficient nitrogen utilization, it is important that soil pH is slightly acidic to neutral (ideally 6.0 to 6.5) and adequate plant-available phosphorus and potassium are available.
- ◆ Nitrogen recommendations are based on field trials where urea-ammonium nitrate (UAN, 32%N) solution was the primary nitrogen source.
- ◆ Recommendations are based on nitrogen response data with commercial varieties and on light and heavy soils at multiple locations on plant cane through third stubble crops.
- ◆ Higher than recommended rates of nitrogen may increase tons of cane per acre but also may decrease sugar per ton of cane. Recommended rates will maximize sugar per acre yields with optimum sugar per ton of cane.
- ◆ Apply nitrogen between March 20 and April 30 — earlier if the crop is more advanced and later if the crop is less advanced. The use of a nitrogen stabilizer will reduce nitrogen losses.
- ◆ Avoid excess levels of nitrogen to reduce brown rust severity.
- ◆ Nitrogen is lost as nitrous oxides when leafy trash is burned.



Nitrogen's Function in Plant Metabolism

- ◆ Essential to produce of chlorophyll, which absorbs light during photosynthesis. The energy absorbed from light is used to convert carbon dioxide from the atmosphere and water into glucose. Oxygen is released as a by-product of photosynthesis. Photosynthesis is the primary means by which sucrose is produced and stored in the plant.
- ◆ A building block for proteins, which are the building blocks of enzymes that carry out important physiological processes.
- ◆ A building block for nucleic acids that make up the DNA and RNA in the sugarcane plant.
- ◆ Critical for new plant growth throughout the year and the tillering of sugarcane in the spring.

POTASSIUM (K₂O)

Potassium rate recommendations for sugarcane in Louisiana based on Mehlich 3 extraction.

Soil Test Category	Plant cane lbs./acre	Stubble cane lbs./acre
Very low	120	140
Low	110	120
Medium	80	80
High	0	0
Very high	0	0

- ◆ When potash prices are high, consider applying only when soil test levels are low or very low. Although not specifically recommended above, if one is not considering applying potassium at all, consider applying 60 pounds/acre to fields testing very low or low.
- ◆ Sugarcane removes approximately 3 pounds of K₂O per ton of cane from the soil.
- ◆ Potassium is made available in the soil through weathering of soil minerals, such as feldspars and micas, and the addition of chemical fertilizers.

Potassium's Function in Plant Metabolism

- ◆ Regulates the opening and closing of stomata in plants. During photosynthesis, stomata regulate the uptake of carbon dioxide.
- ◆ Regulates respiration, a process where plants use sugars and oxygen to create energy for plant growth.
- ◆ Regulates water movement in the plant and is associated with drought resistance.
- ◆ Necessary to produce proteins.
- ◆ An important element for the transport of sugars in the plant.

PHOSPHORUS (P₂O₅)

Phosphorus rate recommendations for sugarcane in Louisiana based on Mehlich 3 extraction.

Level	Concentration (ppm)	Recommendation (lbs. P ₂ O ₅ /acre)
Very low	< 5	45
Low	5-7	45
Medium	8-10	45
Optimum	11-35	0
Above optimum	> 35	0

- ◆ Apply only when soil test levels are very low.
- ◆ Sugarcane removes approximately 1 pound of P₂O₅ per ton of cane from the soil. Optimal soil pH for best phosphorus availability is 6.2.
- ◆ Excess phosphorus may lead to increased brown rust severity.

SULFUR (S)

Recent research within the Louisiana sugarcane growing area indicated a need for a two-tiered recommendation for sulfur fertilizer applications based on soil tests with Mehlich 3 extraction.

	Low (ppm)	Medium (ppm)	High (ppm)
Soil Test Value	< 10	10-20	> 20
Sulfur Fertilizer Recommendation (lbs./acre)	40	20	0

- ◆ Sulfur is an important nutrient for successful sugarcane production and should be applied if recommended by soil test.
- ◆ Sulfur deficiencies in sugarcane are becoming more numerous due to reduced emissions from the burning of fossil fuels.
- ◆ Sulfur deficient plants have a yellowish-green appearance like nitrogen deficiency, except the youngest leaves are more chlorotic. Stalks are short and thin with reduced leaf area. The best way to verify sulfur deficiency is through leaf tissue testing.
- ◆ Excess sulfur may lead to increased brown rust severity.
- ◆ Sulfur is lost as sulfur oxides when leafy trash is burned.



Phosphorus's Function in Plant Metabolism

- ◆ Important for plant growth and is found in every living cell. One important function is energy transfer during photosynthesis within the plant.
- ◆ An important component of enzymes and proteins that drive other important metabolic pathways within the plant.
- ◆ Necessary for early root formation and growth and the maintenance of a healthy root system.
- ◆ Important for maturation.

Sulfur's Function in Plant Metabolism

- ◆ Sulfur is important for chlorophyll formation and photosynthesis. Sulfur is essential for optimum plant growth and sucrose accumulation during maturation.
- ◆ A component of some amino acids, which are the building blocks of protein.
- ◆ Sulfur metabolites provide plant protection against oxidative stresses, such as salinity, drought, metal toxicity and extreme temperatures.

MICRONUTRIENTS - ZINC (Zn)

Zinc rate recommendations for sugarcane in Louisiana based on Mehlich 3 extraction.

Soil Test Category	Application Rate (lbs./acre)
Very low (less than 1 ppm)	6
Low (less than 2.25 ppm)	3

- ◆ Apply only if soil tests or tissue analyses indicate deficiencies.
- ◆ Zinc deficiencies can be caused by high pH or can appear in areas where excess lime has been applied.
- ◆ Zinc is immobile and will accumulate in the topsoil. Some zinc deficiencies have been noted where significant land grading has removed most of the topsoil.

Zinc's Function in Plant Metabolism

- ◆ Activates enzymes for the synthesis of certain proteins.
- ◆ Necessary to produce chlorophyll and some carbohydrates; converts starches to sugars.
- ◆ Associated with the plant's ability to efficiently use water in the plant.

MICRONUTRIENTS - BORON (B)

- ◆ Boron deficiency would be most prevalent in sandy textured acidic soils with low organic matter content.
- ◆ Boron is found primarily in the soil organic matter and becomes available as organic matter decomposes.
- ◆ Plant-available boron exists as boric acid, which is a neutral molecule. Boron has no charge and will not adhere to soil particles or organic matter. Therefore, it is highly mobile and can leach out of the plant's root zone with high rainfall.
- ◆ Research is underway to determine the need for boron in a sugarcane fertility program.

Boron's Function in Plant Metabolism

- ◆ Necessary for the development of young roots and shoots because it is essential for the cell wall formation.
- ◆ Appears to be involved in the uptake and efficient use of calcium, nitrogen and potassium in the plant.
- ◆ Important in the production of sugars and carbohydrates.

ROLE OF LEAF TISSUE TESTING

Plant tissue analysis is determining, in a laboratory, the total elemental content of the whole plant or parts of plants, typically leaves plus midribs in the case of sugarcane. Plant tissue analysis can serve as a troubleshooting tool to diagnose a suspected nutrient deficiency.

Leaf tissue analysis is not a substitute for soil testing. The goal of soil testing is to optimize crop production by predicting nutrient availability from the soil. The goal of leaf tissue testing serves as a periodic check to determine plant health at a point in time. Leaf tissue testing is typically done from mid-June through mid-August.

ORGANIC MATTER

One of the most important components of soil health is organic matter. Increasing soil organic matter can:

- ◆ Reduce erosion by increasing water infiltration by forming stable soil aggregates.
- ◆ Enhance nutrient supply in the soil by nutrient release when organic matter decomposes. Each percent of organic matter in the soil releases 20 to 30 pounds of nitrogen, 4.5 to 6.6 pounds of phosphorus and 2 to 3 pounds of sulfur per year.
- ◆ Improve the water-holding capacity of the soil. Organic matter works like a sponge, with the ability to absorb and hold up to 90% of its weight in water. A great advantage of the water-holding capacity of organic matter is that it will release most of the water that it absorbs to plants. In contrast, clay holds great quantities of water, but much of it is unavailable to plants.
- ◆ Increase carbon sequestration. Soil organic matter is nearly 60% carbon, so increasing soil organic matter is analogous to increased carbon sequestration.
- ◆ Increase levels of soil microorganisms, which in turn improves nutrient mineralization and soil aggregation.
- ◆ Increase cation exchange capacity (CEC). CEC measures how many cations can be held on soil particle surfaces. Negative charges on the soil surfaces of soil particles bind positively charged atoms or molecules, such as potassium, calcium, magnesium and other cations. Soil organic matter exhibits a higher CEC than clay soils.



SOIL AMENDMENTS

Filter Press Mud

The application of filter press mud (FPM) is an excellent soil amendment to improve soil health.

FPM is a byproduct of raw sugar processing. During the juice clarification process, field soil, juice impurities (proteins and gums), and some fiber particles are removed from the juice. The solid impurities are referred to as FPM. FPM is slurried in the factory and sent to settling ponds. Periodically, the FPM ponds are dredged, and the mud is applied to nearby sugarcane fields.

The amount of nitrogen, phosphorus, potassium, calcium, magnesium, sulfur and organic matter found in FPM is generally high compared to field soil. The application of 10 to 50 tons/acre of FPM improved cane yield (tons/acre). The residual effect for the crop cycle is due to the improved organic matter and to the phosphorus. Residual effects may result from sulfur and nitrogen if higher rates of FPM are applied. Although calcium and magnesium increased in the soil from the application of FPM, the soil pH did not increase.

- ◆ Caution: Direct treatment of fields with FPM fresh from the factory during the harvest season occasionally caused “burning” of sugarcane growth when rainfall was low the following spring.



Poultry Litter

Poultry litter (or any manure) is an excellent soil amendment that improves soil health, especially where soils have been cut during precision grading. In cut areas of the field, topsoil has been moved. The quantity and diversity of soil microorganisms decreases in cut areas of the field. An organic amendment can have a beneficial effect on soil microorganism communities and improve crop production.

Poultry litter is a combination of poultry manure and any bedding material. Bedding material may be rice hulls, sawdust, wood shavings or shredded paper. Poultry litter contains nutrients in inorganic form (readily available) and organic form (available when the litter decomposes).

The nutrient content of poultry litter can vary. Accordingly, it is important to obtain a nutrient analysis for the litter. It is also important that soil testing be done in the area targeted for application. Poultry litter rates should be based on the crop needs for phosphorus and potassium. Application of poultry litter should be made as near to planting as is practical. Incorporating the litter soon after application is important for minimizing nutrient losses.

Poultry litter is a source of organic matter. A one-time application of a low rate of litter will not likely increase soil organic matter. Continuous applications of low to moderate rates of poultry litter can improve soil organic matter over time.

Cover Crops

Cover crops can provide many benefits to an overall soil fertility program for sugarcane production. More details can be found by accessing the link below:

<https://www.lsuagcenter.com/profiles/aiverson/articles/page1620152413689>



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