

## SOIL TEST INFORMATION SHEET NO. C-120

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### Cotton

1. In cotton production, applying agricultural limestone is recommended when the soil pH falls below 5.8. To ensure optimal nutrient availability, a soil pH of 6.0-7.0 should be maintained.
2. The effectiveness of limestone depends on the particle size of the liming material (fineness factor) and its Calcium Carbonate Equivalent (CCE). Lime recommendations typically assume a CCE of 100. Agricultural lime (Ag lime), primarily Calcite Lime ( $\text{CaCO}_3$ ), is the most common liming material. If the soil's magnesium content is medium or low, dolomitic limestone [ $\text{CaMg}(\text{CO}_3)_2$ ] should be applied. Ideally, incorporate liming materials into the soil 3 to 6 months before planting. It's also important to consider the soil's buffer pH and avoid overliming, as this can induce deficiencies in micronutrients and phosphorus.
3. For consistent results, soil samples should be collected every two to three years, ideally at the same time of year and submitted to the same laboratory. Collecting multiple soil samples per field or grid using a soil probe is the preferred method. In Louisiana, it is common practice to take 0–6 inch core samples and send them to a lab that utilizes the Mehlich-3 extraction method. The LSU AgCenter fertilizer recommendations are specifically based on analyses of 0–6 inch core samples using the Mehlich-3 extraction method.
4. Generally, a yield response to fertilizer application is anticipated when soil-test nutrient concentrations fall below critical levels. The likelihood and extent of yield increase from fertilization are inversely related to how far the soil-test nutrient concentration is below this critical threshold. Research has established reliable critical concentrations for soil test levels of nitrogen (N), phosphorus (P), potassium (K), and sulfur (S). It's important to note that these critical nutrient concentrations and the corresponding application rate recommendations may be slightly adjusted based on ongoing research and should be considered approximate. Recommended application rates may vary depending on the nutrient concentration: medium, low, very low. For nitrogen (N), the critical level is 100-120 lbs N/acre. For phosphorus (P), the critical level is 35 ppm. When soil test results fall below this threshold, a recommended application rate of 60 to 100 lbs of  $\text{P}_2\text{O}_5$  per acre is advised. For potassium (K), the critical level is 150 ppm K. When soil test results fall below this threshold, a recommended application rate of 60 to 120 lbs  $\text{K}_2\text{O}$  per acre is advised. The critical level for sulfur (S) is 12 ppm S. When soil test results fall below this threshold, a recommended application rate of 10 to 20 lbs S per acre is advised.

5. Other macronutrient and micronutrient application recommendations are generally highly dependent on soil pH. Soils with high pH (above 7.0 – 7.5) may require applications of most micronutrients, except for molybdenum. Boron, copper, chlorine, iron, manganese, molybdenum, and zinc are necessary for cotton growth, but usually only needed in small quantities. Boron and Zinc should be of the most concern. The recommendation for Boron is 0.5 lb/ac in recently limed fields (or 0.1 lb/acre several times during bloom). Zinc is most likely to be deficient in high pH soils. If Zinc is lower than 1 ppm, apply 10 pounds of actual zinc in a soluble form, such as zinc sulfate or zinc chelate per acre. If zinc levels are between 1 to 2.25 ppm, apply 5 pounds of zinc per acre.
6. Fertilization of cotton fields should take place ahead of the next growing season. Nitrogen applications should ideally be split into two applications: 30-50% at preplanting and 50-70% by early bloom. Use the lower end recommendation when a legume was previously grown in the area (previous crop or cover crop). Prior research suggests that spring applications of phosphorus and potassium, when incorporated and followed by rehipping, can enhance yield potential compared to fall applications. This is particularly true for soils susceptible to nutrient losses through runoff, leaching, erosion, and fixation. However, research has shown no significant yield difference between spring and fall applications when spring applications are not incorporated and rehipped. In soils with chloride toxicity issues, it is advisable to apply potassium fertilizer (which may contain chloride) in the fall. This allows winter rainfall to leach and reduce the chloride concentration in the soil.
7. Contact your county agent for additional information and help in your fertilization program. The agent also receives a copy of this report for the parish office files.