

COTTON FERTILITY

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Fertility is the single highest input investment for Virginia cotton farmers. Good soil-fertility management ensures proper available nutrients for maximum production. At the same time, excessive application of nitrogen not only increases production costs but may also cause rank growth, delay maturity, make defoliation more difficult, and negatively impact yields.

Lime

Cotton is very sensitive to soils with a low pH. Cotton grows best when the soil pH is within the range of 5.8 to 6.5. There are several forms of lime commercially available, including dolomitic and calcitic. Dolomitic lime is an economical way of altering pH while also adding magnesium (Mg) to the soil. Dolomitic limes vary in the levels of Mg they will deliver to the soil. In situations where soil Mg levels are high, calcitic lime may be an economically feasible liming material. For more information on liming materials, Virginia Tech offers an extensive publication available through your local Extension office.

Phosphorus

Phosphorus levels should be maintained in the medium to high range, as phosphorus is important for seedling development. Most soil tests from the cotton production region of Virginia fall within medium to high levels of phosphorus. With medium to high levels of phosphorus, sufficient phosphorus may be applied in starter fertilizer or broadcast prior to planting. Phosphorous deficiency is extremely rare in Virginia cotton.

Potassium

Coastal Plain soils in Eastern Virginia typically test low to medium in potassium. Light, sandy soils tend to leach potassium over time making it difficult to build residual soil levels. Some of the heavier soils test high for potassium. Potassium is generally readily available to the plant as Virginia soils do not tie up (fix) potassium. Farms that have been maintained at a high productive capacity should receive about 60 to 100 lb of potassium on medium to heavy soils and 120 lb on lighter soils for optimal cotton yields. In rare cases, as much as 150 lb of potassium can be needed on light land when leaching has occurred. Soil testing is the best means to determine proper fertilization.

Leaching of potassium is possible on extremely coarse textured soils in wet years. Some producers split potassium applications with a reduced application at planting and the remainder of the potassium applied in a side-dress application. This practice should be evaluated closely. Some research from Georgia on soil types similar to Virginia's indicate that in dry years, splitting potassium applications can reduce cotton yields compared to applying all of the potash at planting. Therefore, when soil potassium levels are low, it is best to apply the full recommended amount at planting.

Nitrogen

Rates - Nitrogen can have more impact (negative or positive) on cotton yields than any other nutrient. Too much nitrogen causes excessive plant growth, slows fruiting, delays maturity, makes defoliation more difficult, and increases hardlock and insect problems. Too little nitrogen will result in reduced plant growth and cause premature cutout, resulting in low yields. A basic rate of 70 to 85 lb total nitrogen/A is recommended for many soils. Rates around 100 lb can be beneficial on cotton planted after cotton on light, sandy land. Lower rates are better for cotton on heavy land when planted after peanut. Application rates should be adjusted according to the residual nitrogen available from previous crops. Peanut vines supply 30 to 60 lb of residual nitrogen and a good soybean crop can supply 1 lb of residual nitrogen per bushel of beans.

Timing - At planting, apply 20 to 25 lb of nitrogen. Increase this rate to 30 or 40 lb on very sandy soils or when low residual levels are expected. Apply 50 to 70 lb of nitrogen either side-dressed or top-dressed in mid- to late June. This application should correlate with the time when cotton is at full square but should be about two weeks before blooming begins. Side-dressed applications of nitrogen can be split on sandy land to reduce leaching risk.

Boron

Boron is an essential micronutrient critical for flowering, pollination, and boll development. Boron is required in small amounts and can be applied either to the soil or crop foliage. A suggested rate of soil-applied boron at planting is 1 lb actual boron/A. Two applications applied to foliage at 1/4 lb each time is the suggested rate. Be sure at least part of the boron is applied by first bloom.

Sulfur

Sulfur is needed on some cotton fields, especially those not grown in a rotation with peanuts. When grown in rotation with peanuts, residual sulfur from landplaster applications is usually sufficient for cotton. Actual sulfur may be applied at 20 lb/A either preplant or with side-dressed nitrogen. Sulfur is very mobile in the soil, and is readily leached from sandy soils. On very sandy soils, it is more desirable to make a split application of sulfur with the split nitrogen applications. On loamy soils, sulfur may be applied in a single application, usually with the side-dress nitrogen application.

Starter Fertilizer

Starter fertilizer usually consists of nitrogen and phosphorus. The primary benefits are faster initial growth and, usually, earlier maturity. Typically there is more benefit to starter fertilizer on medium to heavy soils, soils testing low in phosphorus, or in cool soils. The ratio of nitrogen and phosphorus varies to some extent since there are many different formulations of starter fertilizers. Use about 12 to 20 lb of nitrogen and follow soil samples for phosphorus. A yield response is not always obtained but is more common in wet, cooler seasons. Little response to starter fertilizer is noted in hot, dry years.