

**EFFECT OF VARIABLE RATE LIME
ON COTTON**

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Abstract

A study was initiated in 1996 to determine the economic feasibility of precision application of fertilizer and lime for cotton in Missouri. Three fields were sampled by conventional 20-acre composite sampling and 2.5-acre grid sampling using differential global positioning system (GPS). Lime was applied in replicated strips by conventional uniform and variable rate systems in two of the fields. In a field located at East Prairie, Missouri, soil pH_s from grid samples varied from 3.9 to 5.2. Lime recommendations varied from 1.2 to 4.8 tons per acre. A field at Portageville was less acid with average lime recommendations of 2.3 tons per acre. Phosphorus and potassium levels varied across each field. However, Bray-1 phosphorus and ammonium acetate potassium test results were consistently medium or high (> 100 lb P/acre, and >250 lb K/acre). Therefore, no P or K fertilizer was applied. Soil samples were collected 15 months after lime was applied at Portageville. Results showed that strips that had variable rate lime applied had more consistent soil pH across the field as compared to strips with uniform lime applications. Cotton lint yields were not significantly different between conventional and variable rate application systems in 1996 and 1997 at Portageville. A yield map was developed of the entire 60-acre field in 1997 by using GPS and load cells mounted under a cotton picker basket. The map showed that parts of the field without irrigation and areas that had poor or excessive drainage had the lowest yields in the field.