

**SOIL TEST CORRELATION FOR POTASSIUM
FERTILIZATION OF NO-TILL COTTON**

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Abstract

Variable rate technology has increased our awareness of soil sampling and the protocol utilized in the collection process. Research indicates that orienting no-till (NT) cotton (*Gossypium hirsutum* L.) rows within a few inches of the previous year's row allows extractable potassium (EK) accumulation within the row (I-R) position relative to between row (B-R) position. Apparently, this accumulation results from nutrient recycling from decaying root bio-mass. EK in the I-R sample position ranged from 1.25 to 1.69 times greater than EK of the B-R position. Sampling in the B-R position exclusively may result in incorrect K recommendations. The objective of this study was to correlate EK by sample position with relative yields and broadcast K rates to identify a protocol for sampling long-term NT cotton fields. Soil samples were collected from three long term NT research soils after harvest in 1996 and from two soils following harvest in 1997 and 1998. These soils were a Memphis silt loam, a Lexington silt loam and a Loring silt loam. Cores were collected from ten (five/row) I-R and B-R positions for Mehlich I EK evaluations. EK values from these two positions were averaged to simulate a random or combination (C) sampling. EK from each of seven site-years was correlated with yields produced the following year. The R^2 value resulting from regressing yields and broadcast K rates with EK for each sample position was used to evaluate the best sampling protocol. R^2 values for the C sampling position were equal to or higher than six of the seven site-years while the R^2 values were equal to or higher for I-R sampling for three of the site-years (two site-years had equal R^2 values). For the three soil-year combinations, the C sampling data provided higher R^2 values. For broadcast K rates, the R^2 values for the C sampling position were equal to or higher than R^2 of the other positions for six of the seven site-years. The R^2 for the I-R sample position was equal to or higher than the other positions three of the seven site-years. For the three soil-years, the C sampling provided higher R^2 values. These data indicate that a combination or random sampling provides the higher R^2 values with yields and fertilizer applications for long-term NT cotton and would provide a better sampling protocol.