ACCURACY OF SOIL TEST
P AND K RECOMMENDATIONS
FOR LOUISIANA COTTON
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Abstract
Phosphorus (P) and potassium (K) soil test calibration and
correlation data were developed thirty to forty years ago for
cotton grown in Louisiana. The goal of this research was
to verify the accuracy of both our data and the P and K
fertilizer recommendations that are based on these data.
During a 6-yr. period, four P field trials were conducted on
two soil types, and five K field trials were conducted on five
soil types. In seven of the nine tests, LSU fertilizer
recommendations were correct (78%). Responses to P or K
fertilizer did not occur when soil test P or K was rated high
or very high. For the two cases in which recommendations
were incorrect, fertilizer addition did not increase yield,
even though soil test results indicated that a response
should occur. In general, the results of these trials suggest
that the current P and K fertilizer recommendations for
cotton are accurate.

Introduction
Phosphorus and K soil test calibration and correlation data
were developed many years ago for cotton grown in
There is some concern that fertilizer recommendations
based on these data are inadequate for modern high-
yielding crops that have greater nutrient demand
(Funderburg and Kovar, 1996). In addition, accurate
fertilizer recommendations are as important as ever, given
the current emphasis on nutrient management and
environmental quality.

The purpose of this research was to verify the accuracy of
both our current soil test P and K data and the P and K
fertilizer recommendations that are based on these data.
We also wanted to conduct this research on private farms
with diverse soil types and management practices, so that
the results would be applicable to as many of the cotton-
growing areas as possible.

Materials and Methods
This study was conducted during a 6-year period (1992-
1997). A total of four field trials with P were conducted on
a Hebert silt loam (fine-silty, mixed, thermic Aeric
Ochraqualfs) and a Norwood silt loam (fine-silty, mixed,
calcareous, thermic Typic Udifluvents). Five field trials
with K were conducted on Bruin fine sandy loam (coarse-
silty, mixed, thermic Fluvaquentic Eutrochrepts),
Commerce silt loam (fine-silty, mixed, nonacid, thermic
Aeric Fluvaquents), Commerce silty clay loam, Gigger silt
loam (fine-silty, mixed, thermic Typic Fragiudalfs), and
Norwood silt loam (fine-silty, mixed, calcareous, thermic
Typic Udifluvents).

Typically, treatments included three or four rates of P or K
fertilizer, with four or more replications arranged in a
randomized complete block design. Plots were four to eight
rows in width and 400 to 1000 feet long. If required, a
blanket application of K fertilizer was made in the P trials.
Similarly, P fertilizer was applied in K trials when needed.
Nitrogen fertilizer and other inputs were applied by the
cooperators. Plots were harvested with the cooperators’
equipment.

Soil samples were collected before any fertilizer was
applied, and three to four weeks after treatments were
imposed. Samples were collected with a hand probe to a
depth of six inches. Eight to ten cores were taken in each
plot and bulked for analysis. Available P was determined
by Bray 2 extraction (Byrnside and Sturgis, 1958).
Exchangeable K was extracted with neutral 1.0N
ammonium acetate (Thomas, 1982).

Results and Discussion
In the years 1992 to 1997, experiments were conducted at
nine on-farm locations in the cotton-growing areas of
Louisiana. LSU fertilizer recommendations were correct in
seven of the nine tests (78% accuracy). Responses to P
(Table 1) or K (Table 2) fertilizer did not occur when soil
test P or K was rated high or very high. For the two trials
in which recommendations were incorrect, fertilizer
addition did not increase yield, even though soil test results
indicated that a response should occur. In one case, a
numerical yield increase of 118 lb. lint/A was measured
when 60 lb. P2O5/A were applied (Table 1); however,
variability among replicates negated statistical significance.

In general, the results of these trials suggest that the current
P and K fertilizer recommendations for cotton grown in
Louisiana are accurate. Although data are not presented
here, tissue tests tended to confirm the accuracy of the P
and K fertilizer recommendations.

References
Byrnside, D.S., Jr. and M.B. Sturgis. 1958. Soil
phosphorus and its fractions as related to response of sugar
cane to fertilizer phosphorus. Louisiana Agric. Expt. Sta.
Bull. 513.


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<th>Soil Type</th>
<th>Soil Test</th>
<th>Recommended Fertilizer</th>
<th>Response</th>
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<td>Yes (801 vs. 893 @ 40 lb./A)</td>
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<td>No (643 vs. 662 @ 30 lb./A)</td>
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<th>Recommended Fertilizer</th>
<th>Response</th>
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