Determining the Correct Nitrogen Rate for Cotton Following Soybeans

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Objective:
The objective of this proposed study is to determine the optimum rate of nitrogen fertilization for cotton in a cotton/soybean rotation. A secondary objective will be to evaluate plant growth characteristics as effected by N fertilizer rate.

Relevance:
Cotton requires supplemental nitrogen fertilization to achieve maximum lint yields. Proper N rates are critical as lower rates may limit yields while higher rates promote excessive vegetative growth. This delays the harvest and reduces fiber quality. Higher than optimal N rates may also contribute to increased disease and insect pressure. Optimizing N rates also reduces environmental impacts by limiting the potential for run off or leaching. Studies at the University of Missouri-Delta Center have shown that our current soil test recommendations are valid for continuous cotton cultivation. University of Missouri soil test recommendations suggest lowering the N rate by 20-30 lbs/a N following soybeans. Cotton producers have raised concerns about the relevance of our N recommendations for cotton following soybeans.

Procedures:
Evaluation will be located on a research area at the University of Missouri-Delta Center. Soil type will be a Tiptonville silt-loam. The following 5 N treatments will be evaluated:
1. 0 lbs N/a
2. Soil test recommended rate minus 50 lbs. N/a
3. Soil test recommended rate minus 25 lbs. N/a
4. Soil test recommended rate
5. Soil test recommended rate plus 25 lbs. N/a

Beginning at first square plant N status will be monitored weekly using a Chlorophyll meter, Cardy meter and by petiole analysis. At the end of the season the effective cutout date will be determined for each plot.

Each plot will be harvested and the lint yield measured. The cotton produced will also be ginned and the gin turnout calculated. The lint will then be analyzed for the fiber quality properties: micronaire, length, strength, and trash percentage. These fiber quality properties will be determined at the International Textile Research Center in Lubbock Texas using high volume instrument analysis.

All methods of P&K fertilization, weed and insect control and irrigation will be the standard practices for irrigated cotton in Southeast Missouri.
Current status and importance Cotton/soybean rotation:
Soybeans are the most common rotational crop grown with cotton in Missouri. Each year approximately 150,000 acres of soybeans and cotton are rotated. This aids in controlling weeds, insect pests, nematodes, and diseases such as bacterial blight.

Time table:
April 2003   Land and equipment preparation
May 2003    Cotton planting and N fertilization
June, July, August 2003   In season plant N status monitoring
October 2003   Harvest and lint quality evaluation
Nov-Dec 2003   Data evaluation
Jan 2004    Results presented at BeltWide Cotton Conferences
2004 and 2005 Same as 2003

Strategy for transfer of knowledge:
Preliminary results will be shown at extension grower meetings, the annual Delta Center field day, and at the BeltWide Cotton Conference. When the test is complete, a final report will be written and a manuscript will be submitted to a scientific journal.

Budget:

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<th>Expenses</th>
<th>Year</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>2003</td>
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<tr>
<td>Res. Specialist salary (0.25)</td>
<td>6,750</td>
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<tr>
<td>Fringe benefits</td>
<td>1,688</td>
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<td>Student Labor (.125)</td>
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<td>Supplies</td>
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<td>Plant and soil analysis</td>
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<td>Travel</td>
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