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Changes in Soil pH Caused by Heavy Nitrogen Fertilization

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CHANGES IN SOIL pH CAUSED BY HEAVY NITROGEN FERTILIZATION

Ammonium nitrate, ammonium phosphate, ammonium sulfate, urea and anhydrous ammonia leave acid residues, thus tending to make the soils more acid. The degree to which soil pH may be affected and the persistence of such changes for a silt loam soil is shown in the table below. The same amounts of phosphorus and potash were applied to all plots, and the different amounts of nitrogen were supplied from ammonium nitrate. Burley tobacco was the crop grown and the data are for 1963, which was the second consecutive year for the fertilizer treatments. (These were experimental plots and the high treatments are not recommended for burley production.)

<table>
<thead>
<tr>
<th>Pounds Nitrogen per Acre</th>
<th>Date of Soil Sampling</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>April 25* May 7 June 6 July 3 August 2</td>
</tr>
<tr>
<td>0</td>
<td>5.75 5.75 5.85 5.65 5.40</td>
</tr>
<tr>
<td>125</td>
<td>5.90 5.45 5.35 5.25 5.10</td>
</tr>
<tr>
<td>250</td>
<td>5.40 5.25 4.80 4.75 4.70</td>
</tr>
<tr>
<td>500</td>
<td>5.50 5.05 4.85 4.50 4.70</td>
</tr>
</tbody>
</table>

* Before fertilizer was applied on same date.

It is apparent from these data that heavy applications of a nitrogenous fertilizer can increase soil acidity to such an extent that the availability of certain plant nutrients is seriously affected, even though the soil pH was high enough before the fertilizer was applied.

W. O. Atkinson

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