NOTES

FACTORS RESPONSIBLE FOR LOW YIELDS OF SUGAR CANE IN OLD CULTIVATED TERRA ROXA ESTRUTURADA SOILS IN EASTERN BRAZIL

Yields of sugar cane (Saccharum officinarum) are often low in eastern Brazil and show little or no response to dressings of commercial fertilizers. The object of this investigation was to determine whether poor yields were related to lack of fertility or to deterioration of soil structure after years of cultivation.

These studies were conducted on a large sugar cane plantation in southeastern Minas Gerais state of eastern Brazil. The Terra Roxa Estruturada soils investigated have a textural B2 horizon and form in basic volcanic materials. In some ways they are like the Low Humic Latosols, but not equal. They are also similar to the Red Loams of South Africa and nearly equal to the "Laterite Pardo Rojiza" of Chile. They contain 39 to 57% clay. The climate is tropical with a 10-year average precipitation of 1,237 mm. The months of May through September are a rigorous tropical dry period and cane is cut soon after the dry period starts. Two fields of about 100 hectares each with the same flat topography were selected. Field 1 of 96.3 hectares was an uncropped area of virgin soil cleared after years of cultivation. The Terra Roxa Estruturada soils investigated have a textural B2 horizon and form in basic volcanic materials. After 5 years of cultivation, the soil structure changed.

Soils were sampled at four locations before planting and fertilization, and in the fertilized space after 5 years of cropping. On a Morgan extract, determined with Na cobaltinitrite, Ca and with the molybdenum blue method, and diphenylamine. pH was determined on a 1:2 soil:water extract.

Soil structure was examined in blocks 10 cm. thick, taken to a depth of 30 cm. with a constructed plane spade having a very well sharpened steel blade, from the side of a cavity 30 by 40 cm. deep in the soil. A block was shaken with a five-fingered steel claw to all places where soil structure changed.

Table 1 shows the large differences in chemical analysis of the two soils.

Table 1—Chemical analysis of two Terra Roxa Estruturada soils before and after 5 years of sugar cane culture in Brazil.

<table>
<thead>
<tr>
<th>Soil history</th>
<th>Depth cm.</th>
<th>No. of samples</th>
<th>Ca</th>
<th>K</th>
<th>P</th>
<th>NO₃-N</th>
<th>Cane yield metric tons/hectare</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old cane field</td>
<td>0-30</td>
<td>98.1</td>
<td>1.08</td>
<td>1.06</td>
<td>0.07</td>
<td>0.03</td>
<td>3.4</td>
</tr>
<tr>
<td>Uncropped</td>
<td>0-30</td>
<td>96.3</td>
<td>1.08</td>
<td>1.06</td>
<td>0.07</td>
<td>0.03</td>
<td>3.4</td>
</tr>
</tbody>
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3Corbing, J. Grundlagen der Gare in praktischer Anwendung. Hannover. 1951.