**IRONSTONE SOIL**

**General Description:** Ironstone gravelly sandy loam to clay loam, overlying a yellowish brown gravelly sandy clay loam to light clay becoming more clayey and containing ironstone boulders with depth, over kaolinitic weathering rock.

**Landform:** Flat to gently sloping crests and upper slopes

**Substrate:** Highly weathered metasandstones of the Kanmantoo Group, southern Mt. Lofty Ranges.

**Vegetation:** Eucalyptus baxteri / E. fasciculosa scrub

**Type Site:** Site No.: CH019  
Hundred: Yankalilla  
Section: 294  
Sampling date: 31/07/92  
Annual rainfall: 850 mm average

**Type Site:** Site No.: 1:50,000 mapsheet: 6526-1 (Torrens Vale)  
Easting: 260450  
Northing: 6061600

Flat crest of rolling low hills, 1% slope. Firm surface with trace of ironstone gravel.

**Soil Description:**

<table>
<thead>
<tr>
<th>Depth (cm)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10</td>
<td>Dark brown weakly granular clay loam with 10-20% ironstone (ferricrete) nodules. Abrupt to:</td>
</tr>
<tr>
<td>10-21</td>
<td>Orange weakly structured light clay with 20-50% ironstone nodules. Clear to:</td>
</tr>
<tr>
<td>21-40</td>
<td>Yellowish brown weakly structured light clay with 20-50% ironstone nodules and minor quartz gravel. Clear to:</td>
</tr>
<tr>
<td>40-60</td>
<td>Orange and pale yellow light medium clay with moderate polyhedral structure and 20-50% ironstone nodules and larger stones, and minor quartz gravel. Gradual to:</td>
</tr>
<tr>
<td>60-140</td>
<td>Pale yellow, orange and red light clay with more than 50% large ironstone fragments and broken sheets.</td>
</tr>
</tbody>
</table>

**Classification:** Ferric-Acidic, Petroferric, Brown Kandosol; medium, gravelly, clay loamy / clayey, deep
Summary of Properties

Drainage: Imperfectly drained, due to the thickness of clayey soil and the flat terrain. The soil may remain wet for several weeks.

Fertility: Moderate to low natural fertility as indicated by the exchangeable cation data for the non-organic fraction. Test data indicate marginal deficiencies of magnesium, potassium, manganese and copper. Phosphorus levels are sub-optimal - the high fixation potential of the iron-rich soil is an ongoing problem.

pH: Acidic at the surface, becoming slightly more acidic with depth. Dolomite is needed to correct the problem and reduce the high calcium/magnesium ratio.

Rooting depth: 80 cm, but few roots below 60 cm.

Barriers to root growth:

Physical: No physical barriers, except where sheets of ironstone occur. Waterlogging affects root development during winter.

Chemical: Marginal fertility, acidity and high content of ironstone.

Waterholding capacity: 50 mm, but effectively available water may be considerably less due to poor root growth caused by near-surface waterlogging followed by rapid drying of the soil.

Seedling emergence: Good to fair. Soil will seal if organic matter is too low.

Workability: Good, except where surface stone and gravel cause excessive wear on points.

Erosion Potential:

Water: Low.

Wind: Low.

Laboratory Data

<table>
<thead>
<tr>
<th>Depth cm</th>
<th>pH H2O</th>
<th>pH CaCl2</th>
<th>CO2%</th>
<th>EC1:5 ds/m</th>
<th>ECe ds/m</th>
<th>Org.C%</th>
<th>Avail. P mg/kg</th>
<th>Avail. K mg/kg</th>
<th>SO4 mg/kg</th>
<th>Boron mg/kg</th>
<th>Trace Elements mg/kg (DTPA)</th>
<th>CEC cmol (+)/kg</th>
<th>Exchangeable Cations cmol (+)/kg</th>
<th>ESP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paddock</td>
<td>5.7</td>
<td>5.3</td>
<td>0</td>
<td>0.11</td>
<td>-</td>
<td>5.1</td>
<td>22</td>
<td>130</td>
<td>1.1</td>
<td>0.7</td>
<td>161</td>
<td>2.2</td>
<td>6.6</td>
<td>14.7</td>
</tr>
<tr>
<td>0-10</td>
<td>6.0</td>
<td>5.5</td>
<td>0</td>
<td>0.07</td>
<td>0.27</td>
<td>4.2</td>
<td>9</td>
<td>190</td>
<td>1.1</td>
<td>0.3</td>
<td>105</td>
<td>4.2</td>
<td>14.2</td>
<td>8.9</td>
</tr>
<tr>
<td>10-21</td>
<td>5.6</td>
<td>5.0</td>
<td>0</td>
<td>0.05</td>
<td>0.11</td>
<td>1.1</td>
<td>&lt;2</td>
<td>130</td>
<td>1.1</td>
<td>0.8</td>
<td>34</td>
<td>0.1</td>
<td>0.2</td>
<td>9.2</td>
</tr>
<tr>
<td>21-40</td>
<td>5.2</td>
<td>4.6</td>
<td>0</td>
<td>0.06</td>
<td>0.09</td>
<td>0.7</td>
<td>&lt;2</td>
<td>73</td>
<td>1.3</td>
<td>&lt;0.1</td>
<td>10</td>
<td>&lt;0.1</td>
<td>&lt;0.1</td>
<td>9.2</td>
</tr>
<tr>
<td>40-60</td>
<td>5.2</td>
<td>4.7</td>
<td>0</td>
<td>0.06</td>
<td>-</td>
<td>0.5</td>
<td>&lt;2</td>
<td>29</td>
<td>1.6</td>
<td>&lt;0.1</td>
<td>6</td>
<td>&lt;0.1</td>
<td>&lt;0.1</td>
<td>10.4</td>
</tr>
<tr>
<td>60-140</td>
<td>4.9</td>
<td>4.4</td>
<td>0</td>
<td>0.06</td>
<td>-</td>
<td>0.1</td>
<td>&lt;2</td>
<td>5</td>
<td>1.3</td>
<td>&lt;0.1</td>
<td>3</td>
<td>&lt;0.1</td>
<td>&lt;0.1</td>
<td>6.0</td>
</tr>
</tbody>
</table>

Note: Paddock sample bulked from 20 cores (0-10 cm) taken around the pit.
* EDTA trace element analyses for “paddock” sample.
CEC (cation exchange capacity) is a measure of the soil’s capacity to store and release major nutrient elements.
ESP (exchangeable sodium percentage) is derived by dividing the exchangeable sodium value by the CEC.

Further information: DEWNR Soil and Land Program