

## IRONSTONE SOIL WITH CALCAREOUS LOWER SUBSOIL (Vanilla soil – sodic variant)

**General Description:** *Ironstone gravelly loamy sand to sandy loam over a coarsely structured brown to yellow clay with variable iron segregations, calcareous with depth*

**Landform:** Gently undulating plain with low rises.

**Substrate:** Deeply weathered kaolinized Tertiary clay.

**Vegetation:**

|                   |                 |                                                     |                         |
|-------------------|-----------------|-----------------------------------------------------|-------------------------|
| <b>Type Site:</b> | Site No.: EL006 | 1:50,000 sheet: 6029-1 (Cockaleecheie)              | Hundred: Brooker        |
|                   |                 | Annual rainfall: 390 mm                             | Sampling date: 26/03/92 |
|                   |                 | Landform: Midslope of low rise, with slope of 3-4%  |                         |
|                   |                 | Surface: Soft with 2-10% ironstone gravel (6-20 mm) |                         |

**Soil Description:**

| <i>Depth (cm)</i> | <i>Description</i>                                                                                                                                         |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0-10              | Dark greyish brown soft massive loamy coarse sand with 10-20% ironstone concretions. Clear to:                                                             |
| 10-20             | Brown friable massive loamy coarse sand with 20-50% ironstone concretions. Sharp to:                                                                       |
| 20-56             | Brownish yellow and red very hard medium heavy clay with coarse prismatic structure and minor ironstone concretions. Sharp to:                             |
| 56-155            | Orange and red very hard medium clay with strong fine angular blocky structure, 10-20% ironstone nodules and 2-10% fine calcareous segregations. Clear to: |
| 155-190           | Brownish yellow and red firm medium clay with strong fine angular blocky structure and fragments of Tertiary sandstone.                                    |



**Classification:** Ferric, Hypernatric, Yellow Sodosol; medium, gravelly, sandy / clayey, very deep

### Summary of Properties

**Drainage** Imperfectly drained. Water perches on the clayey subsoil for several weeks at a time following heavy or prolonged rainfall.

**Fertility** Inherent fertility is low. Nutrient retention capacity of the surface soil is low because of the low clay content, while abundant ironstone gravel reduces phosphate availability. Organic carbon levels are satisfactory.

**pH** Acidic at the surface, neutral with depth.

**Rooting depth** 56 cm in pit.

#### Barriers to root growth

**Physical:** The dense dispersive clay subsoil prevents uniform root distribution. There is little growth inside clay aggregates, thereby reducing water use efficiency.

**Chemical:** There are no chemical limitations.

**Water holding capacity** Approximately 55 mm in the root zone.

**Seedling emergence:** Satisfactory, although slight water repellence may reduce establishment in some seasons.

**Workability:** Soft surface is easily worked, but ironstone gravel abrades implements.

#### Erosion Potential

**Water:** Moderately low.

**Wind:** Moderately low.

### Laboratory Data

| Depth cm | pH H <sub>2</sub> O | pH CaCl <sub>2</sub> | CO <sub>3</sub> % | EC1:5 dS/m | ECe dS/m | Org.C % | Avail. P mg/kg | Avail. K mg/kg | SO <sub>4</sub> mg/kg | Boron mg/kg | Trace Elements mg/kg (DTPA) |     |      |      | CEC cmol (+)/kg | Exchangeable Cations cmol(+)/kg |     |      |      | ESP  |
|----------|---------------------|----------------------|-------------------|------------|----------|---------|----------------|----------------|-----------------------|-------------|-----------------------------|-----|------|------|-----------------|---------------------------------|-----|------|------|------|
|          |                     |                      |                   |            |          |         |                |                |                       |             | Cu                          | Fe  | Mn   | Zn   |                 | Ca                              | Mg  | Na   | K    |      |
| 0-10     | 5.6                 | 4.9                  | 0                 | 0.08       | 0.67     | 1.33    | 23             | -              | 5.2                   | 1.1         | 0.52                        | 44  | 3.37 | 0.65 | 8.3             | 4.1                             | 0.8 | 0.27 | 0.33 | 3.3  |
| 10-20    | 6.6                 | 6.6                  | 1                 | 0.08       | 0.64     | 0.16    | 5              | -              | 2.7                   | 0.4         | 0.24                        | 36  | 3.21 | 0.35 | 2.1             | 1.4                             | 0.3 | 0.14 | 0.10 | na   |
| 20-56    | 6.6                 | 6.6                  | 1                 | 0.08       | 0.64     | -       | -              | -              | 27                    | 5.7         | 0.24                        | 36  | 0.24 | 0.24 | 19.2            | 7.7                             | 8.1 | 4.82 | 0.73 | 25.1 |
| 56-155   | 6.2                 | 5.4                  | 2                 | 0.12       | 0.52     | -       | -              | -              | 120                   | 11.3        | 0.06                        | 23  | 0.96 | 0.06 | 19.5            | 5.9                             | 7.7 | 6.50 | 0.76 | 33.3 |
| 155-190  | 7.3                 | 6.4                  | 0                 | 0.22       | 1.36     | -       | -              | -              | 39                    | 10.5        | 0.06                        | 5.1 | 0.33 | 0.02 | 12.4            | 3.1                             | 4.8 | 4.18 | 0.50 | 33.7 |

**Note:** 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