# IRONSTONE SOIL

***General Description:*** *Ironstone gravelly sandy loam over a well structured yellow and red clay, becoming greyer with depth and grading to kaolinized weathering rock*

**Landform:** Gently undulating rises.

**Substrate:** Deeply weathered kaolinized sandstone.

**Vegetation:** Kangaroo Island mallee (Eucalyptus cneorifolia)

**Type Site:** Site No.: CK003

| | | | |
|---|---|---|---|
| 1:50,000 sheet: | 6326-1 (Cassini) | Hundred: | Menzies |
| Annual rainfall: | 500 mm | Sampling date: | 08/03/93 |
| Landform: | Very gently undulating crest of low rise, 1% slope | | |
| Surface: | Firm with no stones | | |

**Soil Description:**

| *Depth (cm)* | *Description* |
|---|---|
| 0-12 | Dark brown friable massive sandy loam with more than 50% ironstone nodules (2-20 mm). Clear change to: |
| 12-30 | Pink friable massive sandy loam with more than 50% ironstone nodules (2-20 mm). Sharp change to: |
| 30-50 | Brownish yellow and red hard light clay with strong fine polyhedral structure. Gradual change to: |
| 50-75 | Yellowish brown, light yellowish brown and red firm light clay with weak coarse prismatic breaking to fine subangular blocky structure. Gradual change to: |
| 75-115 | Pale yellow, yellowish brown and red firm medium clay with structure as above, and minor ironstone nodules. Gradual change to: |
| 115-140 | Light grey, yellowish brown and red hard medium clay with medium subangular blocky structure and 10-20% ironstone fragments (20-60 mm). |

**Classification:** Bleached-Ferric, Eutrophic, Yellow Chromosol; thick, moderately gravelly, loamy/clayey, deep

## *Summary of Properties*

**Drainage** Imperfectly drained, due to low permeability clay subsoil. Soil may remain wet for a week to several weeks following heavy or prolonged rainfall.

**Fertility** Natural fertility is moderate as indicated by the exchangeable cation data, but surface fertility relies on maintenance of organic matter at current levels. High ironstone ties up phosphorus, levels of which are marginal at the sampling site. Surface potassium and trace element concentrations are adequate.

**pH** Acidic throughout.

**Rooting depth** 75 cm in pit, but few roots below 30 cm.

**Barriers to root growth**

**Physical:** The clayey subsoil restricts root growth to some extent.

**Chemical:** Phosphorus fixation and subsoil trace element deficiencies impede root growth.

**Water holding capacity** 100 mm in root zone, but about a third is effectively unavailable due to low root density.

**Seedling emergence:** Good, provided surface organic matter is maintained

**Workability:** Fair due to abrasive effects of ironstone.

**Erosion Potential**

**Water:** Low.

**Wind:** Low.

## *Laboratory Data*

| Depth cm | pH $H_2O$ | pH $CaC1_2$ | $CO_3$ % | EC1:5 dS/m | ECe dS/m | Org.C % | Avail. P mg/kg | Avail. K mg/kg | $SO_4$-S 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 | |
| Paddock | 5.4 | 4.9 | 0 | 0.21 | 1.22 | 2.6 | 28 | 560 | - | 1.5 | 0.8 | 170 | 6.6 | 1.9 | 13.0 | 6.36 | 0.97 | 0.13 | 1.11 | 1.0 |
| | | | | | | | | | | | | | | | | | | | | |
| 0-12 | 5.0 | 4.5 | 0 | 0.12 | 0.84 | 2.5 | 20 | 320 | - | 1.2 | 0.8 | 160 | 3.2 | 0.6 | 11.2 | 5.13 | 0.80 | 0.13 | 0.58 | 1.2 |
| 12-30 | 5.5 | 4.9 | 0 | 0.03 | 0.17 | 0.51 | 7 | 200 | - | 0.8 | 0.3 | 85 | 0.2 | 0.8 | 5.0 | 2.29 | 0.61 | 0.09 | 0.37 | 1.8 |
| 30-50 | 6.2 | 5.9 | 0 | 0.08 | 0.15 | 0.30 | 5 | 360 | - | 3.2 | 0.1 | 6 | <0.1 | 0.1 | 17.8 | 8.20 | 8.09 | 0.42 | 0.84 | 2.4 |
| 50-75 | 6.1 | 5.9 | 0 | 0.08 | 0.15 | 0.04 | 4 | 330 | - | 2.9 | 0.1 | 3 | <0.1 | <0.1 | 14.2 | 5.40 | 7.51 | 0.74 | 0.55 | 5.2 |
| 75-115 | 5.7 | 5.5 | 0 | 0.07 | 0.14 | 0.06 | 5 | 300 | - | 3.3 | 0.1 | 2 | <0.1 | <0.1 | 14.3 | 5.40 | 7.97 | 0.81 | 0.54 | 5.7 |
| 115-140 | 5.6 | 5.5 | 0 | 0.07 | 0.15 | 0.07 | 5 | 210 | - | 2.9 | 0.1 | 3 | <0.1 | <0.1 | 10.6 | 4.30 | 5.31 | 0.54 | 0.35 | 5.1 |

**Note**: Paddock sample bulked from 20 cores (0-10 cm) taken around the pit.

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