

## IRONSTONE SOIL WITH CALCAREOUS LOWER SUBSOIL

**General Description:** *Ironstone gravelly loamy sand over a brown and red clay, calcareous with depth grading to kaolinitic weathering material*

**Landform:** Undulating rises.

**Substrate:** Deeply weathered and kaolinized basement sandstone (Kanmantoo Group).

**Vegetation:** Acacia and stringybark.



|                   |                |              |                    |                    |
|-------------------|----------------|--------------|--------------------|--------------------|
| <b>Type Site:</b> | Site No.:      | CK011        | 1:50,000 mapsheet: | 6426-4 (Kingscote) |
|                   | Hundred:       | MacGillivray | Easting:           | 726850             |
|                   | Section:       | 1            | Northing:          | 6040200            |
|                   | Sampling date: | 25/2/94      | Annual rainfall:   | 525 mm average     |

Upper slope of 2%. Loose surface with 10-20% ironstone (6-20 mm).

### Soil Description:

| <i>Depth (cm)</i> | <i>Description</i>   |
|-------------------|--|
| 0-5               | Very dark brown soft single grained loamy sand with 20-50% ironstone gravel (6-20 mm). Abrupt to:  |
| 5-13              | Dark brown soft massive loamy sand with more than 50% ironstone gravel (6-20 mm). Abrupt to:   |
| 13-16             | Very pale brown firm massive loamy fine sand with 20-50% ironstone gravel (6-20 mm). Sharp to:   |
| 16-42             | Yellowish brown and red very hard sandy medium heavy clay with coarse prismatic breaking to angular blocky structure and 2-10% ironstone gravel (6-20 mm). Clear to: |
| 42-76             | Yellowish brown and yellow hard very highly calcareous medium clay with coarse angular blocky structure. Clear to:   |
| 76-120            | Yellowish brown, light grey and red very hard medium clay with moderate angular blocky structure. Gradual to:  |
| 120-145           | Yellowish brown, red and white very hard medium clay with weak angular blocky structure and minor ironstone.   |



**Classification:** Ferric, Mottled-Subnatric, Brown Sodosol; medium, moderately gravelly, sandy / clayey, deep



## Summary of Properties

- Drainage:** Imperfectly drained, due to the tight domed shallow clay subsoil. Soil may remain wet for several weeks following heavy or prolonged rainfall.
- Fertility:** Natural fertility is moderate as indicated by exchangeable cation data. Most surface nutrient retention is provided by organic matter (organic carbon levels are very high). Ironstone gravel can tie up phosphorus, although levels are high at the sampling site. Concentrations of all other tested elements are adequate.
- pH:** Acidic at the surface, strongly alkaline at depth.
- Rooting depth:** Approximately 60 cm in pit, but few roots below 13 cm.
- Barriers to root growth:**
- Chemical:** Root growth is impeded by phosphorus fixation by ironstone and induced subsoil trace element deficiencies.
  - Physical:** Hard coarsely structure subsoil clay reduces root density and hence use efficiency.
- Waterholding capacity:** 70 mm in rootzone, but low subsoil root density reduces effective availability.
- Seedling emergence:** Good, provided surface organic matter is maintained.
- Workability:** Fair - ironstone is abrasive.
- Erosion Potential:**
- Water:** Moderately low.
  - Wind:** Moderately low.

## Laboratory Data

| Depth<br>cm | pH<br>H <sub>2</sub> O | pH<br>CaCl <sub>2</sub> | CO <sub>3</sub><br>% | EC1:5<br>dS/m | ECe<br>dS/m | Org.C<br>% | Avail.<br>P<br>mg/kg | Avail.<br>K<br>mg/kg | SO <sub>4</sub><br>mg/kg | Boron<br>mg/kg | Trace Elements mg/kg<br>(DTPA) |     |     |     | CEC<br>cmol<br>(+)/kg | Exchangeable Cations<br>cmol(+)/kg |      |      |      | ESP  |
|-------------|------------------------|-------------------------|----------------------|---------------|-------------|------------|----------------------|----------------------|--------------------------|----------------|--------------------------------|-----|-----|-----|-----------------------|------------------------------------|------|------|------|------|
|             |                        |                         |                      |               |             |            |                      |                      |                          |                | Cu                             | Fe  | Mn  | Zn  |                       | Ca                                 | Mg   | Na   | K    |      |
| Paddock     | 5.8                    | 5.2                     | 0                    | 0.29          | 2.14        | 4.2        | 41                   | 571                  | -                        | 1.5            | 0.5                            | 172 | 5.2 | 0.9 | 14.8                  | 9.54                               | 2.46 | 0.39 | 1.47 | 2.6  |
| 0-5         | 5.7                    | 5.1                     | 0                    | 0.23          | 0.91        | 7.2        | 38                   | 332                  | -                        | 0.9            | 0.6                            | 488 | 8.7 | 2.2 | 16.6                  | 11.3                               | 2.07 | 0.21 | 0.87 | 1.3  |
| 5-13        | 6.0                    | 5.1                     | 0                    | 0.04          | 0.30        | 2.4        | 12                   | 83                   | -                        | 0.4            | 0.4                            | 100 | 1.5 | 0.2 | 8.1                   | 5.56                               | 0.91 | 0.15 | 0.23 | 1.9  |
| 13-16       | 6.6                    | 5.4                     | 0                    | 0.03          | 0.26        | 0.6        | 6                    | 55                   | -                        | 0.3            | 0.2                            | 58  | 0.3 | 0.2 | 3.6                   | 2.80                               | 0.57 | 0.18 | 0.18 | 5.0  |
| 16-42       | 7.1                    | 6.0                     | 0                    | 0.19          | 1.24        | 1.1        | <4                   | 394                  | -                        | 2.9            | 0.1                            | 67  | 0.1 | 0.2 | 20.7                  | 7.88                               | 7.57 | 2.87 | 1.14 | 13.9 |
| 42-76       | 9.6                    | 8.5                     | 19.4                 | 0.73          | 2.42        | 0.3        | <4                   | 341                  | -                        | 5.5            | 0.1                            | 6   | 0.2 | 0.2 | 21.1                  | 5.95                               | 9.19 | 6.82 | 0.88 | 32.3 |
| 76-120      | 9.7                    | 8.7                     | 0.2                  | 0.61          | 2.61        | 0.0        | <4                   | 338                  | -                        | 8.6            | 0.2                            | 6   | 0.1 | 0.2 | 20.7                  | 4.25                               | 8.40 | 7.24 | 0.80 | 35.0 |
| 120-145     | 9.0                    | 8.1                     | 0                    | 0.73          | 3.76        | 0.1        | <4                   | 301                  | -                        | 11.8           | 0.3                            | 8   | 0.1 | 0.2 | 22.0                  | 3.93                               | 8.47 | 7.56 | 0.79 | 34.4 |

**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

**Further information:** [DEWNR Soil and Land Program](#)

