# GRADATIONAL CLAY LOAM

***General Description:*** *Reddish brown loam to clay loam, more clayey with depth, over rubbly carbonate within 50 cm. Rubble grades to fine carbonate which merges with clayey alluvium or highly weathered rock.*

**Landform:** Lower slopes and pediments adjacent to ranges of the Northern Agricultural Districts

**Substrate:** Highly weathered sandstone, capped by Class III C carbonate layer

**Vegetation:** Mallee scrub

**Type Site:** Site No.: CU041

| | | | |
|---|---|---|---|
| 1:50,000 sheet: | 6532-2 (Booleroo) | Hundred: | Booleroo |
| Annual rainfall: | 400 mm | Sampling date: | 06/06/94 |
| Landform: | Lower slope of a gently undulating rise, 2% slope | | |
| Surface: | Firm with minor calcrete, sandstone and ironstone gravel | | |

**Soil Description:**

| *Depth (cm)* | *Description* |
|---|---|
| 0-10 | Dark reddish brown light clay with weak subangular blocky structure. Clear to: |
| 10-21 | Reddish brown weakly calcareous light medium clay with moderate subangular blocky structure. Abrupt to: |
| 21-38 | Reddish brown very highly calcareous massive light clay with 20-50% carbonate nodules. Abrupt to: |
| 38-50 | Moderately cemented nodular calcrete pan (Class III C carbonate). Clear to: |
| 50-80 | Orange very highly calcareous sandy light clay with 2-10% carbonate nodules. Clear to: |
| 80-105 | Red highly calcareous medium heavy clay with strong angular blocky structure and 10-20% soft carbonate. Gradual to: |
| 105-140 | Weathering sandstone with 2-10% soft carbonate segregations. |

**Classification:** Sodic, Lithocalcic, Red Dermosol; medium, non-gravelly, clayey / clayey, deep

## *Summary of Properties*

**Drainage** Well drained. The soil is unlikely to remain wet for more than a week following rain.

**Fertility** The soil has a high nutrient storage capacity (high CEC values) and good calcium status (more than 75% of CEC), indicating favourable fertility. Organic carbon levels are also satisfactory (adequate nitrogen reserves). All elements except phosphorus appear to be in good supply.

**pH** Alkaline at the surface, strongly alkaline with depth.

**Rooting depth** 105 cm in pit but there are very few roots below 80 cm.

**Barriers to root growth**

**Physical:** There are no physical barriers except where the calcrete becomes massive.

**Chemical:** Salt and boron levels are not a problem, but high pH and carbonate contents limit nutrient availability in the subsoil. High sodium (ESP more than 30%) affects root growth.

**Water holding capacity** Approximately 80 mm.

**Seedling emergence** Good.

**Workability** Good.

**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 | 8.3 | 7.9 | 1.0 | 0.12 | 0.56 | 1.6 | 18 | 666 | - | 1.6 | 0.7 | 6 | 13.1 | 1.2 | 23.5 | 18.0 | 2.3 | 0.18 | 2.0 | 0.8 |
| | | | | | | | | | | | | | | | | | | | | |
| 0-10 | 8.2 | 7.7 | 0.1 | 0.10 | 0.50 | 1.6 | 15 | 552 | - | 1.8 | 0.6 | 7 | 12.4 | 1.5 | 22.9 | 17.3 | 2.3 | 0.16 | 1.7 | 0.7 |
| 10-21 | 8.2 | 7.8 | 0.1 | 0.12 | 0.74 | 0.8 | 4 | 254 | - | 1.9 | 0.5 | 7 | 3.9 | 0.3 | 17.6 | 15.8 | 3.5 | 0.24 | 0.81 | 1.4 |
| 21-38 | 8.7 | 8.1 | 14.8 | 0.15 | 0.58 | 1.1 | 4 | 138 | - | 2.6 | 0.6 | 7 | 3.2 | 0.4 | 20.2 | 13.8 | 5.4 | 0.76 | 0.46 | 3.8 |
| 38-50 | 9.4 | 8.3 | 66.8 | 0.31 | 1.40 | 0.7 | 4 | 74 | - | 6.0 | 0.3 | 2 | 0.8 | 0.4 | 9.9 | 4.4 | 4.2 | 1.9 | 0.23 | 18.9 |
| 50-80 | 9.6 | 8.3 | 60.9 | 0.51 | 1.90 | 0.3 | <4 | 90 | - | 5.9 | 0.4 | 3 | 0.7 | 0.3 | 12.2 | 3.9 | 5.2 | 3.6 | 0.26 | 29.6 |
| 80-105 | 9.6 | 8.5 | 22.5 | 0.57 | 1.39 | 0.2 | <4 | 147 | - | 11.1 | 4.6 | 4 | 0.8 | 0.4 | 20.7 | 4.7 | 8.9 | 7.1 | 0.45 | 34.5 |
| 105-140 | 9.7 | 8.5 | 6.8 | 0.42 | 2.40 | 0.1 | <4 | 60 | - | 6.9 | 0.1 | 1 | 0.4 | 0.3 | 7.7 | 1.9 | 2.9 | 2.5 | 0.13 | 32.2 |

**Note**: Paddock sample bulked from 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.