# HARD LOAM OVER DISPERSIVE RED CLAY

***General Description:*** *Hard setting reddish brown sandy loam to clay loam overlying a strongly structured dark reddish brown clayey subsoil with soft calcareous segregations at depth, forming in fine grained alluvium*

**Landform:** Lower slopes and valley flats

**Substrate:** Fine grained alluvium, mantled by soft secondary carbonates, of the Pooraka Formation

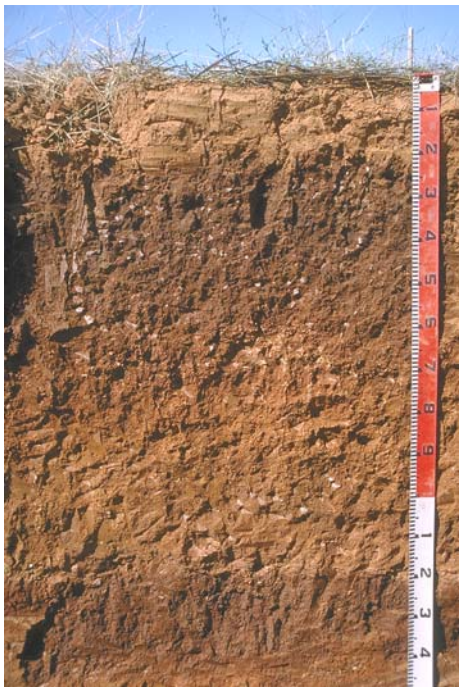
**Vegetation:** Open savannah with scattered blue gum, red gum, sheoak and irongrass

**Type Site:**

| | | | |
|---|---|---|---|
| Site No.: | CU025 | | |
| 1:50,000 sheet: | 6631-3 (Bundaleer) | Hundred: | Belalie |
| Annual rainfall: | 450 mm | Sampling date: | 25/02/93 |
| Landform: | Mid slope of a broad alluvial fan, 2% slope | | |
| Surface: | Hard setting with no stones | | |

**Soil Description:**

| *Depth (cm)* | *Description* |
|---|---|
| 0-20 | Yellowish red very hard massive light clay loam. Abrupt change to: |
| 20-40 | Dark reddish brown very hard medium heavy clay with strong coarse prismatic structure. Gradual change to: |
| 40-65 | Dark reddish brown very hard medium heavy clay with strong blocky structure. Clear change to: |
| 65-95 | Red friable highly calcareous medium clay with moderate blocky structure and 2-10% soft carbonate segregations. Gradual change to: |
| 95-120 | Dark red and orange very hard massive clay loam (buried soil surface). Abrupt change to: |
| 120-150 | Dark red firm medium clay with strong prismatic structure (buried subsoil). |



**Classification:** Calcic, Subnatric, Red Sodosol; medium, non-gravelly, loamy / clayey, moderate

## *Summary of Properties*

**Drainage** Moderately well to imperfectly drained due to the soil's hard setting, sealing surface and its slowly permeable sodic clay subsoil. The soil may remain wet for one to several weeks after rain.

**Fertility** Inherent fertility is moderate to high, as indicated by the exchangeable cation data. Organic matter (low at the type site) is necessary to maintain surface fertility. There is ample surface phosphorus (high values in the lower layers indicate a buried soil).

**pH** Slightly acidic at the surface, grading to alkaline with depth.

**Rooting depth** 120 cm in pit, but few roots below 95 cm.

**Barriers to root growth**

**Physical:** Hard clay subsoil (caused high exchangeable sodium).

**Chemical:** Class I carbonate layer from 65 cm restricts root development. Low zinc from 20 cm may also be limiting.

**Water holding capacity** 140 mm in root zone (high), but not all is available because of low root densities.

**Seedling emergence** Fair to poor due to hard setting surface which tends to seal over. This condition is made worse by low organic matter levels. Gypsum response is highly likely.

**Workability** Fair to poor due to the poor structure of the surface. The soil has only a narrow moisture range for safe cultivation, outside of which shattering or puddling occurs. Improved organic matter status and gypsum will improve workability.

**Erosion Potential**

**Water:** Moderately low due to the low slope. However the soil is highly erodible and on sloping ground erosion potential would be significant.

**Wind:** Low, unless the soil is excessively cultivated or over-grazed.

## *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 | 5.7 | 5.2 | 0 | 0.06 | 0.41 | 1.2 | 54 | 1003 | - | 1.0 | 1.3 | 43 | 58.9 | 0.6 | 7.4 | 3.81 | 1.52 | 0.14 | 0.72 | 1.9 |
| | | | | | | | | | | | | | | | | | | | | |
| 0-20 | 6.1 | 5.4 | 0 | 0.04 | 0.20 | 0.7 | 39 | 1117 | - | 1.0 | 1.4 | 19 | 34.9 | 0.3 | 6.7 | 3.43 | 1.75 | 0.26 | 0.45 | 3.9 |
| 20-40 | 8.0 | 7.0 | 0 | 0.12 | 0.30 | 0.8 | 7 | 1110 | - | 7.5 | 2.1 | 9 | 8.1 | 0.1 | 24.6 | 6.33 | 10.79 | 3.30 | 1.19 | 13.4 |
| 40-65 | 8.7 | 7.9 | 0.2 | 0.21 | 0.63 | 0.4 | 7 | 562 | - | 12.6 | 1.6 | 7 | 4.7 | 0.1 | 22.3 | 5.22 | 11.36 | 3.80 | 1.21 | 17.0 |
| 65-95 | 9.0 | 8.3 | 4.9 | 0.64 | 4.08 | 0.1 | 9 | 824 | - | 6.2 | 0.8 | 6 | 2.4 | 0.2 | 15.3 | 3.94 | 7.85 | 3.87 | 0.79 | 25.3 |
| 95-120 | 8.9 | 8.4 | 0.3 | 0.51 | 4.10 | 0.1 | 12 | 921 | - | 3.4 | 0.6 | 4 | 2.8 | 0.2 | 8.7 | 2.49 | 4.40 | 2.22 | 0.40 | 25.5 |
| 120-150 | 8.3 | 7.8 | 0.1 | 0.94 | 4.46 | 0.2 | 23 | 602 | - | 11.0 | 1.2 | 6 | 2.3 | 0.1 | 29.7 | 6.19 | 15.61 | 8.11 | 1.59 | 27.3 |

**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.