# HARD GRADATIONAL RED CLAY

***General Description:*** *Hard clay loam to clay over a red coarsely structured clay, calcareous with depth*

**Landform:** Gently undulating plains.

**Substrate:** Deeply weathered granite, mantled by fine carbonate.

**Vegetation:**

**Type Site:** Site No.: CY029

| | | | |
|---|---|---|---|
| 1:50,000 sheet: | 6430-2 (Alford) | Hundred: | Tickera |
| Annual rainfall: | 360 mm | Sampling date: | 20/07/94 |
| Landform: | Very gentle slope of 0.5% | | |
| Surface: | Hard setting with minor calcrete stone (20-60 mm) | | |

**Soil Description:**

| *Depth (cm)* | *Description* |
|---|---|
| 0-10 | Dark brown hard light clay with weak subangular blocky structure and minor quartz grit. Clear to: |
| 10-38 | Red very hard medium clay with coarse prismatic breaking to strong coarse angular blocky structure. Gradual to: |
| 38-68 | Reddish yellow hard massive very highly calcareous light medium clay. Diffuse to: |
| 68-140 | Yellowish red hard massive very highly calcareous light medium clay. Gradual to: |
| 140-150 | Yellowish red, light grey and red friable massive very highly calcareous light medium clay with 20-50% soft weathered granite fragments (60-200 mm). |

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

## *Summary of Properties*

**Drainage** Moderately well drained. Water perches on the hard subsoil clay for up to a week following heavy or prolonged rainfall.

**Fertility** Inherent fertility is high, as indicated by the exchangeable cation data and high clay content. Surface soil fertility relies on organic matter and phosphorus - levels of both are adequate at the sampling site. Apart from nitrogen and phosphorus, nutrient deficiencies are likely to be sporadic, depending on seasonal conditions.

**pH** Alkaline throughout.

**Rooting depth** Approximately 70 cm in pit, but few roots below 38 cm.

**Barriers to root growth**

**Physical** High soil strength in subsoil acts as a barrier to roots. Densities are reduced but growth is not prevented.

**Chemical** High sodicity and pH from 68 cm restrict deeper root growth. Low trace element availability in the subsoil contributes to poor root density.

**Water holding capacity** Approximately 115 mm in rootzone, but some of this is effectively unavailable due to low root density in the subsoil.

**Seedling emergence** Fair. Organic matter levels need to be maintained to preserve surface structure.

**Workability** Fair.

**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 | 8.0 | 7.2 | <0.1 | 0.2 | 0.6 | 1.65 | 35 | 638 | 7.2 | 1.3 | - | - | - | - | 25.3 | 17.94 | 3.21 | 0.23 | 3.08 | 0.9 |
| | | | | | | | | | | | | | | | | | | | | |
| 0-10 | 7.9 | 7.2 | <0.1 | 0.1 | 0.4 | 1.4 | 16 | 668 | 5.1 | 1.0 | - | - | - | - | 25.4 | 18.87 | 3.39 | 0.29 | 2.76 | 1.1 |
| 10-38 | 8.6 | 7.7 | 0.2 | 0.3 | 0.5 | 0.55 | 2 | 287 | 3.4 | 0.6 | - | - | - | - | 32.5 | 23.54 | 8.57 | 1.65 | 1.46 | 5.1 |
| 38-68 | 9.2 | 8.0 | 23.7 | 0.3 | 0.5 | 0.3 | 2 | 262 | 7.3 | 1.2 | - | - | - | - | 21.9 | 9.55 | 7.73 | 5.07 | 1.17 | 23.2 |
| 68-140 | 9.5 | 8.2 | 20.3 | 0.4 | 0.7 | 0.2 | 2 | 312 | 16 | 4.1 | - | - | - | - | 22.4 | 8.22 | 8.40 | 7.71 | 1.23 | 34.4 |
| 140-150 | 9.5 | 8.1 | 19.5 | 0.3 | 0.8 | 0.15 | 4 | 190 | 19 | - | - | - | - | - | 18.0 | 7.25 | 6.98 | 5.68 | 0.55 | 31.6 |

**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