# SAND OVER BROWN SODIC CLAY

***General Description:*** *Sandy loam surface soil with a thin bleached sandy subsurface layer over brown dispersive clay with soft carbonate*

**Subgroup soil:** G4

**Landform:** Level plain

**Substrate:** Alluvial heavy clay

**Vegetation:** Irrigated lucerne.

**Type Site:**

| | | | |
|---|---|---|---|
| Site No: | SE144 | 1:50,000 mapsheet: | 7025-4 (Cannawigara) |
| Hundred: | Cannawigara | Easting: | 465900 |
| Sampling date: | 21/10/08 | Northing: | 6001660 |
| | | Annual rainfall: | 475 mm average |

**Soil Description:**

| *Depth (cm)* | *Description* |
|---|---|
| 0–10 | Hardsetting, water repellent, dark brown, sandy loam with massive structure. |
| 10–13 | Bleached, loamy sand with massive structure. |
| 13–35 | High-strength, yellowish brown, medium heavy clay with weak, coarse prismatic parting to strong subangular blocky structure. |
| 35–50 | Highly calcareous, yellowish brown, medium heavy clay with weak, coarse prismatic parting to strong subangular blocky structure and 20–50% soft carbonate segregations (6–20 mm in diameter). |
| 50–90 | Highly calcareous, pale yellow, light medium clay with weak subangular blocky structure and abundant fine carbonate. |
| 90–130 | Light olive brown and strong brown, medium clay with weak angular blocky structure and soft carbonate in root channels [Blanchetown Clay Formation]. |
| 130–160 | Olive yellow and light olive brown, light sandy clay loam with massive structure [Parilla Sand Formation]. |

**Classification:** Hypercalcic, Subnatric, Brown Sodosol; medium, non-gravelly, loamy/clayey, deep.

## *Summary of Properties*

**Drainage:** Drainage is moderately good to imperfect.

**Fertility:** Inherent fertility is low in the topsoil (especially in the bleached subsurface layer; however, this is only thin), but high in the subsoil, as the sandy topsoil has limited capacity to retain and provide nutrients, unlike the clayey subsoil. However, much of the soil's fertility is provided by the organic matter present in the surface soil. Maintenance and improvement of surface soil organic matter and residues is important for maintenance of fertility as well as protection against erosion.

**pH:** Soil pH is slightly alkaline in the surface soil (which is irrigation induced), grading to alkaline in the lower subsoil.

**Rooting depth:** Viewed in the pit: most roots occur above 50 cm, with some to 130 cm.

**Barriers to Root Growth:**

**Physical:** Dispersiveness and high subsoil strength limit root growth.

**Chemical:** Moderate levels of salts, high pH, low levels of some nutrients (e.g. zinc and phosphorus?), and possibly low oxygen levels associated with wetness, may limit root growth with depth. Raised levels of salts also occur in the topsoil and upper subsoil. There is the likelihood of a seasonal perched watertable that would limit root growth (which could be exacerbated by irrigation).

**Waterholding capacity:** High. Total available: approx 110 mm
[(0.1x115)+(0.03x90)+(0.22x160)+(0.15x150)+(0.4x150x0.5)+(0.4x150x0.1)].

**Seedling emergence:** Good.

**Workability:** Good.

**Erosion Potential:**

**Water:** Low.

**Wind:** Moderate. Residue retention and maintenance of surface cover are important for protection against erosion.

## *Laboratory Data*

| Depth cm | pH $H_2O$ | pH $CaC1_2$ | $CO_3$ % | EC 1:5 dS/m | ECe dS/m | Org.C % | Avail. P mg/kg | Avail. K mg/kg | Cl mg/kg | $SO_4$ -S mg/kg | Boron mg/kg | Al $CaCl_2$ mg/kg | Trace Elements mg/kg (EDTA) | | | | Sum cations cmol (+)/kg | Exchangeable Cations cmol(+)/kg | | | | | | Est. ESP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | Cu | Fe | Mn | Zn | | Ca | Mg | Na | K | Al | H | |
| Paddock | 8.0 | 7.6 | 0.3 | 0.36 | 3.01 | 1.8 | 75 | 256 | 198 | 16.7 | 2.1 | 0 | 1.9 | 78 | 15 | 3.0 | 8.3 | 5.3 | 2.4 | 0.3 | 0.3 | 0.0 | 0.0 | 3 |
| | | | | | | | | | | | | | | | | | | | | | | | | |
| 0-10 | 7.8 | 7.4 | 0.3 | 0.28 | 2.79 | 1.7 | 82 | 274 | 143 | 17.2 | 2.1 | 0 | 1.9 | 120 | 14 | 2.5 | 8.8 | 5.6 | 2.6 | 0.2 | 0.4 | 0.0 | 0.0 | 3 |
| 10-13 | | | | | | | | | | | | | | | | | | | | | | | | |
| 13-35 | 8.9 | 8.1 | 0.4 | 0.37 | 2.82 | 0.3 | 6 | 432 | 235 | 23.4 | 2.8 | 0 | 0.8 | 72 | 3.2 | 0.4 | 15.3 | 6.5 | 6.1 | 1.6 | 1.1 | 0.0 | 0.0 | 11 |
| 35-50 | 9.0 | 8.3 | 7.0 | 0.77 | 7.64 | 0.2 | 4 | 391 | 932 | 64.3 | 6.5 | 0 | 0.4 | 13 | 2.2 | 0.2 | 21.3 | 14.0 | 5.2 | 1.1 | 0.9 | 0.0 | 0.0 | 5 |
| 50-90 | 8.9 | 8.4 | 4.8 | 1.49 | 14.15 | 0.1 | 2 | 490 | 1868 | 139 | 5.7 | 0 | 0.5 | 9 | 2.1 | 0.1 | 23.2 | 13.1 | 7.2 | 1.6 | 1.3 | 0.0 | 0.0 | 7 |
| 90-130 | 9.0 | 8.4 | 0.7 | 1.37 | 11.17 | 0.1 | 2 | 773 | 2077 | 182 | 14.2 | 0 | 0.7 | 21 | 12 | 0.1 | 23.6 | 7.4 | 11.0 | 3.4 | 1.8 | 0.0 | 0.0 | 14 |
| 130-160 | 8.7 | 8.2 | 0.3 | 0.96 | 11.13 | 0.1 | 2 | 530 | 1281 | 90.8 | 14.2 | 0 | 0.5 | 18 | 7.3 | 0.1 | 10.4 | 1.9 | 5.3 | 1.7 | 1.5 | 0.0 | 0.0 | 17 |

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

Sum of cations approximates the CEC (cation exchange capacity), 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, in this case estimated by the sum of cations.

**Further information:** DEWNR Soil and Land Program