

## SAND OVER CLAY ON LIMESTONE

**General Description:** *Sandy topsoil with a bleached subsurface layer over brown sandy light clay on limestone at moderate depth*

**Subgroup soil:** G3-2

**Landform:** Jumbled dunefield.

**Substrate:** Padthaway Formation clayey limestone.

**Vegetation:** Irrigated lucerne.



<b>Type Site:</b>	Site No:	MM165B	1:50,000 mapsheet:	6926-3 (Tintinara)
	Hundred:	Coombe	Easting:	414390
	Section:	76	Northing:	6028680
	Sampling date:	16/08/2005	Annual rainfall:	480 mm average

The site lies in a small closed depression. The soil is formed in a solution hole within the limestone substrate. Irrigation water comes from an underlying aquifer, approximately 80 m below shallow saline groundwater (which is at roughly 4 m depth?).

### Soil Description:

<i>Depth (cm)</i>	<i>Description</i>
0-12	Soft, water repellent, very dark greyish brown, clayey sand with single grain structure.
12-45	Bleached, loamy sand with single grain structure.
45-85	Strong brown and yellowish brown, hard, dispersive, sandy light clay with massive structure.
85-98	Slightly calcareous, light yellowish brown, sandy light clay with massive structure.
98	Very weak clayey limestone.



**Classification:** Mesotrophic, Mottled-Subnatric, Brown Sodosol; thick, non-gravelly, sandy / clayey, moderate.



## Summary of Properties

- Drainage:** Drainage is imperfect.
- Fertility:** Inherent fertility is low in the topsoil owing to the sandy nature of the soil (as sand has limited capacity to retain and provide nutrients), but somewhat raised in the more clayey subsoil. Most of the soil's natural 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. There is evidence of phosphorus leaching in this profile.
- pH:** Soil pH is slightly alkaline to alkaline in the topsoil, and alkaline below this. The alkalinity in this profile is probably irrigation induced.
- Rooting depth:** Root growth was observed to 98 cm, with most in the surface soil.
- Barriers to Root Growth:**
- Physical:** The underlying limestone layer greatly restricts root growth; while the relatively high strength and dispersive nature of the subsoil would limit root growth to some extent. The dispersive (sodic) nature of the subsoil is probably irrigation induced.
- Chemical:** Fertility is generally adequate in the sandy topsoil; however, marginal sulfur and boron levels may limit root growth. Marginal zinc levels in the subsoil may limit lower root growth. There are raised levels of salts in the surface soil. There is also the risk of seasonal waterlogging (low oxygen conditions) within the profile.
- Waterholding capacity:** Moderate. Total available: approx 80 mm  
 $[(0.12 \times 120) + (0.33 \times 90) + (0.4 \times 150 \times 0.5) + (0.13 \times 140 \times 0.3)]$
- Seedling emergence:** Good.
- Workability:** Good.
- Erosion Potential:**
- Water:** Low.
- Wind:** Moderate. Residue retention and maintenance of surface cover are crucial for protection against erosion.

## Laboratory Data

Depth cm	pH H <sub>2</sub> O	pH CaCl <sub>2</sub>	CO <sub>3</sub> %	EC 1:5 dS/m	ECe dS/m	Org.C %	Avail. P mg/kg	Avail. K mg/kg	Cl mg/kg	SO <sub>4</sub> -S mg/kg	Boron mg/kg	Al CaCl <sub>2</sub> 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	7.4	6.7	0.2	0.09	1.35	1.4	27	97	19	7.5	1.3	0	2.0	53	16.3	5.4	5.0	3.4	1.3	0.2	0.1	0.0	0.0	4
0-12	7.9	6.9	0.2	0.09	3.32	1.0	17	104	28	5.8	1.0	0	2.1	44	14.1	3.4	4.6	3.1	1.1	0.2	0.1	0.0	0.0	4
12-45	7.9	7.0	0.2	0.04	0.73	0.3	6	64	13	2.9	0.5	0	1.0	49	2.5	0.8	1.8	1.1	0.4	0.2	0.1	0.0	0.0	10
45-85	8.2	7.2	0.2	0.17	0.50	0.3	30	474	57	5.6	2.0	0	0.7	50	3.7	0.4	11.4	5.6	4.0	0.7	1.1	0.0	0.0	6
85-98	8.9	8.0	1.8	0.24	1.28	0.2	14	488	71	6.1	2.0	0	0.5	26	4.8	0.3	17.2	10.7	4.9	0.6	1.0	0.0	0.0	3
98																								

- 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](#)

