

SHALLOW BLACK CLAY LOAM ON CALCRETED LIMESTONE

General Description: *Black, organic, well-structured clay loam on Mt Gambier Limestone with a very thin calcrete cap*

Subgroup soil: B5

Landform: Gently undulating plain

Substrate: Miocene limestone

Vegetation: Irrigated grass and clover.



Type Site:	Site No:	SE147	1:50,000 mapsheet:	7022-3 (Schank)
	Hundred:	MacDonnell	Easting:	471630
	Section:	261	Northing:	5792440
	Sampling date:	23/10/08	Annual rainfall:	745 mm average

The site is in a flat, irrigated via centre-pivot irrigator. Note that a water-filled, slight drainage depression is situated nearby.

Soil Description:

<i>Depth (cm)</i>	<i>Description</i>
0–10	Hardsetting, black, somewhat spongy, clay loam with fine strong granular parting to moderate subangular blocky structure and 10–20% coarse gravelly limestone fragments.
10–24	Black, heavy clay loam with fine strong granular parting to weak subangular blocky structure and 20–50% cobbly limestone fragments.
24–25	Very strongly cemented laminar calcrete cap.
25–35	Weak rock: Mt Gambier limestone.
35–130	Very weak rock: Mt Gambier limestone with obvious shell content.



Classification: Melanic, Petrocalcic, Black Dermosol; medium, gravelly, clay loamy/–, very shallow.

Alternatively: Melanic, Petrocalcic, Chernic-Leptic Tenosol; medium, gravelly, clay loamy/–, very shallow.



Summary of Properties

- Drainage:** Drainage is imperfect to poor. This is exacerbated by compacted soil.
- Fertility:** Inherent fertility is high, given the high organic content and relatively high clay content of the soil. Surface soil phosphorus level is very high (above what is required for optimal growth). Boron levels may be marginal for high levels of productivity.
- pH:** Soil pH is alkaline.
- Rooting depth:** Root growth to the base of the soil: 24 cm in the pit where the profile was described.
- Barriers to Root Growth:**
- Physical:** Even though the soil naturally has very good structure, the pressure of cattle hooves and machinery, especially when soil is wet, have led to an increase in bulk density and hardsetting surface condition. Nonetheless, the original structural aggregates are retained. Root growth would be restricted due to the decrease in pore space and the increase in soil strength. The calcrete and limestone base form an obvious barrier to root growth.
- Chemical:** There are no chemical barriers to root growth in the soil. Note that there are raised levels of salts in the soil.
- Waterholding capacity:** Low. However mild climate reduces the loss of soil moisture to evaporation. Total available: approx 35 mm [(0.1x200x0.8)+(0.14x200x0.65)].
- Seedling emergence:** Moderate.
- Workability:** Moderate.
- Erosion Potential:**
- Water:** Low.
- Wind:** Low.

Laboratory Data

Depth cm	pH H ₂ O	pH CaCl 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	7.9	7.4	6.6	0.34	2.30	7.7	133	264	114	37.3	2.1	0	2.6	59	8.9	7.6	39.4	32.3	6.0	0.4	0.6	0.0	0.0	1
0-10	7.8	7.4	2.3	0.36	2.17	7.1	131	160	108	61.8	1.7	0	1.6	94	10	6.6	37.6	30.5	6.0	0.6	0.5	0.0	0.0	2
10-24	8.1	7.6	0.7	0.38	2.26	3.7	17	103	137	89.8	1.5	0	0.8	120	5.8	1.0	38.5	34.3	3.1	0.9	0.3	0.0	0.0	2
24-25																								
25-35	9.0	8.0	10.3	0.10	0.42	0.1	11	16	19	7.3	0.2	0	0.3	11	1.9	0.3	15.3	14.5	0.3	0.2	0.0	0.1	0.1	1
35-130																								

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](#)

