

BLACK CRACKING CLAY

General Description: *Strongly granular structured black cracking clay grading to a coarsely structured black heavy clay with variable soft carbonate, over red, brown or green heavy clay*

Landform: Elevated plains

Substrate: Heavy clay (early Pleistocene age) with coarse lenticular structure and slickensides

Vegetation:



Type Site: Site No.: CL011

1:50,000 sheet: 6628-1 (Barossa)

Annual rainfall: 550 mm

Hundred: Moorooroo

Sampling date: 27/07/92 (CL011A)

18/11/04 (CL011B)

Landform: High level flat, 0.5% slope

Surface: Seasonally cracking with no stone

Summary of Properties

Drainage: Moderately well to imperfectly drained. The cracking soil accepts water readily when dry, but after the cracks close, water moves slowly through the soil. Saturation may last up to a week or two following heavy or prolonged rainfall.

Fertility: Natural fertility is very high, as indicated by the exchangeable cation data. Nutrient retention capacity is very high throughout due to the clayey textures. Data do not indicate any nutrient deficiencies, although zinc deficiencies are common.

pH: Alkaline throughout.

Rooting depth: 80 cm in both pits, with some roots extending below 100 cm in cracks filled with surface soil.

Barriers to root growth:

Physical: The coarse structural aggregates and hard consistence of the underlying brown clay restrict deeper root development. This is shallower in CL011B.

Chemical: High boron concentrations, high sodicity and marginally high salinity in the underlying brown clay restrict root growth.

Water holding capacity: (Estimates for potential root zone of irrigated crops)

Total available: 120 mm (CL011A), 100 mm (CL011B)

Readily available: 50 mm (CL011A), 40 mm (CL011B)

Although capacities are high, large amounts of water must be absorbed by clayey soils before any is available to plants.

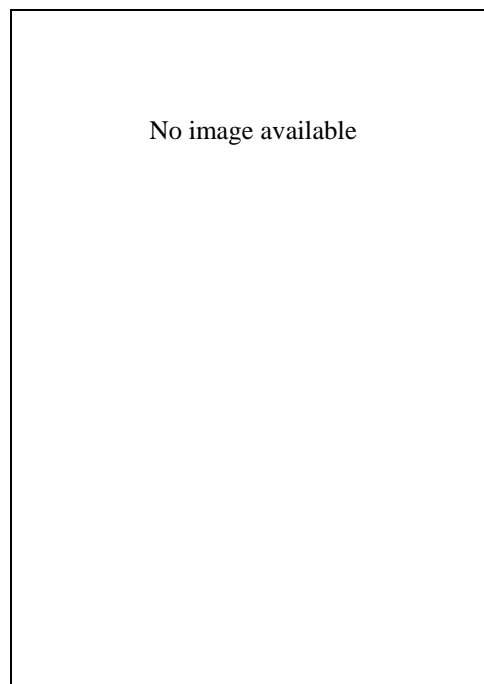
Seedling emergence: Good.

Workability: Fair to good. Surface becomes sticky when wet. Gypsum helps overcome this condition.

Erosion Potential: Low (water and wind).

Soil Description: (CL011A)

<i>Depth (cm)</i>	<i>Description</i>
0-10	Black medium clay with strong granular structure. Gradual to:
10-74	Black slightly calcareous heavy clay with strong angular blocky structure. Gradual to:
74-100	Black moderately calcareous clay with strong angular blocky structure.



Classification: Endocalcareous, Epipedal, Black Vertosol

Laboratory Data

Depth cm	pH H ₂ O	pH CaCl ₂	CO ₃ %	EC1:5 dS/m	ECe dS/m	Org.C %	Avail. P mg/kg	Avail. K mg/kg	SO ₄ 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	
0-10	8.0	7.7	1.7	0.15	0.44	1.86	65	619	-	2.0	3.0	19	3.9	6.1	40.0	34.2	4.9	0.32	1.85	0.8
10-74	8.2	7.8	1.0	0.18	0.57	1.39	41	426	-	2.6	1.3	19	2.6	1.4	32.6	30.8	5.8	0.93	1.35	2.9
74-100	9.0	8.2	8.2	0.31	0.87	0.64	<5	252	-	5.7	1.2	16	2.6	0.2	32.6	18.6	9.3	4.57	0.74	14.0

Note: 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.

Soil Description: (CL011B)

Depth (cm)	Description
0-15	Very dark grey slightly calcareous friable medium clay with strong subangular blocky structure. Gradual to:
15-35	Very dark grey moderately calcareous firm heavy clay with strong coarse subangular blocky structure and 2-10% soft carbonate segregations. Gradual to:
15-55	Dark grey highly calcareous hard heavy clay with strong coarse subangular blocky structure and 10-20% soft carbonate segregations. Gradual to:
55-150	Brown moderately calcareous hard heavy clay with slickensides and strong very coarse prismatic breaking to lenticular structure. Cracks and pockets are filled with dark soil from surface layers.



Classification: Epicalcareous-Endohypersodic, Epipedal, Black Vertosol;

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 mg/kg	Boron 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	
0-15	8.0	7.4	3.4	0.179	1.30	1.61	138	534	15	55.4	1.2	3.46	28	10.4	4.30	39.0	31.8	5.16	0.65	1.39	1.7
15-35	8.1	7.6	5.6	0.276	1.38	0.97	20	244	19	69.0	1.0	1.78	25	3.67	0.93	40.3	31.7	6.59	1.28	0.69	3.2
35-55	8.5	7.8	6.7	0.259	1.07	0.67	50	252	33	42.5	1.7	1.35	24	3.91	0.52	38.2	26.7	8.5	2.38	0.65	6.2
55-150	8.9	8.1	11.4	0.792	3.22	0.31	21	280	393	88.4	13.5	1.24	14	1.32	0.56	37.4	16.8	11.3	8.53	0.75	22.8

Note: Sum of cations, in a neutral to alkaline soil, 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.