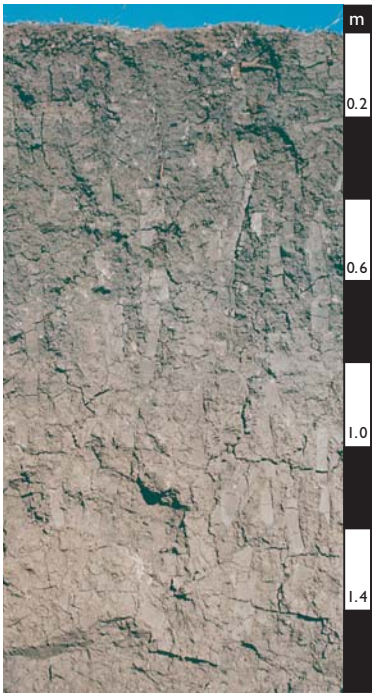
VE10: Epihypersodic-Endocalcareous, Crusty, Grey Vertosol



Dalby district, Darling Downs, south Queensland

General description of the soil

A grey, shrink-swell, cracking clay soil with a thin crusty surface horizon, strongly sodic (i.e. ESP >15) within the upper 0.50 m of the solum. Calcareous in the major part below 0.50 m.

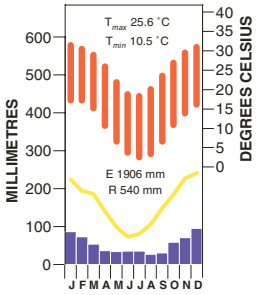
Distribution:	A widely distributed soil occupying mainly small areas in regions with Vertosols. The soils are common in the important irrigation areas of the Riverine Plain of south-eastern Australia.
Typical land use:	Mainly cereal cropping.
Common variants:	Amount and form of carbonate is variable, gypsum is usually present in the more arid areas. A sporadically bleached A2 horizon may occur in some forms.
World Reference Base:	Natric Vertisol.
Other names:	Grey Clays and Cracking Clays.

Environment and location of the example profile

Landform:	Gently undulating alluvial fan.
Parent material or substrate:	Clay alluvium.
Drainage class:	Imperfectly drained.
Surface condition:	Surface crust and periodic cracking.
Site disturbance:	Limited clearing.
Native vegetation:	Open woodland dominated by *Eucalyptus populnea*.
Microrelief:	Normal gilgai, 0.20 m vertical interval. Profile is situated on the shelf of the gilgai.

Site location

Site climate



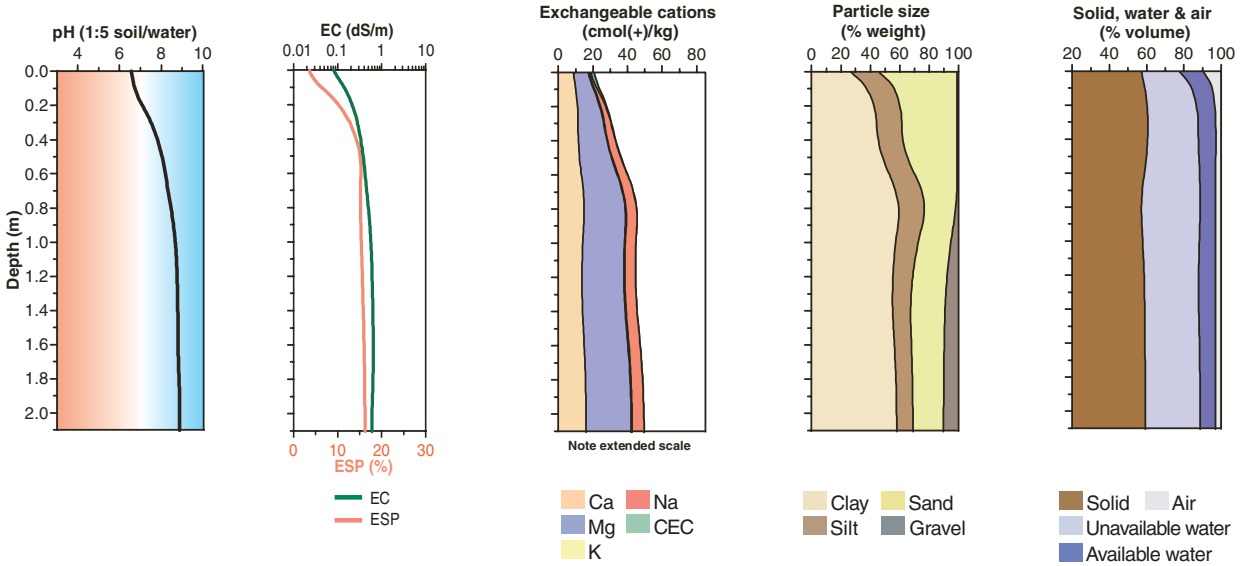
Soil morphology

Horizon	Depth (m)	Colour	Mottles	Texture	Structure			Consistence	Coarse fragments	Segregations	Boundary
					Grade	Shape	Size				
A1	0.00–0.02	dark brownish grey (10YR 3.5/1)	dark grey (10YR 4/1)	light sandy clay		subangular blocky parting to platy	10 mm parting to 2 mm	strong (dry)	–	–	clear
B1	0.02–0.30	very dark grey (10YR 3/1)	dark brownish grey (10YR 3.5/1)	heavy clay	moderate to strong	subangular blocky	30 mm	firm (moist)	–	–	gradual
B21	0.30–0.80	dark brownish grey (10YR 3.5/1)	greyish brown (10YR 5/2)	heavy clay	moderate to strong	subangular blocky	30 mm	firm (moist)	–	–	diffuse
B22	0.80–0.90	olive grey (2.5Y 4.5/2)	–	heavy clay	moderate (slickensides)	subangular blocky	30 mm	firm (moist)	–	2–10% carbonate concretions (5 mm)	diffuse
B31	0.90–1.80	greyish brown (10YR 5/2)	–	heavy clay	moderate	lenticular parting to subangular blocky	150 mm parting to 5 mm	firm (moist)	–	<2% carbonate concretions (<30 mm) 2–10% soft carbonate	diffuse
B32	1.80–2.70	dark greyish brown (10YR 4/2)	brown (7.5YR 5/4)	heavy clay	strong	lenticular parting to subangular blocky	150 mm parting to 10 mm	firm (moist)	–	<2% carbonate concretions (<30 mm) 2–10% soft carbonate	diffuse
B33	2.70–3.50	brown (7.5YR 5/4)	greyish brown (10YR 5/2)	medium to heavy clay	strong	lenticular parting to subangular blocky	150 mm parting to 10 mm	firm (moist)	–	<2% carbonate concretions (<30 mm) <2% soft carbonate	

Soil chemical and physical properties

Horizon	Sample Depth (m)	pH H_2O [G]	pH $CaCl_2$ [H]	Elect. Cond. dS/m	$CaCO_3$ %	Org. C % [A]	Extr. P mg/kg	Tot. P % [D]	Tot. K %	Cation exchange properties [I] cmol(+)/kg							ESP %	Bulk dens. Mg/m^3	Particle size %			
										Ca	Mg	K	Na	H+Al	CEC	ECEC			CS	FS	Silt	Clay
A1	0.00–0.02	6.5	5.0	0.06		2.4	47	0.04	0.33	8.5	8.2	0.7	0.6		20		3	1.5	13	36	18	25
B1	0.02–0.10	6.5	4.6	0.09		1.2	21	0.03	1.20	9.5	8.3	0.7	0.6		21		3		14	27	19	37
B1	0.10–0.20	6.6	5.0	0.18		0.9		0.02	0.37	12.0	14.0	0.4	3.6		30		12	1.6	10	26	17	43
B1	0.20–0.30	7.5	6.0	0.27																		
B21	0.30–0.60	8.2	6.8	0.39		0.6		0.02	0.32	11.0	17.0	0.3	5.0		31		16	1.6	10	26	16	44
B21	0.60–0.80	8.3	6.9	0.45				0.02	0.44	16.0	25.0	0.5	6.3		42		15	1.5	6	14	18	60
B31	0.90–1.20	8.8	7.2	0.60	1			0.03	0.48	13.0	24.0	0.6	6.1		39		16	1.5	6	19	14	58
B31	1.50–1.80	8.8	7.3	0.66	2			0.03	0.51	16.0	26.0	0.5	6.8		42		16	1.5	6	17	12	62

Key profile properties



General qualities of the soil

Infiltration:	Slow to very slow.
Available water store:	Moderate.
Permeability:	Low to very low.
Physical root limitations:	Restricted aeration when wet. Profile is prone to compaction, and crusting may restrict seedling emergence.
Erosion hazard:	Sheet erosion can occur on low slopes under high intensity rainfall.
Nutrient availability:	Moderate to high.
Toxicities:	Unlikely to occur apart from possible salinity.

Grey Vertosols are widely distributed. In irrigation areas near Griffith, New South Wales, they are used for various crops including rice.

Acknowledgements: Soil image, soil description and laboratory data: CSIRO Land and Water. Stace et al. (1968), Profile G, page 98. Landscape image: Bill van Aken, CSIRO.