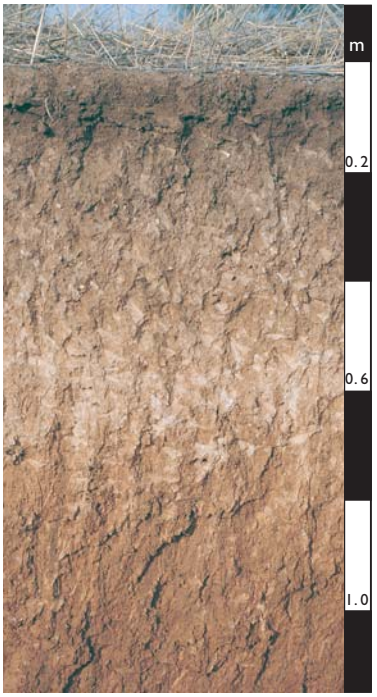
CA9: Endohypersodic, Regolithic, **Hypercalcic Calcarosol**



Clare Valley, South Australia

General description of the soil

A Hypercalcic Calcarosol (> 20% soft and < 20% hard carbonate) underlain by unconsolidated sedimentary materials. An ESP of 15 or greater occurs below 0.5 m.

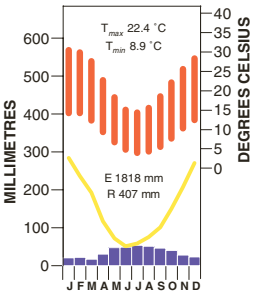
Distribution:	Most of South Australia including the Northern Agricultural Districts, Eastern Eyre Peninsula, Central Murray Mallee and Yorke Peninsula.
Typical land use:	Cereal cropping.
Common variants:	Depth to substrate clay may vary (approximately 0.4 m to 1 m). Surface texture may vary from loam to light clay.
World Reference Base:	Luvic Calcisol.
Other names:	Solonised Brown Soils and Mallee Soils.

Environment and location of the example profile

Landform:	Gently sloping pediment.
Parent material or substrate:	Substrate is strongly structured heavy clay.
Drainage class:	Moderately well-drained, but profile is rarely wet for longer than 1 week.
Surface condition:	Firm.
Site disturbance:	Cultivation – rainfed.
Native vegetation:	Tall mallee shrubland.

Site location

Site climate



Soil morphology

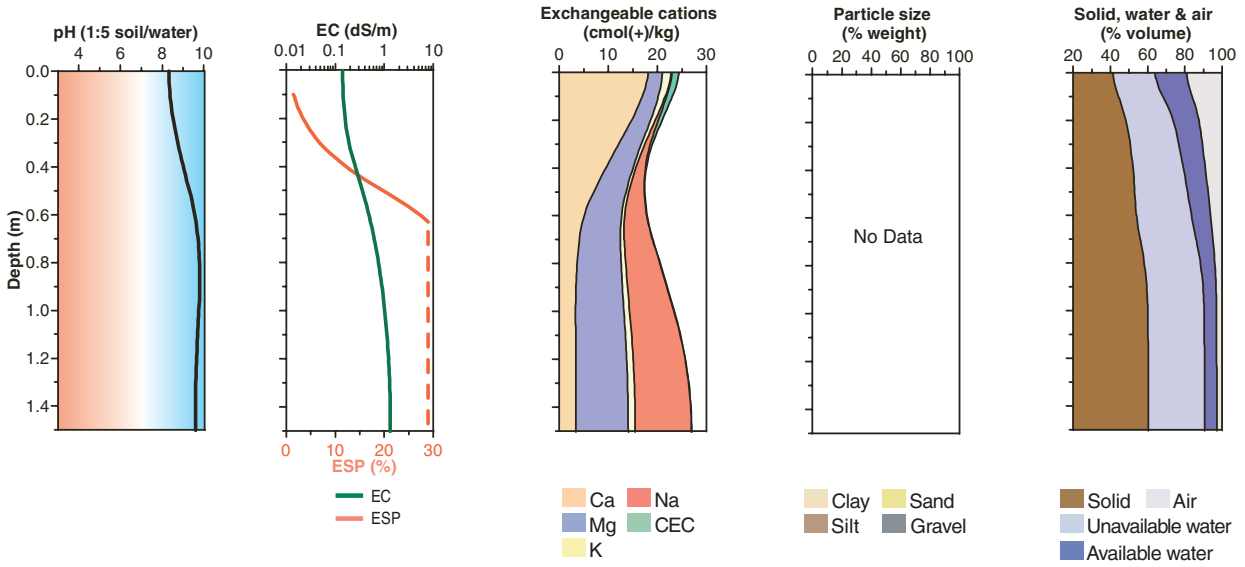
Horizon	Depth (m)	Colour	Mottles	Texture	Structure			Consistence	Coarse fragments	Segregations	Boundary
					Grade	Shape	Size				
A1	0.00–0.10	dark reddish brown (5YR 3/3)	–	clay loam	weak	granular	2–5 mm	weak (moist)	–	<2% ferromanganiferous nodules (2–6 mm) highly calcareous*	clear
B1	0.10–0.25	dark reddish brown (5YR 3/4)	–	light clay	weak	subangular blocky	2–5 mm	firm (dry)	–	2–10% soft carbonate and <2% ferromanganiferous nodules (2–6 mm) highly calcareous*	gradual
B2k	0.25–0.50	yellowish red (5YR 5/6)	–	light medium clay	weak	subangular blocky	2–5 mm	firm (dry)	–	>50% soft carbonate and <2% ferromanganiferous nodules (2–6 mm) highly calcareous*	gradual
B3k	0.50–0.70	reddish yellow (5YR 6/8)	–	medium clay	weak	prismatic	10–20 mm	firm (dry)	–	>50% soft carbonate and <2% ferromanganiferous nodules (2–6 mm) highly calcareous*	diffuse
Ck	0.70–1.00	red (2.5YR 4/8)	–	medium to heavy clay	moderate	prismatic	10–20 mm	very firm (moderately moist)	–	10–20% soft carbonate and <2% ferromanganiferous nodules (2–6 mm) highly calcareous*	diffuse
C	1.00–1.50	red (2.5YR 4/6)	light yellowish brown (2.5Y 6/4)	heavy clay	strong	lenticular	10–20 mm	very firm (moderately moist)	–	<2% soft carbonate and <2% ferromanganiferous nodules (2–6 mm) moderately calcareous*	

* Fine earth fraction

Soil chemical and physical properties

Horizon	Sample Depth (m)	pH H_2O[A]	pH $CaCl_2$[B]	Elect. Cond. dS/m[A]	$CaCO_3$ %[B]	Org. C %[D]	Extr. P mg/kg[A]	Tot. P %	Tot. K %	Cation exchange properties[G] cmol(+)/kg							ESP %[A]	Bulk dens. Mg/m³	Particle size %			
										Ca	Mg	K	Na	H+Al	CEC	ECEC			CS	FS	Silt	Clay
A1	0.00–0.10	8.3	7.8	0.14	4	1.5	19			18.2	2.9	1.8	0.2		24		–					
B1	0.10–0.25	8.4	7.9	0.14	17	0.8	6			15.8	3.7	0.8	0.3		22		2					
B2k	0.25–0.50	8.9	8.0	0.18	35	0.3	6			9.8	5.1	0.4	1.2		17		8					
B3k	0.50–0.70	9.7	8.4	0.47	43	0.1	7			3.9	7.9	0.6	4.7		16		30					
Ck	0.70–1.00	9.9	8.7	0.84	29	0.1	6			3.2	9.4	1.1	7.7		20		39					
C	1.00–1.50	9.6	8.8	1.32	12	0.1	5			3.3	10.7	1.4	11.3		26		44					

Key profile properties



General qualities of the soil

Infiltration:	Moderate, but low if surface is sealed or compacted.
Available water store:	Small to moderate depending on the ability of roots to penetrate the C horizon.
Permeability:	Ranging from moderate in the upper profile to very low in the C horizon.
Physical root limitations:	The high strength and poor aeration of the clay subsoil may restrict root growth.
Erosion hazard:	Water erosion potential is low to moderate. Where slopes are long, considerable runoff may generate in heavy rains. Wind erosion susceptibility is low.
Nutrient availability:	Nutrient availability is restricted by the high soil pH; phosphorus is low.
Toxicities:	High levels of boron and high ESP values, together with other high pH-induced nutrient deficiencies, probably limit root growth particularly in the C horizon. High to very high salinity in the C horizon.

The profile occurs on a gently sloping pediment which is typical of large areas in the cropping lands of South Australia.

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