

KA1: Haplic, Duric, Red Kandosol

General description of the soil

A loamy Red Kandosol underlain by a red-brown hardpan at shallow depth.

Distribution:	Widely distributed in semi-arid and arid central west regions of Western Australia, with lesser occurrences elsewhere in the arid zone.
Typical land use:	Some cereal growing and medic pastures, otherwise sparse grazing by sheep and cattle.
Common variants:	The main variation is in texture, depth to the hardpan and the presence of carbonate in the hardpan. The soils above the hardpan vary widely (see SO1).
World Reference Base:	Epipetric Durisol.
Other names:	Widely known as Red and Brown Hardpan Soils.

Environment and location of the example profile

Landform:	Broad flat valley floor.
Parent material or substrate:	Alluvium from sheet flooding.
Drainage class:	Restricted by hardpan.
Surface condition:	Firm.
Site disturbance:	Not known.
Native vegetation:	Open Eucalypt and Acacia woodland.

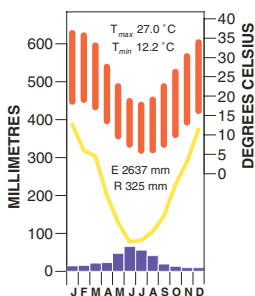


Geraldton district, south-west Western Australia

Site location



Site climate



Soil morphology

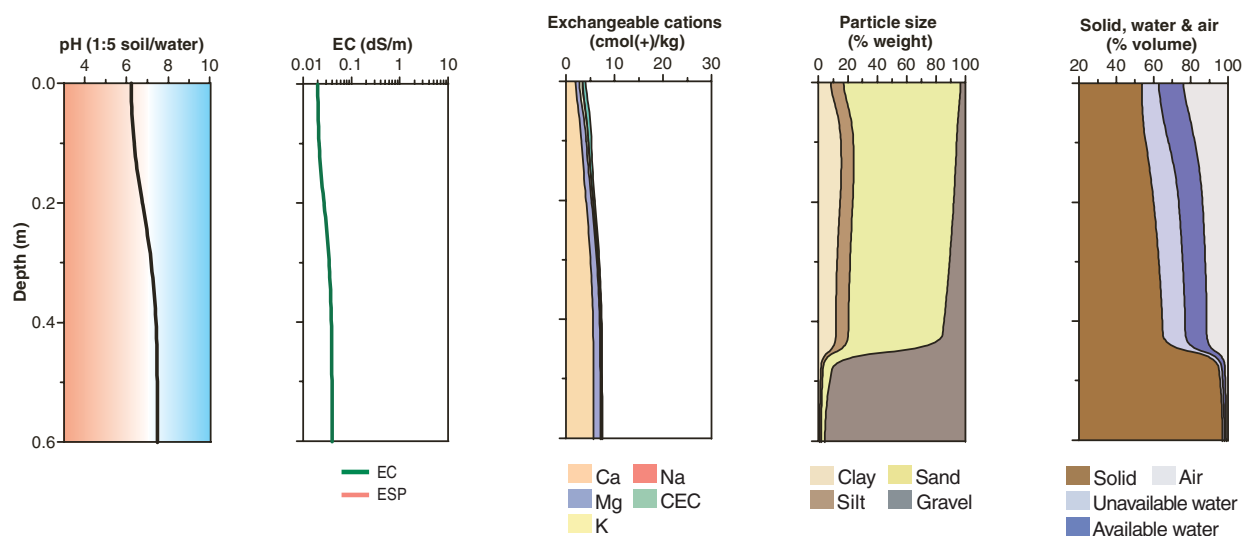
Horizon	Depth (m)	Colour	Mottles	Texture	Structure			Consistence	Coarse fragments	Segregations	Boundary
					Grade	Shape	Size				
A11	0.00–0.04	dark reddish brown (2.5YR 3/4)	–	weak thin algal crust sandy loam	weak	granular	–	weak (moist)	2% gravel	–	gradual
A12	0.04–0.10	dark red (2.5YR 3/6)	–	sandy loam	massive	–	–	weak (moist)	3% gravel	–	clear
B11	0.10–0.20	dark red (2.5YR 4/6)	–	sandy clay loam	massive	–	–	firm (moist)	4% gravel	–	clear
B12	0.20–0.45	dark red (2.5YR 4/6)	–	sandy clay loam	massive	–	–	very firm (dry)	7% gravel	–	sharp
	0.45 +	red and brown hardpan	–	–	laminar	–	–	very strong (dry)		black coating on laminae	

Soil chemical and physical properties

Horizon	Sample Depth (m)	pH H ₂ O ^A	pH CaCl ₂ ^B	Elect. Cond. dS/m ^A	CaCO ₃ %	Org. C % ^A	Extr. P mg/kg ^A	Tot. P % ^B	Tot. K %	Cation exchange properties ^D cmol(+)/kg						ESP %	Bulk dens. Mg/m ³	Particle size % ^B				
										Ca	Mg	K	Na	H+Al	CEC			ECEC	CS	FS	Silt	Clay
A11	0.00–0.04	6.2	5.2	0.02		0.8	4	0.010		1.8	0.8	0.6	<0.1		4		–		41	40	9	10
A12	0.04–0.10	6.2	5.3	0.02		0.6	2	0.007		3.4	1.0	0.4	<0.1		6		–		40	35	9	16
B11	0.10–0.20	6.4	5.5	0.02		0.5	2	0.007		3.4	1.0	0.3	<0.1		5		–		39	35	9	17
B12	0.20–0.45	7.5	6.6	0.04		0.5	<2	0.007		5.7	1.4	0.1	0.2		7		–		42	34	10	14

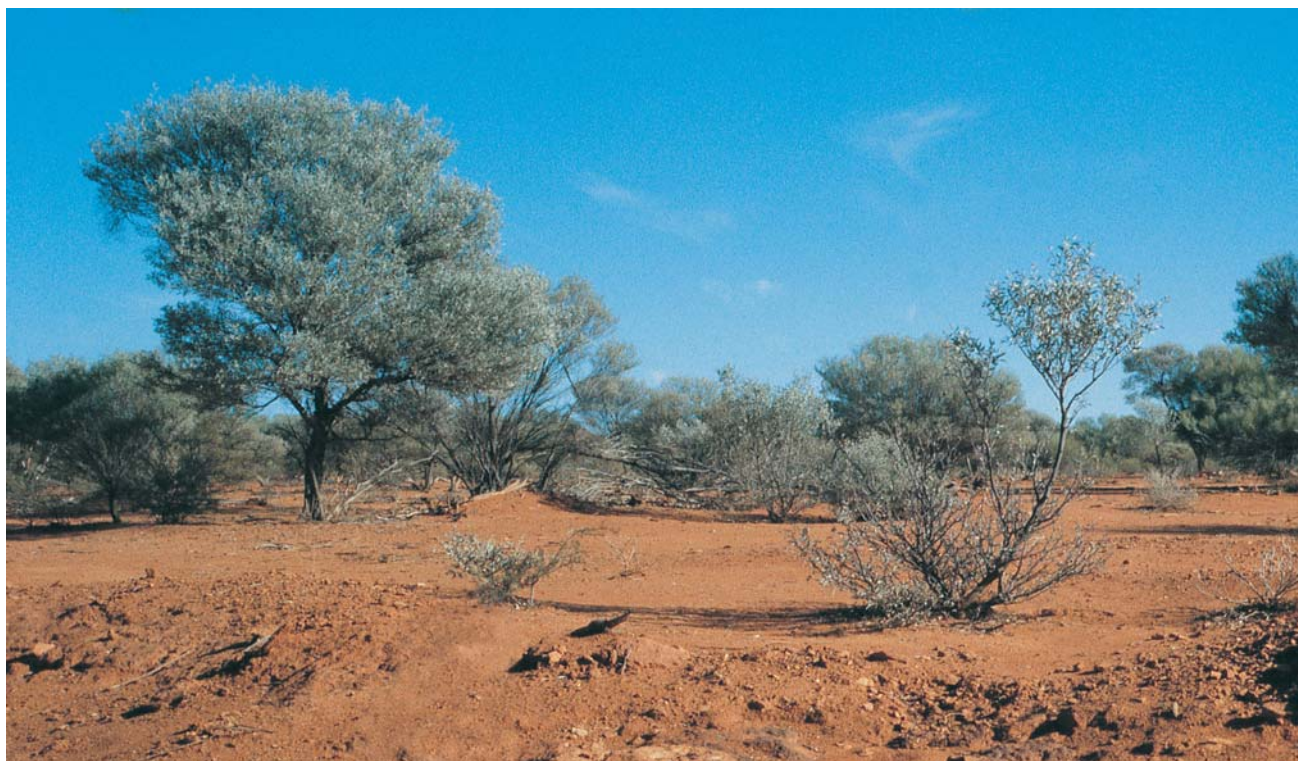
Note: Laboratory data for a similar soil (McArthur 1991).

Key profile properties



General qualities of the soil

Infiltration:	Slow to rapid depending on surface crusts and soil condition.
Available water store:	Small.
Permeability:	High above hardpan.
Physical root limitations:	Hardpan restricts roots to fractures.
Erosion hazard:	Moderate if surface soil is disturbed.
Nutrient availability:	Generally low.
Toxicities:	None likely.



Mulga (*Acacia aneura*) woodland associated with shallow soils, containing a red-brown hardpan (foreground). Mt Magnet district, Western Australia.

Acknowledgements: Soil image, soil description and laboratory data: Agriculture Western Australia. Site GTN6 from McArthur (1991). Landscape image: Agriculture Western Australia.