HARD RED GRADATIONAL CLAY LOAM
(Cooper soil)

General Description: *Hard clay loam grading to a coarsely structured red clay, highly calcareous with depth*

Landform: Gently undulating rises.

Substrate: Very highly calcareous clayey deposits of Woorinen Formation, variably hardened.

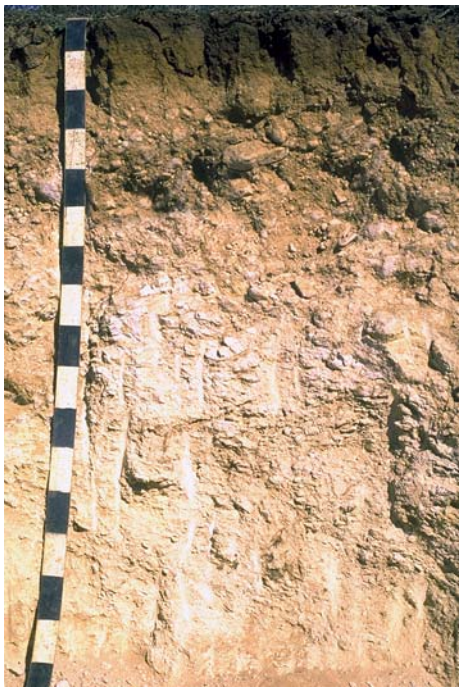
Vegetation: Mallee.

Type Site:

Site No.:	EW076		
1:50,000 sheet:	5831-1 (Addison)	Hundred:	Rounsevell
Annual rainfall:	385 mm	Sampling date:	30/03/93
Landform:	Midslope of an undulating rise, 3-4% slope		
Surface:	Hard setting with no stones		

Soil Description:

Depth (cm)	*Description*
0-6	Dark reddish brown firm clay loam with weak fine subangular blocky structure and minor ironstone concretions. Clear to:
6-14	Dark reddish brown hard moderately calcareous medium clay with strong coarse columnar structure and minor ironstone concretions. Clear to:
14-34	Brown massive very highly calcareous medium clay with 20-50% carbonate concretions and minor ironstone. Gradual to:
34-140	Class III C carbonate.



Classification: Haplic, Lithocalcic, Red Dermosol; thin, non-gravelly, clay loamy / clayey, deep

Summary of Properties

Drainage Well drained. The soil never remains saturated for more than a few days following heavy or prolonged rainfall.

Fertility Inherent fertility is moderate to high, as indicated by the exchangeable cation data. The soil has good nutrient retention capacity due to favourable clay and organic matter contents. Regular phosphorus applications are necessary. Nitrogen levels depend on legume content of pastures and cropping history. Concentrations of all tested elements are satisfactory at the sampling site.

pH Slightly alkaline at the surface, alkaline with depth.

Rooting depth 150 cm in pit, but few roots below 34 cm.

Barriers to root growth

Physical: The clayey subsoil restricts root growth to some extent, and the calcrete is a variable restriction, depending on degree of cementation.

Chemical: There are no chemical barriers.

Water holding capacity Approximately 50 mm in the root zone (ie above the Class III C carbonate layer).

Seedling emergence: Fair to satisfactory, depending on the degree of surface sealing.

Workability: Fair to good. Surface may set hard, reducing the moisture range over which cultivation is effective.

Erosion Potential

Water: Moderately low to moderate.

Wind: Low.

Laboratory Data

Depth cm	pH H_2O	pH $CaC1_2$	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	
0-6	7.7	7.4	1	0.19	0.85	1.5	37	630	-	1.6	0.26	22	11.0	1.30	20.7	14.59	2.30	0.16	1.93	0.8
6-14	8.2	7.7	3	0.17	0.66	0.6	5	490	-	1.6	0.16	17	1.70	0.19	26.7	21.89	3.93	0.26	1.94	1.0
14-34	8.6	8.0	24	0.13	0.42	0.5	3	300	-	1.6	0.54	7.1	0.88	0.33	21.7	17.25	3.41	0.26	1.10	1.2
34-140	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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