HARD LOAM OVER POORLY STRUCTURED RED CLAY

General Description: *Hard setting red brown sandy loam to clay loam overlying a reddish brown coarsely structured clay grading to a Class I carbonate layer*

Landform: Lower slopes and valley flats

Substrate: Red to brown sandy clay to clay alluvium (Pooraka Formation), calcified in its upper part with soft carbonate

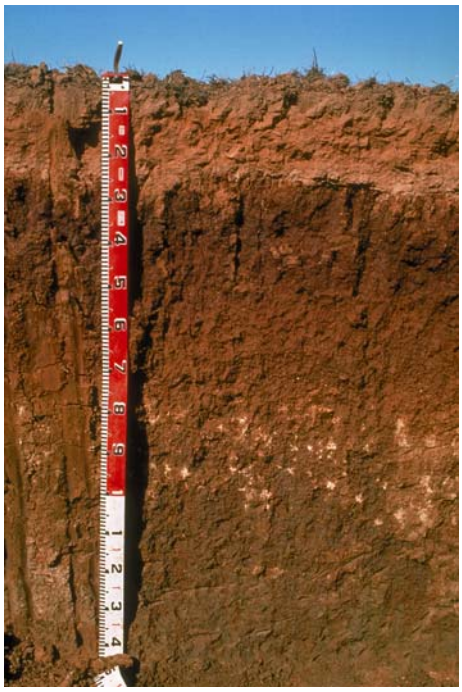
Vegetation: Grassland with occasional blue gum and sheoak

Type Site: Site No.: CM022

1:50,000 sheet:	6630-2 (Apoinga)	Hundred:	Stanley
Annual rainfall:	550 mm	Sampling date:	04/12/91
Landform:	Flat between gently undulating rises with a 1% slope		
Surface:	Hard setting with no stones		

Soil Description:

Depth (cm)	*Description*
0-10	Reddish brown hard fine sandy loam with weak subangular blocky structure. Clear to:
10-20	Yellowish red massive clay loam. Abrupt to:
20-25	Reddish yellow massive clay loam. Sharp to:
25-50	Dark reddish brown heavy clay with strong coarse prismatic structure. Gradual to:
50-75	Red heavy clay with strong coarse polyhedral structure. Gradual to:
75-100	Brown highly calcareous light clay with strong polyhedral structure and fine calcareous segregations (Class I carbonate layer). Gradual to:
100-150	Brown and red mottled light clay with strong polyhedral structure.



Classification: Calcic, Mesonatric, Red Sodosol; medium, non-gravelly, loamy / clayey, deep

Summary of Properties

Drainage The soil is moderately well to imperfectly drained; the sodic clay subsoil prevents satisfactory water movement. The hard setting sealing surface also tends to pond water. In wet years the soil may remain wet for several weeks.

Fertility The subsoil has a high nutrient retention capacity, but the surface layers with lower CEC values (due to lower clay content and acidification) have moderately low fertility unless organic matter levels are high. Organic carbon is low at this site (1.5% is desirable). Phosphorus levels are high.

pH Acidic at the surface, strongly alkaline with depth.

Rooting depth 75 cm in sampling pit, with few roots below 50 cm.

Barriers to root growth

Physical: Root densities are poor in the hard massive subsurface layer, and roots are largely confined to the surfaces of the coarse aggregates in the sodic subsoil clay. Waterlogging in the surface layers limits root elongation in wet years.

Chemical: The only apparent chemical limitation is the high exchangeable sodium percent, which is the cause of the poor structural condition of both the surface and subsoil. The very high pH at depth probably induces deficiencies of some trace elements.

Water holding capacity Approximately 80 mm in root zone, but not all is available due to low root densities in most horizons.

Seedling emergence Poor due to the hard setting, sealing surface and tendency for surface ponding of water.

Workability Poor due to the hard, dispersive surface soil which tends to shatter if worked too dry and puddle if worked too wet.

Erosion Potential

Water: Low, because there is no slope. However, this soil is highly erodible.

Wind: Low, but the soil will blow if excessively worked or pulverized by livestock.

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-S 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	6.0	5.6	0	0.08	0.4	1.20	59	247	10	2.0	1.2	93.0	58.5	0.5	7.4	5.3	1.1	0.28	0.50	3.8
10-20	5.2	4.6	0	0.06	0.3	0.32	12	198	19	1.5	0.8	19.3	54.6	0.1	4.3	2.3	0.6	0.26	0.39	6.0
20-25	6.3	5.4	0	0.05	0.4	0.19	4	172	14	1.3	0.5	12.6	20.4	0.1	3.6	2.2	1.0	0.33	0.30	9.2
25-50	7.5	6.6	<0.1	0.13	0.4	0.49	<4	455	15	8.6	2.0	13.8	8.2	0.1	24.1	7.4	11.5	4.36	1.31	18.1
50-75	9.1	8.5	0.4	0.50	1.4	0.24	<4	499	53	14.2	1.6	5.2	2.1	0.1	25.2	6.8	14.3	6.61	1.34	26.2
75-100	9.3	8.5	11.0	0.60	2.3	<0.02	<4	424	99	13.9	1.0	5.0	1.8	0.1	21.0	5.2	10.1	5.43	0.97	25.9
100-150	9.2	8.6	0.8	0.66	3.1	0.14	<4	395	127	13.4	0.9	5.7	2.3	0.1	18.9	4.5	9.5	5.34	0.91	28.3

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.