HARD CLAY LOAM OVER DISPERSIVE RED CLAY

General Description: *Loamy to clay loamy surface soil overlying a reddish brown coarsely structured mildly saline subsoil clay, weakly calcareous and gypseous with depth*

Landform: Old alluvial plains adjacent to Spencer Gulf

Substrate: Weakly calcified reddish gypseous clay

Vegetation:

Type Site: Site No.: CU023

1:50,000 sheet:	6531-3 (Crystal Brook)	Hundred:	Pirie
Annual rainfall:	360 mm	Sampling date:	16/12/92
Landform:	Plain, 0% slope		
Surface:	Hard setting with no stones		

Soil Description:

Depth (cm)	*Description*
0-3	Reddish brown hard massive clay loam. Abrupt to:
3-35	Dark reddish brown heavy clay with strong prismatic, breaking to polyhedral structure. Clear to:
35-60	Red highly calcareous medium clay with strong polyhedral structure and 20-50% soft and nodular carbonate segregations (Class I carbonate). Diffuse to:
60-100	Red highly calcareous medium clay with strong polyhedral structure, and 2-10% soft carbonate segregations. Gradual to:
100-150	Red highly calcareous medium clay with strong coarse blocky structure, and 2-10% soft and crystalline gypsum.

Classification: Calcic, Mesonatric, Red Sodosol; thin, non-gravelly, clay loamy / clayey, very deep

Summary of Properties

Drainage Moderately well drained. Soil may remain wet for a week or so, as water tends to perch on top of the clay subsoil.

Fertility Natural fertility is high, as indicated by the CEC values. However, this advantage is offset by the high proportion of sodium on the exchange complex. There do not appear to be any nutrient deficiencies, although the high pH may affect trace element availability.

pH Neutral at surface, strongly alkaline with depth.

Rooting depth 100 cm in the pit, but few roots below 60 cm.

Barriers to root growth

Physical: Hard sodic clay restricts root growth and water entry.

Chemical: High boron, high ESP and moderate salinity (from 35 cm) affect root growth.

Water holding capacity 140 mm in rootzone (high), but only about 80 mm is effectively available due to low root density.

Seedling emergence Fair to poor, due to hard setting poorly structured surface.

Workability Fair due to poor structure (sodic surface). The soil has a limited moisture range for effective working and is likely to puddle when wet and shatter if too dry. Increased organic matter (although achieving more than about 1.2% in this rainfall is difficult), and gypsum applications will improve the surface.

Erosion Potential

Water: Low, due to lack of slope.

Wind: Low, unless soil is over-grazed or over-cultivated.

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	
Paddock	6.9	6.2	1	0.17	0.92	0.93	60	620	-	2.4	-	-	-	-	16.2	8.59	5.96	1.69	1.62	10.4
0-3	7.1	6.6	0	0.31	1.97	1.1	70	600	-	2.4	-	-	-	-	13.1	7.79	5.59	1.75	1.46	13.4
3-35	8.6	7.8	1	0.51	2.11	0.53	11	490	-	6.8	-	-	-	-	33.6	11.5	11.8	8.19	1.57	24.4
35-60	9.0	8.4	13	2.32	11.15	0.29	14	340	-	15.6	-	-	-	-	26.7	7.20	11.8	11.1	1.09	41.4
60-100	8.9	8.5	8	3.48	16.42	0.17	19	340	-	25.5	-	-	-	-	26.9	5.82	11.4	12.5	1.06	46.4
100-150	8.3	8.0	6	6.17	16.83	0.15	18	360	-	20.1	-	-	-	-	28.3	22.7	9.53	2.92	1.05	10.3

Note: Paddock sample bulked from cores (0-10 cm) taken around the pit.

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.