GREY BROWN CRACKING CLAY

General Description: *Hard setting calcareous cracking clay, becoming brown and yellowish mottled with depth.*

Landform: Gilgai plains.

Substrate: Pleistocene age Hindmarsh Clay, with soft calcareous segregations.

Vegetation: Mallee - broombush scrub.

Type Site: Site No.: CH010

1:50,000 map:	6627-2 (Milang)	Hundred:	Bremer
Annual rainfall:	450 mm	Sampling date:	22/03/91
Landform:	Mound on gilgai plain, 0% slope		
Surface:	Hard setting and seasonally cracking, no stones		

Soil Description:

Depth (cm)	*Description*
0-5	Dark brown weakly blocky highly calcareous light clay. Clear to:
5-10	Very pale brown massive light clay with up to 20% soft calcareous segregations. Clear to:
10-30	Reddish brown and brown mottled, coarsely blocky, highly calcareous heavy clay with slickensides. Gradual to:
30-80	Reddish brown and olive grey mottled, coarsely blocky, moderately calcareous heavy clay with slickensides. Diffuse to:
80-140	Light olive grey and reddish brown heavy clay (Hindmarsh Clay).

Classification: Episodic-Epicalcareous, Massive, Brown Vertosol

Summary of Properties

Drainage Imperfect to poor. Soil may remain wet for several weeks to several months.

Fertility Fertility is moderate to high, as indicated by the cation exchange capacity, but nutrient availability is affected by the high pH below 10 cm. Zinc is commonly deficient.

pH Alkaline in the surface, grading to strongly alkaline from 10 cm.

Rooting depth There is little root growth below 30 cm in the pit.

Barriers to root growth

Physical: The hardness of the clay (caused by high exchangeable sodium), retards root growth. The root hairs must grow around the large clay aggregates, rather than through them. Waterlogging also affects root growth in wet years.

Chemical: High boron (more than 15 mg/kg is toxic), reduced trace element availability due to high pH, and moderate subsoil salt levels are the main chemical barriers to root growth. These occur at shallow depth.

Water holding capacity 200 mm in whole soil, but only about 40 to 50 mm is available to plants because of the lack of root penetration. These soils contain considerable amounts of unused water.

Seedling emergence Fair to poor, due to poor surface structure and tendency to water logging.

Workability Poor, due to poor structure and clayey texture.

Erosion Potential

Water: Low.

Wind: Low.

Laboratory Data

Depth cm	pH H_2O	pH $CaC1_2$	$CaCO_3$ %	EC1:5 dS/m	ECe dS/m	Org.C %	Avail. P mg/kg	Avail. K mg/kg	Cl 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	
0-5	8.1	7.9	6.4	0.33	-	1.9	44	530	241	7.6	0.6	17.7	2.7	0.1	32.4	20.3	8.1	1.6	1.8	5
5-10	8.7	8.3	15.8	0.45	-	1.0	8	360	351	13.0	0.8	12.8	1.3	<0.1	32.5	16.2	10.9	4.0	1.4	12
10-30	9.4	8.7	11.4	0.87	-	0.4	2	570	554	42.8	1.1	11.1	0.6	<0.1	32.9	7.3	14.6	9.0	2.1	27
30-80	9.4	8.7	1.2	1.35	-	0.1	<2	730	1200	65.4	1.2	10.8	0.2	0.2	36.6	3.2	15.4	15.3	2.7	42
80-140	9.0	8.5	0.4	1.77	-	0.1	<2	710	1760	58.2	0.7	13.5	0.3	<0.1	37.5	2.8	15.1	18.9	2.6	50

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.