HARD LOAMY SAND OVER DISPERSIVE BROWN CLAY

General Description: *Thin sandy surface soil, sharply overlying a hard, brownish columnar structured sandy clay loam to sandy clay subsoil, grading to a Class III A carbonate layer at shallow depth.*

Landform: Gently undulating plains and low rises

Substrate: Medium to fine grained sediments mantled by highly calcareous windblown materials

Vegetation: Mallee-broombush shrubland

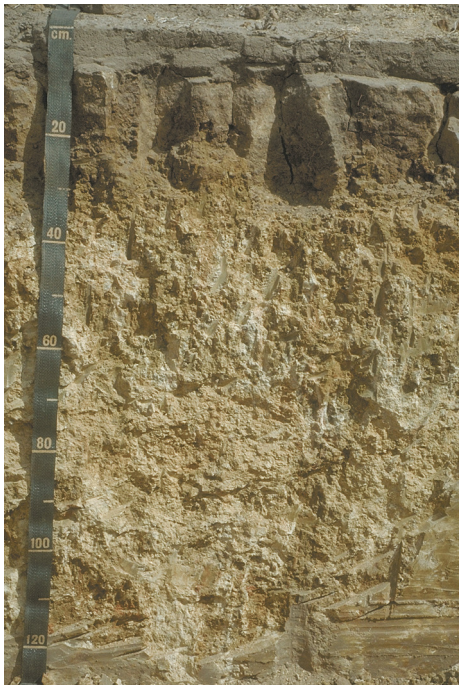
Type Site:

Site No:	CH011	1:50,000 mapsheet:	6627-2 (Milang)
Hundred:	Bremer	Easting:	304910
Section:	55	Northing:	6083790
Sampling date:	22/03/91	Annual Rainfall:	475 mm average

Upper slope of gently undulating low rise, slope 2%. Hard setting surface with no stone.

Soil Description:

Depth (cm)	*Description*
0-8	Brown hard massive loamy sand. Sharp to:
8-20	Brown and yellow mottled, very hard sandy clay with strong coarse columnar structure and bleaching on the tops of the domes. Clear to:
20-30	Dark brown, yellow and olive mottled, very hard light clay with strong coarse angular blocky structure. Clear to:
30-70	Brown and pale yellow massive very highly calcareous light clay (Class III A carbonate layer). Diffuse to:
70-130	Dark brown, yellow and red mottled, massive, moderately calcareous light clay with up to 20% soft carbonate in pockets.



Classification: Calcic, Mottled-Hypernatric, Brown Sodosol; thin, non-gravelly, sandy / clayey, deep

Summary of Properties

Drainage: Moderately well to imperfectly drained. The surface soil and upper subsoil may remain wet for several weeks due to the low permeability of the clay.

Fertility: Moderate, due to the low clay and organic matter content of the surface soil (as indicated by the low CEC). The subsoil has a moderate capacity to store nutrients, but the exchange complex is dominated by magnesium and sodium, rather than calcium which would be more favourable. Zinc appears to be critically low at the type site.

pH: Neutral at the surface grading to strongly alkaline in the subsoil.

Rooting depth: 70 cm at type site, but root density below 30 cm is low.

Barriers to root growth:

Physical: The highly sodic, dispersive subsoil is very dense and presents a barrier to satisfactory root development.

Chemical: Poor root growth below 30 cm may be due to the Class III A carbonate layer, which typically retards root growth, and the accompanying high pH, caused by high sodicity. The problem may be accentuated by extremely low trace element availability.

Waterholding capacity: 75 mm in rootzone, but only a fraction of this is available to plants because of the poor root distribution pattern in the subsoil.

Seedling emergence: Fair due to tendency of surface to seal over.

Workability: Fair due to the poor structure (low organic matter) of the surface, limiting the moisture range for effective working.

Erosion Potential:

Water: Moderately low to moderate. The soil is highly erodible due to its poorly structured surface and shallow, impermeable subsoil, and on slopes of more than 2% protective measures would be needed.

Wind: Moderately low. The soil is readily pulverised and susceptible to wind damage.

Laboratory Data

Depth cm	pH H_2O	pH $CaCl_2$	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	
0-8	6.	6.9	-	0.25	-	0.9	42	320	-	1.2	0.1	84	1.0	<0.1	3.9	2.9	1.0	0.2	0.8	5
8-20	7.7	7.1	-	0.26	-	0.4	2	340	-	4.8	0.1	27	0.1	<0.1	20.5	6.0	7.7	4.3	1.1	21
20-30	8.6	8.1	0.1	0.46	-	0.3	4	410	-	7.0	0.1	15	0.2	<0.1	23.5	6.6	10.0	5.9	1.3	25
30-70	9.6	8.5	14.4	0.69	-	0.2	3	350	-	10.1	0.3	5.4	0.2	<0.1	17.7	4.2	8.2	6.2	1.0	35
70-130	9.4	8.5	19.9	1.08	-	0.1	<2	330	-	10.5	0.2	3.9	0.2	<0.1	14.3	2.5	6.6	5.6	0.8	39

Note: CEC (cation exchange capacity) is a measure of the soil's ability to store and release major nutrient elements. ESP (exchangeable sodium percentage) is derived by dividing the exchangeable sodium value by the CEC.

Further information: DEWNR Soil and Land Program