BLEACHED ACIDIC LOAM OVER YELLOW CLAY

General Description: *Heavy loam with some ironstone gravel and a bleached subsurface overlying mottled yellow light clay, which in turn overlies 'mottled zone' substrate.*

Landform: Plateau surface.

Substrate: Deeply weathered kaolin-clay-rich 'mottled zone', formed from Kanmantoo Group metasediments.

Vegetation: Pasture species trial.

Type Site:

Site No.:	CK026	1:50,000 mapsheet:	6326–1 (Cassini)
Hundred:	Seddon	Easting:	705179
Section:	39	Northing:	6038436
Sampling date:	07/12/10	Annual rainfall:	620 mm average

Level plateau surface. Firm surface.

Soil Description:

Depth (cm)	*Description*
0–10	Black, heavy fine sandy loam with weak granular structure.
10–20	Yellowish brown (dry), very dark brown and strong brown, heavy fine sandy loam with massive structure, 2–10% ironstone nodules (2–6 mm) and iron staining along root channels.
20–27	Bleached, heavy fine sandy loam with massive structure, 10–20% ironstone nodules (2– 20 mm), 2–10% quartz fragments (6–20 mm) and iron staining along root channels, abrupt to:
27–45	Brownish yellow, yellow and strong brown, heavy clay loam with weak subangular blocky structure.
45–92	Brownish yellow, yellow to pale yellow and reddish brown to dark reddish brown, somewhat silty light clay with weak subanguler blocky breaking to moderate–strong fine lenticular structure.
92–130	'Mottled zone' kaolin-clay-rich substrate: light yellowish brown to light brownish grey, yellowish brown to brownish yellow and dark red, somewhat silty light clay with strong lenticular breaking to strong fine lenticular structure, 2–10% quartz fragments (20–60 mm) and some sandy saprolite fragments below 115 cm.

Classification: Bleached-Mottled, Mesotrophic, Yellow Chromosol; thin, non-gravelly, loamy / clayey, moderate.

Summary of Properties

Drainage: Imperfectly drained. Soil is likely to remain saturated for several weeks following heavy or prolonged rainfall. The bleached subsurface horizon (20–27 cm) indicates the presence of a seasonal perched watertable.

Fertility: Inherent fertility is low, as indicated by the sum of cation data, which is especially low in subsurface horizons (10–20 and 20–27 cm). Topsoil nutrient retention capacity is mostly attributable to surface soil organic matter content. Kaolinitic clays, characteristic of ironstone soils, have low nutrient retention capacity. Ironstone fixes phosphorus, however, levels of available phosphorus are high in the surface soil (as a result of substantial addition of fertiliser at this trial site), and there is indication of phosphorus leaching within the topsoil. Calcium levels are low except in the organic-rich surface soil, which is fairly typical of such soils. Boron levels are marginal. Leaf analyses are needed to confirm apparently marginal levels of zinc.

pH: Acidic throughout, with some horizons on the margins of strong acidity where aluminium toxicity can become a problem (e.g. in the surface soil).

Rooting depth: Most root growth is in the upper 45 cm; with a few observable roots to 92 cm.

Barriers to root growth:

Physical: The subsoil and substrate are tightly structured, which impedes drainage. Root growth is restricted by limited drainage and possibly by tight subsoil structure.

Chemical: Very low nutrient availability below 45 cm restricts root growth. 'Mottled zone' substrate material (below 92 cm) is hostile to root growth.

Waterholding capacity: Approximately ((0.1x140) + (0.17x100x0.9) + (0.18x150) + (0.47x150x0.1)) 60 mm in the potential rootzone for crop and pasture plants.

Seedling emergence: Satisfactory.

Workability: Satisfactory.

Erosion Potential: **Water:** Low. **Wind:** Low.

Laboratory Data

Depth cm	pH H_2O	pH $CaCl_2$	CO_3 %	EC 1:5 dS/m	ECe dS/m	Org.C %	Avail. P mg/kg	Avail. K mg/kg	Cl mg/kg	SO_4 mg/kg	Boron mg/kg	Al CaCl2 mg/kg	Trace Elements mg/kg (EDTA)				Sum cations cmol (+)/kg	Exchangeable Cations cmol(+)/kg					Est. ESP
													Cu	Fe	Mn	Zn		Ca	Mg	Na	K	Al	
Paddock	5.4	4.9	0	0.173	0.98	4.74	55	225	125.8	16.4	0.77	7.08	0.56	494	2.38	1.10	6.51	4.08	0.86	0.37	0.42	0.78	5.69
0–10	5.9	4.9	0	0.184	1.20	5.80	66	363	202.2	13.5	1.17	2.65	0.98	701	7.18	1.85	11.82	8.41	1.98	0.54	0.76	0.13	4.57
10–20	6.1	5.5	0	0.064	0.42	1.41	28	137	33.3	9.3	0.49	<0.20	0.44	209	2.19	0.11	2.29	1.34	0.52	0.18	0.25	<0.01	7.86
20–27	6.1	5.4	0	0.039	0.41	0.47	8	141	11.5	12.9	0.46	1.68	0.20	72.0	1.40	<0.05	2.22	0.92	0.60	0.17	0.26	0.27	7.65
27–45	6.2	5.4	0	0.103	0.44	0.40	3	305	67.1	46.2	1.48	0.22	0.27	31.1	0.53	0.18	10.17	2.69	5.86	0.77	0.70	0.15	7.57
45–65	6.9	6.1	0	0.156	0.44	0.22	5	258	105.2	66.1	1.64	<0.20	0.31	33.6	3.98	0.36	11.64	1.41	8.53	1.03	0.67	<0.01	8.85
65–92	6.7	5.7	0	0.120	0.40	0.09	3	356	99.7	56.6	1.95	<0.20	0.17	13.7	0.43	0.15	9.47	0.28	7.70	0.78	0.71	<0.01	8.24
92–115	5.7	4.9	0	0.071	0.39	0.08	<2	246	87.5	40.8	1.92	0.23	0.13	11.5	0.51	0.19	8.64	0.15	6.92	0.73	0.64	0.20	8.45
115–130	5.8	4.8	0	0.084	0.31	0.09	<2	167	58.7	34.1	1.63	1.14	0.11	14.5	2.00	0.23	6.50	0.22	4.99	0.53	0.43	0.33	8.15

Note: Paddock sample bulked from 20 cores (0–10 cm) taken around the pit.
Sum of cations approximates the CEC (cation exchange capacity), 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, in this case estimated by the sum of cations.

Further information: DEWNR Soil and Land Program