SHALLOW CALCAREOUS CLAY LOAM ON CALCRETE

General Description: *Dark, calcareous clay loam topsoil overlies grey, highly to very highly calcareous clay loamy subsoil on a very hard calcrete base*

Subgroup soil: B5

Landform: Level plain

Substrate: Calcrete

Vegetation: Irrigated tall fescue, perennial ryegrass and clover.

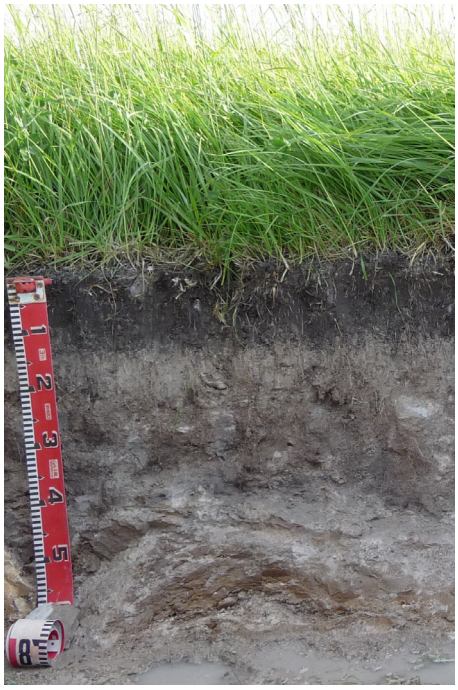
Type Site:

Site No:	SE153	1:50,000 mapsheet:	6923-4 (Konetta)
Hundred:	Ross	Easting:	418220
Section:	131	Northing:	5893120
Sampling date:	24/10/08	Annual rainfall:	650 mm average

The site is in a flood-irrigation bay on a level plain.

Soil Description:

Depth (cm)	*Description*
0–11	Hardsetting, moderately calcareous, very dark greyish brown, clay loam with weak, fine granular structure.
11–22	Highly calcareous, dispersive, greyish brown, light clay loam with moderate, fine granular structure and approximately 50% hard carbonate fragments.
22–36	Very highly calcareous, dispersive, greyish brown, light clay loam with weak, fine granular structure and >50% hard carbonate fragments.
36–60	Very strongly cemented, massive calcrete.



Note: at the time of sampling a watertable was evident at approximately 65 cm.

Classification: Epihypersodic, Petrocalcic, Lithocalcic Calcarosol; medium, slightly gravelly, clay loamy/clay loamy, shallow.

Alternatively: Natric, Calcarosolic, Oxyaquic Hydrosol; medium, slightly gravelly, clay loamy/clay loamy, shallow.

Summary of Properties

Drainage: Drainage is imperfect.

Fertility: Inherent fertility is relatively high: clay loamy texture, high surface soil organic content, and little leaching (owing to clay content, shallow watertable and the calcrete base), ensure the soil has good capacity to retain and provide nutrients. However, much of the soil's natural fertility is provided by the organic matter present in the surface soil. Maintenance and improvement of surface soil organic matter and residues is important for maintenance of fertility. Phosphorus levels are surprisingly raised in the subsoil.

pH: The soil profile is alkaline throughout.

Rooting depth: Root growth was observed to 36 cm (i.e. to the calcrete base) in the pit.

Barriers to Root Growth:

Physical: The very strongly cemented calcrete base limits root growth. However, some roots may grow deeper than this via cracks or solution holes in the calcrete. Dispersive subsoil is likely to result in some reduction in root growth, while hardsetting surface soil condition could be improved via retention of plant residues and the use of gypsum.

Chemical: Seasonal waterlogging is a potential problem in the soil profile (which could be exacerbated by irrigation and the shallow watertable). Alkaline pHs throughout and associated fine carbonate content may result in reduced availability of some mineral elements (in particular, phosphorus, zinc, manganese and iron). Low levels of zinc and possibly boron in the subsoil may limit root growth in these layers. Raised levels of salts occur in the subsoil.

Waterholding capacity: Low. However, some roots might access groundwater.
Total available: approx 30 mm [(0.11x180)+(0.11x160x0.5)+(0.14x150x0.2)].

Seedling emergence: Moderate to good.

Workability: Moderate to good.

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-S mg/kg	Boron mg/kg	Al $CaCl_2$ 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	H	
Paddock	8.4	7.8	3.9	0.36	1.83	5.4	42	446	185	18.9	1.8	0	1.4	14	18.8	1.6	34.1	27.1	5.0	0.6	1.4	0.0	0.0	2
0-11	8.4	7.7	3.2	0.31	1.49	5.4	46	367	125	15.2	1.9	0	1.3	14	19.3	1.9	32.7	26.2	4.7	0.5	1.2	0.0	0.0	2
11-22	8.7	7.9	0.4	0.30	2.38	1.2	28	91	204	27	1.2	0	0.5	8.6	4.6	0.5	27.2	24.0	2.4	0.5	0.3	0.0	0.1	2
22-36	8.5	7.9	0.8	0.58	3.91	0.6	42	104	97	223	0.7	0	0.6	7.4	4.2	0.3	25.9	22.6	2.7	0.3	0.2	0.0	0.0	1
36-60																								

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