

CALCAREOUS SANDY LOAM ON CALCRETE

General Description: *Calcareous greyish brown sandy loam becoming more clayey and highly calcareous in the subsurface over rubbly calcrete at moderately shallow depth*

Landform: Gently undulating plains.

Substrate: Interbedded limestone and clay of an ancient lagoon bed.

Vegetation:



Type Site: Site No.: MM153

1:50,000 sheet:	6827-2 (Buccleuch)	Hundred:	Roby
Annual rainfall:	375 mm	Sampling date:	22/07/02
Landform:	Lower slope on a gently undulating plain		
Surface:	Soft with no stones		

Soil Description:

<i>Depth (cm)</i>	<i>Description</i>
0-10	Dark brown soft single grain highly calcareous sandy loam. Clear to:
10-30	Light brown soft massive very highly calcareous sandy loam. Gradual to:
30-45	Reddish yellow soft massive very highly calcareous light sandy clay loam. Abrupt to:
45-60	Calcrete pan comprising cemented hard carbonate fragments. Gradual to:
60-75	Light brown firm massive very highly calcareous light sandy clay loam with more than 50% calcrete fragments (60-200 mm). Gradual to:
75-120	Light yellowish brown and brownish yellow mottled firm massive very highly calcareous sandy light clay with pockets of sandier soil as for 60-75 cm layer, and more than 50% calcrete fragments (60-200 mm).



Classification: Endohypersodic, Petrocalcic, Hypercalcic Calcarosol; thick, non-gravelly, loamy / clay loamy, shallow

Summary of Properties

- Drainage:** Rapidly drained. The soil rarely remains wet for more than a few hours.
- Fertility:** Inherent fertility is moderately low, due mainly to high carbonate concentrations below the immediate surface layer. Phosphorus levels are low to marginal, but concentrations of other tested elements are satisfactory. However, high carbonate concentrations tie up phosphorus, zinc, manganese and copper – tissue tests required to establish whether levels are adequate. Organic carbon levels are high, as is normal for highly calcareous soils.
- pH:** Alkaline at the surface, strongly alkaline with depth
- Rooting depth:** 75 cm in pit, but few roots below 45 cm.
- Barriers to root growth:**
- Physical:** The calcrete layer impedes root growth, but does not entirely prevent deeper extension.
- Chemical:** High pH below the calcrete layer severely restricts deeper growth. High carbonate levels throughout reduce nutrient availability.
- Water holding capacity:** Approximately 65 mm above the calcrete.
- Seedling emergence:** Satisfactory.
- Workability:** The soft surface is easily worked.

Erosion Potential

- Water:** Low.
- Wind:** Moderately low to moderate. The calcareous surface is easily pulverized by livestock or excessive working.

Laboratory Data

Depth cm	pH H ₂ O	pH CaCl 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)				Sum of cations cmol (+)/kg	Exchangeable Cations cmol(+)/kg				ESP
											Cu	Fe	Mn	Zn		Ca	Mg	Na	K	
Paddock	8.5	7.7	6	0.18	1.01	1.83	23	401	27.1	1.1	0.32	6.4	2.34	1.37	19.6	16.21	2.15	0.14	1.06	0.7
0-10	8.5	7.8	7	0.26	3.41	1.98	27	466	39.0	1.4	0.30	5.1	3.00	3.16	20.6	17.10	2.30	0.13	1.10	0.6
10-30	8.8	8.1	23	0.18	1.17	0.91	4	218	14.3	1.7	0.23	4.7	0.56	0.29	18.7	12.58	5.20	0.40	0.54	2.1
30-45	9.2	8.3	37	0.21	1.30	0.90	6	177	27.3	2.6	0.24	3.4	0.43	0.58	20.3	7.90	10.75	1.18	0.42	5.8
45-60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
60-75	9.7	8.6	29	0.31	2.18	0.39	5	697	36.5	6.2	0.27	3.4	0.69	0.25	21.6	3.91	11.92	4.06	1.75	18.8
75-120	9.6	8.7	41	0.41	3.08	0.37	3	768	26.8	8.4	0.31	7.3	0.41	0.41	18.6	4.14	6.47	6.11	1.88	32.8

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

Sum of cations is a measure of the soil's capacity to store and release major nutrient elements. In neutral to alkaline soils the sum is approximately equivalent to CEC (cation exchange capacity).

ESP (exchangeable sodium percentage) is derived by dividing the exchangeable sodium value by the CEC, which at this site is estimated from the sum of cations.