

Comparative Soil Characterisation – Coomandook

General Description: Brown loamy sand over sandy clay over calcrete grading to highly calcareous pale brown sandy light clay.

Landform: Dunefield, low slope

Substrate: Molineaux sand over Bungunnia
Limestone over ancient coastal
sanddunes and old lake beds

Vegetation: Barley grass, some clover

Land use: grazing



Type Site:	Site No:	1	Easting:	0378558
	Hundred:	Roby	Northing:	6080797
	Sampling date:	9 July 2021	Annual rainfall:	410 mm

Soil Description

Depth (cm)	Horizon	Description
0-10	A1	Brown loose loamy sand. Clear to:
10-20	A2	Light brown sand with 2-10% segregations, 6-20 mm in size. Abrupt to:
20-40	B21	Reddish yellow very highly calcareous fine sandy light clay. Sharp to:
40-50	B22K	laminar calcrete cap with very pale brown very highly calcareous sandy light clay with. Gradual to:
50-80	B22K	Very pale brown very highly calcareous sandy light clay with <2% calcareous segregations, 2-6 mm in size. Gradual to:
80-100	B3	Pale brown coarse sandy clay loam
100 +		watertable at 90-100cm



Summary of Properties

Drainage: well drained, although water-table at base

Fertility: moderately low. Regular fertiliser input required and some trace elements for higher production

pH: Neutral surface, grading to strongly alkaline in subsoil

Rooting depth: depend on salt tolerance 50? cm

Barriers to root growth

Physical: calcrete restricts to some extent

Chemical: high pH and Boron from 20cm, moderate surface salt to high salt throughout, sodic from 10cm, EC 6 + dS/m restricts many plants

Water holding capacity: depends on salinity levels

Seedling emergence: slightly water repellent can affect germination

Workability: easily worked

Erosion potential

Water: low

Wind: moderately low



Laboratory Data

Depth (cm)	pH H ₂ O	pH CaCl ₂	NO ₃ mg/kg	EC 1:5 dS/m	ECe	OC %	PBI	Colwell		Boron mg/kg	SO ₄ -S mg/kg	Trace Elements mg/kg (DPTA)			
								Avail. P	Avail. K			Cu	Zn	Fe	Mn
0-10	7.6	7.6	21	0.37	6	1.5	21	59	250	1.2	17	0.94	3.5	28	3
10-20	9.2	9.2	29	0.81	12	0.3	38	45	370	12	68	0.51	0.4	17	0.4
20-50	9.3	9.3	23	2	16	0.2	99	23	530	19	200	0.61	0.2	9.5	0.6
50-80	9.3	9.3	6.9	2.2	18	0.3	141	<5	480	16	230	0.41	0.23	6.9	0.5
80-110	9.4	9.4	2.4	2	18	0.2	106	<5	410	12	190	0.28	0.28	6.7	0.9
Critical / Ideal values	6-8	5-7	-	<0.7	<4	S: 0.5-1.0 SL: 0.7-1.4 L: 0.9-1.8 CL/C: 1.2-2.0	20-120	25-30	100	<15	>6-8	0.3	0.5		1

Depth (cm)	Cl mg/k	Sum cations cmol (+)/kg	Exchangeable cations cmol (+)/kg				ESP	Dispersion		Calcium carbonate Equiv. %
			Ca	Mg	Na	K		2 hrs	20 hrs	
0-10	150	7.5	6.4	0.8	0.1	0.4	1	0	0	<0.4
10-20	610	5.6	3.5	1.1	0.6	0.4	11	2	2	<0.4
20-50	2300	14	8.5	2.9	1.7	1	12	0	0	7.4
50-80	2800	14.6	9	3.2	1.5	1	10	0	0	23
80-110	2300	12.3	7.9	2.7	1	0.7	8	0	0	25
Critical / Ideal values	S: <120 L: <200 C: <300	15	75% of CEC	20% of CEC	<6% of CEC	5% of CEC	<6-15			

General Description: Shallow dark brown sandy loam over brown clay grading to highly calcareous light to medium clay.

Landform: Dunefield, flat, bare salt affected

Substrate: Molineaux sand over Bungunnia Limestone over ancient coastal sanddunes and old lake beds

Vegetation: Bare

Land use: grazing



Type Site: **Site No:** 1S
Hundred: Roby
Sampling date: 9 July 2021
watertable at 40cm

Easting: 0378555
Northing: 6080809
Annual rainfall: 410 mm

Soil Description

Depth (cm)	Horizon	Description
0-5	A1	Dark brown sandy loam with yellow and red mottling. 10-20% segregations, 6-20 mm in size.
5-25	B2	Strong brown very highly calcareous medium clay with gray mottling.
25-40	B21K	Light yellowish brown very highly calcareous coarse sandy light clay.
40-65	B22K	Very pale brown very highly calcareous light clay with yellow mottling.
65-95	2B21	Very pale brown highly calcareous medium clay with yellow and red mottling. 10-20% nodules, >60 mm in size.
95-110	2B22	Very pale brown highly calcareous medium clay with yellow and red mottling. 10-20% nodules, >60 mm in size.



Summary of Properties

Drainage: imperfectly drained, soil may remain wet for several weeks

Fertility: moderate fertility as indicated by CEC, regular P required, although very high at this site now.
Surface levels of many nutrients are high linked to salinity issue

pH: alkaline surface to strongly alkaline subsoil

Rooting depth: 40 cm to water table although highly saline at surface

Barriers to root growth

Physical: medium clay would provide some restriction

Chemical: surface salinity EC 49 dS/m which allows only extremely salt tolerant plants or mostly bare ground, B at toxic levels

Water holding capacity: n/a

Seedling emergence: fine provided salinity overcome

Workability: satisfactory although underlying clay quite shallow

Erosion potential

Water: low

Wind: low

Laboratory Data

Depth (cm)	pH H ₂ O	pH CaCl ₂	NO ₃ mg/kg	EC 1:5 dS/m	EC _e	OC %	PBI	Colwell		Boron mg/kg	SO ₄ -S mg/kg	Trace Elements mg/kg (DPTA)			
								Avail. P mg/kg	Avail. K mg/kg			Cu	Zn	Fe	Mn
0-5	8.85	8.56	28	4.1	49	1.02	108	140	520	41	710	1.3	2.6	19	2.4
5-25	9.12	8.64	24	3.3	26	0.34	96	50	720	23	190	0.57	0.42	17	0.6
25-40	9.38	8.62	11	2	16	0.27	165	10	540	13	160	0.51	0.19	7.9	0.4
40-65	9.39	8.61	7.7	1.8	14	0.22	127	<5	520	11	150	0.45	0.5	8.6	0.6
65-95	9.34	8.52	6.2	1.7	14	0.22	112	<5	540	13	150	0.41	1.1	11	2.1
95-110	9.37	8.43	4.9	1.5	12	0.19	118	<5	590	12	150	0.42	1.3	12	5.1
Critical / Ideal values	6-8	5-7	-	<0.7	<4	S: 0.5-1.0 SL: 0.7-1.4 L: 0.9-1.8 CLC: 1.2-2.0	20-120	25-30	100	<15	>6-8	0.3	0.5		1

Depth (cm)	Cl mg/kg	Sum cations cmol (+)/kg	Exchangeable cations cmol (+)/kg				ESP	Dispersion		Calcium carbonate Equiv %
			Ca	Mg	Na	K		2 hrs	20 hrs	
0-5	4900	13.4	6.72	4.68	0.92	1.07	7	0	1	1.5
5-25	4600	13.6	7.01	3.09	2.35	1.19	17	0	0	3.6
25-40	2500	18.4	10.4	4.56	2.09	1.37	11	0	1	27
40-65	2200	15.4	8.89	3.92	1.51	1.06	10	0	0	23
65-95	2000	14.7	8.27	3.78	1.59	1.05	11	0	0	25
95-110	1900	14.7	8.19	3.7	1.73	1.06	12	0	0	28
Critical / Ideal values	S: <120 L: <200 C: <300	15	75% of CEC	20% of CEC	<6% of CEC	5% of CEC	<6			

General Description: Thick brown loamy sand over sandy light clay over a laminar calcrete at depth.

Landform: Dune, low slope

Substrate: Molineaux sand over Bungunnia
Limestone over ancient coastal
sanddunes and old lake beds

Vegetation: Cereal stubble

Land use: Cropping

Site Details:	Site No: 2G	Easting: 0378580
	Hundred: Roby	Northing: 6080801
	Sampling date: 9 July 2021	Annual rainfall: 410 mm

Soil Description

Depth (cm)	Horizon	Description
0-12	A1	Brown slightly calcareous loamy sand.
12-30	A21	Brown loamy sand.
30-60	A22	Yellowish red sand.
60-110	B21	Yellowish red slightly calcareous sandy light clay. 10-20% calcareous segregations, 2-6 mm in size.
110-120	B22K	Calcareous lamination.

Summary of Properties

Drainage: well drained, soil rarely remains wet for more than a few days
Fertility: inherent fertility is low as indicated by low CEC. Regular P required and occasional trace elements.
pH: alkaline throughout
Rooting depth: 110cm, roots maybe restricted in red and brown sand layers due to compaction and low nutrients

Barriers to root growth

Physical: no major limitations laminar calcrete provides barrier to some roots at depth, possible hard pans at 20-50cm

Chemical: No toxicities in the surface although subsoil Cl and EC increasing at depth.

Water holding capacity: 127mm

Seedling emergence: satisfactory although can be water repellent

Workability: loose surface easy to work

Erosion potential

Water: low

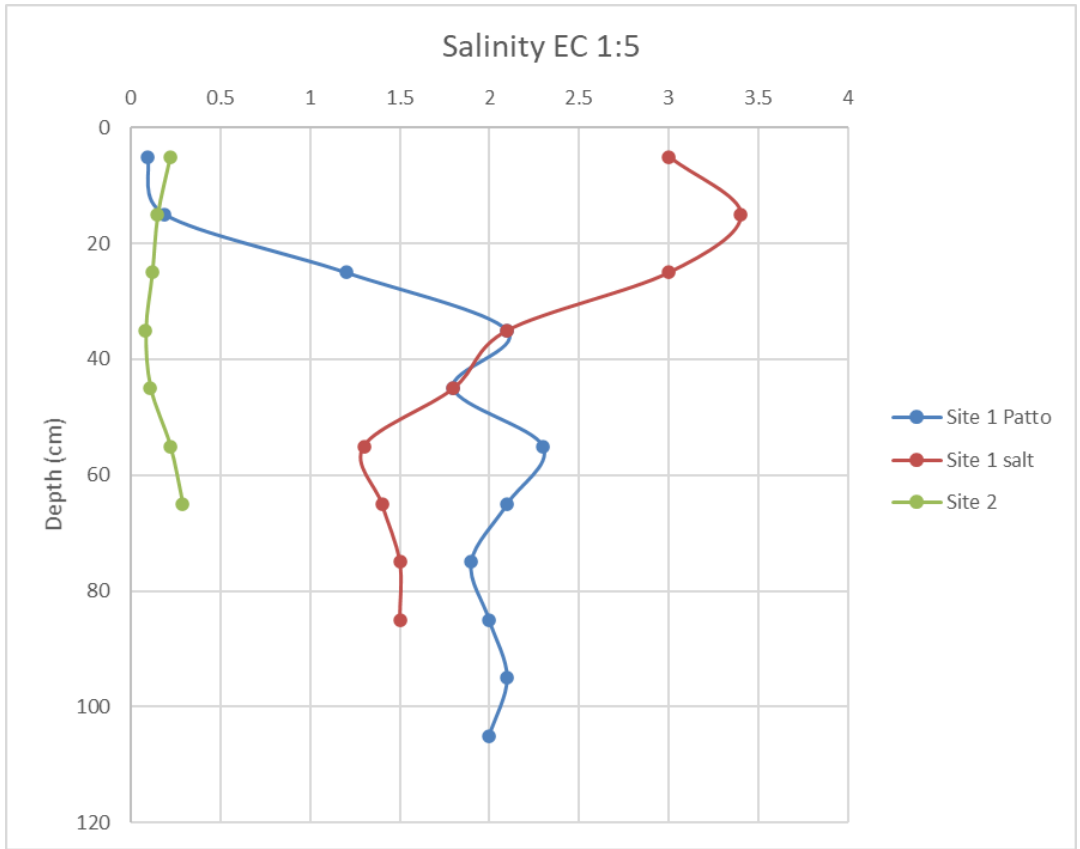
Wind: moderately low to moderate

Laboratory Data

Depth (cm)	pH H ₂ O	pH CaCl ₂	NO ₃ mg/kg	EC 1:5 dS/m	ECe	OC %	PBI	Colwell		Boron mg/kg	SO ₄ -S mg/kg	Trace Elements mg/kg (DPTA)			
								Avail. P mg/kg	Avail. K mg/kg			Cu	Zn	Fe	Mn
0-12	8.08	7.48	7.7	0.21	3	1.16	18	21	200	0.81	8.9	0.36	3.4	18	1.7
12-30	8.01	7.52	2.4	0.14	2	0.6	22	17	160	0.59	5.7	0.2	0.94	12	0.8
30-60	8.51	7.93	1.2	0.13	2	0.21	21	8	150	0.78	6.8	0.09	0.19	7.4	0.5
60-110	8.59	8.01	3.2	0.36	3	0.25	99	<5	320	2.6	19	0.13	0.11	21	<0.3
110-120	8.69	8.14	1.4	0.68	4	0.34	155	<5	340	3.2	38	0.27	0.15	15	0.4
Critical / Ideal values	6-8	5-7	-	<0.7	<4	S: 0.5-1.0 SL: 0.7-1.4 L: 0.9-1.8 CL/C: 1.2-2.0	20-120	25-30	100	<15	>6-8	0.3	0.5		1

Depth (cm)	Cl mg/kg	Sum cations cmol (+)/kg	Exchangeable cations cmol (+)/kg				ESP	Dispersion		Calcium carbonate Equiv %
			Ca	Mg	Na	K		2 hrs	20 hrs	
0-12	57	7.3	6.35	0.68	0.00	0.30	0	0	0	1
12-30	24	6.8	5.84	0.66	0.00	0.28	0	0	0	0.5
30-60	42	5.0	4.09	0.65	0.00	0.26	0	2	2	0.4
60-110	250	16.8	12.3	3.26	0.40	0.85	2	2	2	4.6
110-120	600	20.4	14.6	4.07	0.64	1.04	3	0	0	34
Critical / Ideal values	S: <120 L: <200 C: <300	15	75% of CEC	20% of CEC	<6% of CEC	5% of CEC	<6			

10cm increment salinity profiles EC 1:5



10cm increment salinity profiles ECE converted

